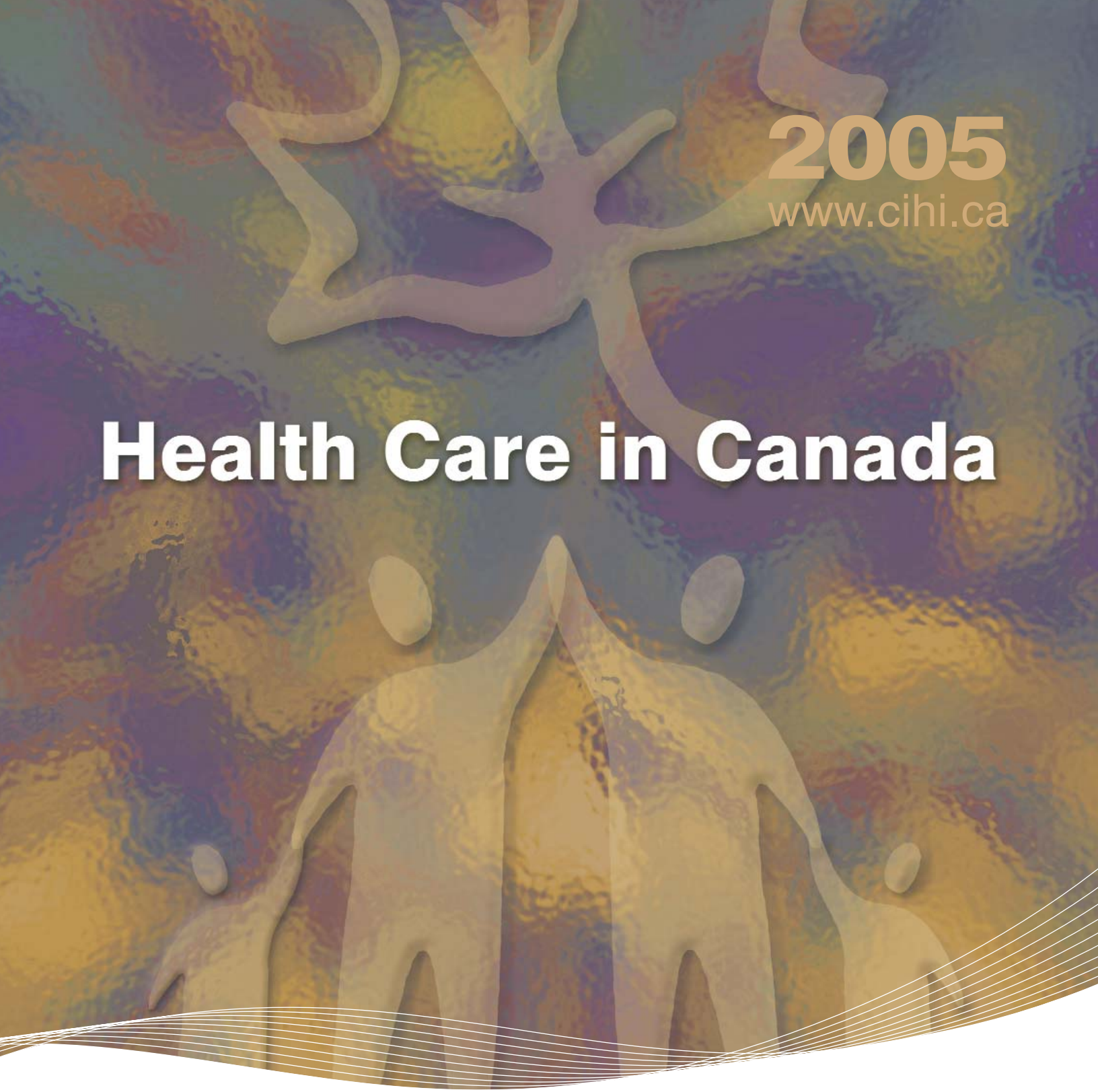

2005

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Health Care in Canada

Statistics Canada
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About the Canadian Institute for Health Information

The Canadian Institute for Health Information (CIHI) is an independent, pan-Canadian, not-for-profit organization working to improve the health of Canadians and the health care system by providing quality health information. CIHI's mandate, as established by Canada's health ministers, is to coordinate the development and maintenance of a common approach to health information for Canada. To this end, CIHI is responsible for providing accurate and timely information that is needed to establish sound health policies, manage the Canadian health system effectively, and create public awareness of factors affecting good health.

For more information, visit our Web site, at www.cihi.ca.

As of April 1, 2005, the following individuals are members of CIHI's Board of Directors:

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About Statistics Canada

Statistics Canada is authorized under the *Statistics Act* to collect, compile, analyze, abstract, and publish statistics related to the health and well-being of Canadians. The Health Statistics Division's primary objective is to provide statistical information and analyses about the health of the population, determinants of health, and the scope and utilization of Canada's health care sector.

Acknowledgements

The Canadian Institute for Health Information (CIHI) would like to acknowledge and thank the many individuals and organizations that have contributed to the development of this report.

We would like to express our appreciation to the members of our reference panel who reviewed *A Focused Look at Care Volumes and Outcomes*. In particular, we extend our thanks to Dr. David Urbach for his invaluable assistance in helping us develop our methodologies and interpret the results of our research.

Members of the reference panel included:

- **Dr. John Birkmeyer**, George D. Zuidema Professor of Surgery, University of Michigan
- **Dr. Bernard Langer**, Senior Consultant in Surgery, Cancer Care Ontario
- **Mr. John Malcom**, Chief Executive Officer, Cape Breton District Health Authority
- **Dr. Thérèse Stukel**, Vice-President, Research and Senior Scientist, Institute for Clinical Evaluative Sciences
- **Dr. David Urbach**, Assistant Professor, Departments of Surgery and Health Policy, Management and Evaluation, University of Toronto
- **Dr. John Wade**, Board Chair, Canadian Patient Safety Institute

We would also like to acknowledge the contribution of our expert editorial board for reviewing *A Look Inside Canada's Health System*. Members included:

- **Dr. Victor Dirnfeld**, Past President, Canadian Medical Association and Past Chair, Medical Advisory Council, Vancouver Coastal Health Authority
- **Mr. Jonathan Lomas**, Chief Executive Officer, Canadian Health Services Research Foundation
- **Mr. John Malcom**, Chief Executive Officer, Cape Breton District Health Authority
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- **Dr. Michael Wolfson**, Assistant Chief Statistician, Analysis and Development, Statistics Canada
- **Dr. Jennifer Zelmer** (ex officio), Vice President, Research and Analysis, Canadian Institute for Health Information

It should be noted that the analyses and conclusions in the report do not necessarily reflect those of the individuals listed or their affiliated organizations.

The editorial committee for the 2005 report included Jennifer Zelmer, Jack Bingham, Jacinth Tracey, Cheryl Gula, and Patricia Finlay. Health Reports staff who contributed to the report were Raghda AlAtia, Lynne Duncan, Sharon Gushue, Chad Gyorfi-Dyke, Thi Ho, Luciano Ieraci, Tina LeMay, Jenny Lineker, Maraki Merid, Mary Neill, Sarita Patel, and Anne Tenenbaum.

Health Indicators 2005 was developed by Zeerak Chaudhary, Kathy Nguyen, Joan Porter, Indra Pulcins, Sharon Relova, Carolyn Sandoval, Greg Webster, Eugene Wen, and Shamali Wickremaarachi.

Production of this report involves many people and many aspects of the CIHI organization. We want to thank all CIHI staff for their contribution to this report, including individuals from Publications, Translation, Communications, Clinical Administrative Databases, Classifications, Health Expenditures, Health Human Resources, Distribution Services, and Web.

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This report could not have been completed without the generous support and assistance of many other individuals and organizations. This includes representatives from the many health regions and the federal, provincial, and territorial ministries of health who compiled data, assisted with quality assurance, or otherwise supported the development of this report.

Executive Summary

Consistently identified as a top issue for Canadians, access to care is a priority from coast to coast. What matters most differs between regions of the country and over time—sometimes the focus is on wait times for hip replacements, sometimes finding a family doctor is a priority—but the underlying challenge is shared. Reflecting this reality, Canada's first ministers put timely access to quality care for all at the top of their agenda in the recent *Ten-Year Plan to Strengthen Health Care*.

The goal of *Health Care in Canada 2005* is to provide a window into today's $130 billion health system by highlighting what we know and don't know about access to care and other emerging issues. This year's report focuses on the relationship between surgical volumes and patient outcomes.

What the Research Says

Many studies across a variety of procedures, diseases, and health care settings have shown that patients treated in centres with higher numbers of cases are less likely to die after surgery. A new systematic review commissioned for this report—the largest ever conducted—found 161 journal articles on this topic published worldwide between 1979 and the spring of 2004. In more than two-thirds (68%) of the analyses, the greater the volume of procedures performed by a hospital or a physician, the better the outcomes. In a further 31%, the relationship between volumes and outcomes was either not statistically significant or was undetermined. Only a few analyses (1%) showed a significant association between higher volumes and poorer patient outcomes.

There are two theories often used to explain why higher volumes are associated with better outcomes. The first is that "practice makes perfect." That is, high volume centres may have more experienced teams and a broader range of resources. The second is that these hospitals and care providers have better outcomes because physicians tend to refer more patients to centres of excellence. This theory is known as "selective referral." Regardless of which theory is correct (or if both have some merit), much remains to be learned about the nature of the link between volumes and outcomes and the potential effects of consolidating care in centres of excellence.

New Findings for Canada

The bulk of existing volume-outcome research (about 80% of studies) comes from the United States. To further explore the relationship in Canada, we studied the risk of dying in hospital within 30 days of admission for nine different types of surgery. Our analyses covered more than 180,000 surgeries performed between 1998–1999 and 2003–2004 (excluding procedures in Quebec and parts of Manitoba). Adjusted mortality rates ranged from 0.2% to 5.9%.

The results confirm that hospitals that perform higher numbers of select procedures tend to have better outcomes for some types of surgery, but the nature and strength of the relationship varies. In three of the nine selected procedures, we found a steady drop in the risk of death with higher volumes, after taking patient characteristics and the year the procedure was performed into account. For example, for every 10 additional procedures performed in a hospital, the risk of mortality was 44% lower for esophagectomies (complete or partial surgical removal of the esophagus) and 46% lower for pancreatic cancer surgery. A smaller, but still statistically significant, effect was also seen for angioplasty (1% reduction). For the six other procedures, either no statistically significant relationship was observed, or a difference was seen only between hospitals performing the highest and lowest volumes of surgery.

Consolidating Care: Trade-Offs to Be Made?

Across the country, decisions are being made to concentrate care in centres of excellence—or not to—on a regular basis. For both relatively rare operations and more common procedures, there are large variations in the number of hospitals performing different types of surgery. Many hospitals conduct a very small number of procedures. A much smaller number of centres perform higher volumes of surgery. Cardiac surgery is among the most highly concentrated, reflecting decisions in many parts of the country to consolidate care within high-volume centres.

The issues involved in deciding how and when to consolidate care are clearly complex. The “right” balance likely varies from procedure to procedure and place to place. The potential travel burden for patients and families is just one of many factors that may weigh in the balance. A new survey of adults aged 20 and older across the country found that many respondents would prefer to have surgery at a hospital close to their home. But if forced to choose, quality was more important than closeness. Only 9% of those surveyed were primarily concerned with how close to home they received their care. More valued having a surgeon recommended by their family doctor (42%) or the number of similar procedures the surgeon had performed in the past (41%). However, less than half (38%) of those who actually had a procedure in the past two years said that they had been aware of the number of procedures that their surgeon had performed recently.

Monitoring Key Trends

Almost all Canadians receive some type of health services each year. Visiting a doctor and taking medication are the most common types of care. In 2003, 80% of teens and adults said that they had consulted a physician in the past year. About the same number (84%) reported having taken prescription or non-prescription medication.

In addition to the detailed analyses of this year's focus topic, *Health Care in Canada 2005* highlights broad trends related to these and other health services. Two chapters profile health expenditures. Findings include:

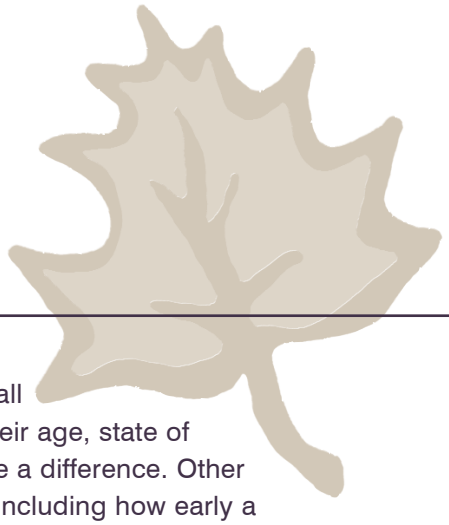
- Canada spent an estimated $130 billion on health care in 2004. That's approximately $4,078 per Canadian. The amount spent represents about 10% of Canada's gross domestic product, placing us fifth among OECD countries in 2002.
- Both public and private health expenditures are higher than in the past, but recent public-sector spending growth has outpaced that of the private sector.
- Hospitals, drugs, and physician services are the three largest categories of expenditures. In 2004, hospitals accounted for an estimated $39 billion—about 30% of all health care expenditures. Hospital spending has grown an average of 7% per year since 1975.
- Retail spending on prescribed drugs, over-the-counter medications, and personal health supplies has doubled since 1996. It reached an estimated $21.8 billon in 2004, about 17% of total health expenditures.
- There are about 59,000 physicians practising in Canada. Spending on physician services rose 4.8% between 2003 and 2004. Last year, it reached an estimated $16.8 billion or 13% of total health spending.

The report also looks at Canadians' views on health care. For example:

- Most Canadians give high marks to their care. A 2003 Statistics Canada survey found that 85% of Canadians were very or somewhat satisfied with the care they had received in the last year, about the same number as in 2000–2001.
- As in other countries, Canadians tend to give higher ratings to the care that they or their families receive than to the health care system in general. In 2004, only 1% to 3% of adults in Canada, Australia, New Zealand, the United Kingdom, and the U.S. said that their medical care in the past year was poor. More—13% to 33%—said that their health system needed to be completely rebuilt. About one in seven Canadians (14%) felt this way. This is down from 23% in 1998, but higher than the 1988 level of 5%.

In addition, *Health Indicators 2005* highlights how health, health care, and patient outcomes vary across the country. It offers comparative data on a range of health and health system indicators for health regions with a population of 75,000 or more and for provinces and territories, representing 95% of the Canadian population.

Introduction



The thousands of Canadians who are wheeled into operating rooms every year all hope for good outcomes from surgery. Their age, state of health, and even where they live can make a difference. Other factors may also contribute to outcomes, including how early a diagnosis is made, the skills and experience of the health care team, and the setting in which the surgery takes place.

In recent years, researchers in several countries have explored the relationship between surgical volume and patient outcomes. Many studies—across a variety of procedures, diseases, and health care settings—show improved clinical outcomes when patients are cared for by physicians or in hospitals performing a higher volume of procedures. The bulk of this research comes from the United States, but a few studies are from other countries. *Health Care in Canada 2005* provides new information on the relationship between volumes and outcomes of care in Canada.

Understanding this relationship, and what might be influencing it, is more than an academic question. There are practical implications for health policy and patient care that flow from this research and how results are interpreted. For example, policy-makers may consider the results as they weigh decisions about where different types of care should be provided. Individual Canadians also indicate that they want information that will inform their own choices. This report is a first step in responding to both sets of information needs.

About This Report

Since the *Health Care in Canada* report series was initiated in 2000, the aim of each report has been to further the understanding of specific health issues and to update data and analyses about topics of continuing relevance. For every report, produced in partnership with Statistics Canada, CIHI researchers bring together the most recent data available in Canada and, where appropriate, compare them to international results. Each report also includes a companion *Health Indicators* document with data on a range of regional health indicators.

To ensure continuity, each report builds on previous information while highlighting recent local, regional, provincial, territorial, national, and international experience. The reports also reflect feedback from health professionals, health researchers, policymakers, and individual Canadians. This input aids CIHI in identifying fresh issues for review.

This year's *Health Care in Canada* report is divided into two sections:

Part A: A Look Inside Canada's Health System summarizes recent developments in health and health care. It includes an overview of health spending and updated information on how Canadians view the health system and the services that they have received.

Part B: A Focus on Volumes and Outcomes: This section includes information on the distribution of select procedures across Canada and in-depth analyses of the relationship between hospital volumes and patient outcomes.

The report also includes a companion document entitled *Health Indicators 2005*. This reference offers comparative data on a range of health and health system indicators for health regions with populations of 75,000 or more—comprising more than 95% of Canada's total population—and for provinces and territories. Wherever the icon to the left appears beside the text, it indicates that related regional or provincial/territorial data can be found in *Health Indicators 2005*.

For More Information

Highlights and the full text of *Health Care in Canada 2005* are available free of charge in both official languages on the CIHI Web site (at www.cihi.ca). To order additional copies of the report (a nominal charge will apply to cover printing, shipping, and handling costs), please contact:

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The companion report series *Improving the Health of Canadians 2005–2006* and the companion report *How Healthy Are Canadians, 2005?* will also be available through the Web after their release.

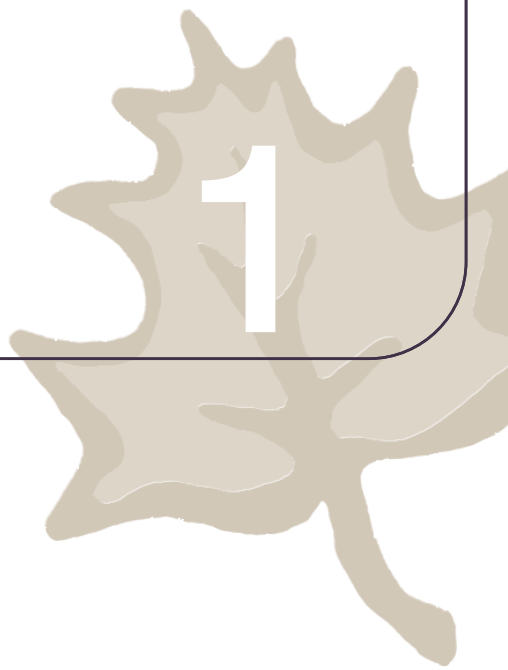
CIHI welcomes comments and suggestions about this report and about how to make future reports more useful and informative. We encourage you to use the feedback sheet, "It's Your Turn," provided at the end of this report. Comments may also be emailed to healthreports@cihi.ca.

There's More on the Web!

The print version of this report can be found at our Web site (www.cihi.ca). With the release of *Health Care in Canada 2005* and in the weeks following, CIHI will add more information to the site. For example, it will be possible to:

- **Download free copies of the report and its accompanying technical report, as well as *Health Indicators 2005*, in English or French.**
- **Find the report highlights in an easy-to-read executive summary.**
- **Sign up to receive regular updates on CIHI's upcoming reports via email.**
- **View a presentation of the report's highlights.**
- **Look at previous annual reports; related reports, such as the *Giving Birth in Canada* report series and *Medical Imaging in Canada*; CIHI's regular series of reports on aspects of health spending, health human resources, health services, and population health; and reports from Statistics Canada.**
- **Learn about upcoming reports, such as CIHI's report on the funding of health services in Canada.**

A Year in the Life of Canada's Health Care System



1 A Year in the Life of Canada's Health Care System

It's been an eventful year since our last report. Over the past 12 months, we learned that deadly bacteria are active in hospitals; that some much-used prescription drugs were being taken off the market; that drug expenditures continued to soar upward; and that some experts predict a coming flu pandemic on the scale of the plague that killed a third of the population of Europe during the Middle Ages. Patient safety, financial sustainability, and the readiness of our health system to confront large-scale public health crises were just a few of 2004's high-profile issues in Canada and around the world. Many other events also figured large. The full impact of some of them—such as changes to regional health authority responsibilities and geography in several provinces, efforts to renew primary health care, the establishment of a new public health care agency, and agreements to reduce wait times—will emerge with time.

Spending: Slower Growth . . . New Money on the Horizon

In 2004, Canada spent an estimated 5% more per person on health care than in the previous year. At 1% over inflation, that is the lowest rate of increase since 1997. Drug costs alone rose 8.8%, accounting for one of every six dollars of health spending.[1] Some said that was too much. For example, Auditor General Sheila Fraser issued a report critical of the amount the federal government spends on drugs, most of which falls under the non-insured health benefits program for First Nation and Inuit peoples and veterans' entitlements.[2] She suggested that the federal government make better use of cost-management strategies used by some provinces, such as reference-based pricing. The report also cited the failure to coordinate drug benefits across the country as a missed opportunity to control costs.

While we are spending more on drugs and other health services, there is also more money on the way. For example, federal/provincial first ministers signed off on a 10-year plan in the fall of 2004 that provides for the disbursal of $41.3 billion over 10 years, most of it through the Canada Health Transfer.[3] The plan identified several shared priority areas, including access (that is, reduced wait times and increased availability of health care professionals), pharmacare, home care, and primary health care.

A Year in the Life of CIHI

The year 2004 was an exciting one for CIHI. Here are just a few highlights:

- **We celebrated our 10th anniversary.**
- **We recruited Graham W. S. Scott as the new Chair of our Board of Directors.**
- **We hired Glenda Yeates as our new President and CEO.**
- **We opened the doors of the new Western Office in Victoria, British Columbia.**
- **We signed a new agreement with Quebec.**
- ***Maclean's* magazine profiled us as one of Canada's top 100 employers, based on analysis by Mediacorp Canada Inc.**

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In part, the new funds may pay for activities in these priority areas. For example, the 2003 Health Accord included a commitment to catastrophic drug coverage in all jurisdictions, which the 2004 plan restates. The issue of drug coverage may be more pressing in some provinces than others. A University of British Columbia study found that those currently at risk of paying more than 4.5% of household income on drugs are concentrated in Quebec, New Brunswick, Nova Scotia, and Newfoundland and Labrador.[4]

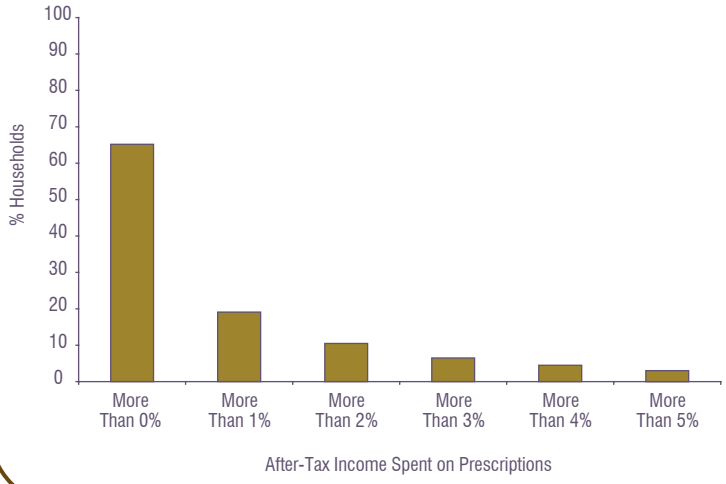
A Snapshot on Infectious Disease

Developments in science and the effective implementation of public health measures have almost eradicated some diseases, but potentially threatening microbes still exist and continue to evolve. Outbreaks of *Clostridium difficile*, a bacterium causing severe and sometimes fatal diarrhea, offer a dramatic example. In 2003 and 2004, outbreaks were reported in hospitals in several parts of Canada, including Montréal, Calgary, and most recently, Toronto. Between April 2003 and March 2004, Quebec reported 7,004 cases and 1,270 deaths.[5] By November 2004, the bacteria had been identified as a contributing factor in an additional 109 deaths.[6] In response, Quebec's health minister announced $20 million in new funding to fight *C. difficile*.[7] The Public Health Agency of Canada also announced it would begin tracking infections in 25 teaching hospitals across the country.[5] For its part, Manitoba decided to begin mandatory reporting of the infection.[5, 8]

Because of the large number of deaths from *C. difficile* during 2004, some experts concluded that the bacterium had evolved into a so-called "superbug." This popularized description is widely misunderstood to mean that the bacteria are resistant to *all* antibiotics. In actuality, it describes bacteria that have become resistant to certain antibiotic treatments; others typically remain effective.[9]

1 Household Spending on Prescriptions

Many Canadians take prescription drugs. Depending on their public and private insurance coverage, they may pay out of pocket for part or all of the cost of these medicines. Across the country, the amount of after-tax income spent on prescriptions varies.

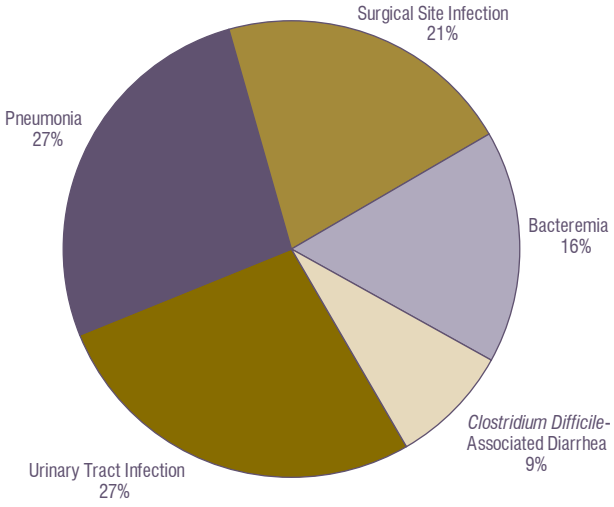


View Data

Source: 2002 Survey of Household Spending, Statistics Canada.

2 Common Hospital-Acquired Infections

In 2002, researchers conducted a point prevalence survey of hospital-acquired infections among 6,745 patients in 29 acute care hospitals across nine provinces. Preliminary results from the study estimated that one in nine adults contracts a nosocomial (that is, a hospital-acquired) infection while staying in an acute care hospital. Five types of infections were studied, as shown below.



Notes: Hospitals from Prince Edward Island and the territories are not represented. Patients from long-term care and rehabilitation wards, psychiatric wards, maternity and well-baby nurseries, and day or overnight surgeries were also not included.

Source: Unpublished data from D. Gravel, the Point Prevalence Working Group, the Canadian Nosocomial Infection Surveillance System, the Canadian Hospital Epidemiology Committee, *Point Prevalence Survey of Nosocomial Infections Within Selected Canadian Health Care Institutions*, 2004.

C. difficile is just one example of the range of infectious disease challenges that have confronted our public health system in recent years. The 2003 SARS outbreak, following closely on the heels of water-borne disease outbreaks in Walkerton and North Battleford, put public health in the spotlight. Following the recommendation of the Ontario-commissioned Naylor Report on SARS, the Ontario government announced a plan to create the new Health Protection and Promotion Agency in early 2005.[10] Also in response to the Naylor report, the federal government established the Public Health Agency of Canada. Headquartered in Winnipeg, it has five regional centres of expertise, three directorates, and two laboratories distributed across the country.[11] Dr. David Butler-Jones, a former Chief Medical Officer for Saskatchewan, was appointed the first Chief Public Health Officer for Canada.

One of the first issues to confront the new agency was the shortage of flu vaccine supplies in the United States. When some Americans looked north for help, a debate flared over ensuring adequate supplies to protect the Canadian population. In response, the government assured Canadians that only surplus supplies would be sold to other countries.

For this and other reasons, various strains of the virus we call "flu" were a big story in 2004. Over the course of the 2004–2005 flu season, there were close to 11,000 confirmed cases in Canada.[12] As of March 2005, infections were widespread in Ontario and one region in Alberta, with local or sporadic outbreaks in Quebec, Manitoba, and Newfoundland and Labrador. The rest of the country reported either sporadic or no activity.[12]

Likewise, in Asia there were outbreaks of avian flu (or so-called "bird flu"). In January 2004, the World Health Organization (WHO) reported that the virus had spread to humans.[13] By the end of September 2004, the WHO also reported the first instances of probable human-to-human transmission.[14] By mid-March, the confirmed number of human cases was 69, with 46 deaths—a fatality rate of about 67%.[15] The virus was also detected in poultry flocks in British Columbia, several of which were destroyed in an attempt to wipe it out.[16]

The concern around bird flu stems from speculation that the devastating Spanish flu pandemic of 1918–1919, responsible for as many as 50 million deaths, was a variant of this kind of virus. Many experts, including those at the WHO, believe that a new pandemic of this (or some other virus) is inevitable and could result in millions of deaths.[17] Other experts argue that these estimates are too low. Scientists are working as quickly as possible to produce an avian flu vaccine, with delivery anticipated for 2005.

In Canada, precautions are already being taken to ensure we are ready for such an event. The *Canadian Pandemic Influenza Plan* was developed by federal, provincial, territorial, local, and regional governments, in cooperation with non-government stakeholders. The plan—updated annually—sets out a framework for prevention, preparedness, response and implementation, and after-care. An agreement between ministries of health made in March 2001 specifies the various roles and responsibilities of different levels of government in pandemic planning and response.[16]

Policy and Law

Last fall, live coverage of first ministers' meetings pre-empted regular programming on some TV stations for several days. The meetings culminated in a ceremony with first ministers signing a new 10-year health plan. The plan promised first-dollar coverage for two weeks of home care for post-hospital, acute community mental health, and palliative care patients. It targeted wait time reductions in five key areas—cancer, cardiac, diagnostic imaging, joint replacements, and sight restoration—by March 2007. The provinces and territories agreed to establish comparable indicators and benchmarks by December 2005. The plan reaffirmed previous commitments to improve information technology and to ensure that 50% of Canadians have access to primary health care multidisciplinary teams by 2011. As well, there are plans for a national pharmaceutical strategy that includes catastrophic drug coverage, improved prescribing, an improved drug approval process, and a common national drug formulary.[3] The plan also created a special fund to improve Aboriginal health and added new money to territorial health budgets. There are separate reporting provisions for Quebec, and the agreement recognizes that Quebec will continue to run its own pharmacare program.

Several provinces introduced various new polices related to funding (for example, Ontario's new health care premium) and the administrative organization of health services delivery. Newfoundland and Labrador became the latest province to change its regional structures, replacing 14 health and community service boards with four Regional Integrated Health Authorities. Previously, there were separate boards for institutional and community services. The new boards (whose mandates may be the broadest in Canada) will be responsible for a wide range of services, including medical clinics, health promotion and prevention, youth and family services, community corrections, public health, cancer care, mental health, hospitals and residential care programs, and health care premiums.

The Health Council's First Report

The Health Council of Canada released its first report in January 2005—*Health Care Renewal in Canada: Accelerating Change*. In it, the Council focused on the following three themes—the health of canadians: healthy living, Aboriginal health, and patient safety; access to health care services: primary health care, home care, pharmaceuticals management, and wait times; and infrastructure to support health care renewal: people, information technology, funding, and public information/comparable health indicators.[i]

Key messages from the Council's report include:

- **The health care system is headed in the right direction. Progress is being made.**
- **The Council urges governments and health care providers to accelerate the pace.**
- **Sufficient funds are in place to advance health care renewal in Canada significantly.**
- **Renewal can be stepped up by focusing on the management of health human resources and targeting education and training to meet the needs of renewal, introducing multi-disciplinary teams as the basis of primary health care reform, and increasing the use of information technology.**
- **As well, more attention has to be given to effective investments in other social programs and to reducing the gaps in health status.**
- **Focusing on the strategic needs mentioned above will lead to better access to services and a reduction in health disparities—and ultimately, will improve the health of Canadians.**
- **The Council will engage Canadians on the directions for health care renewal, guided in the belief that all efforts and resources should be geared to achieving and maintaining sustainability, accessibility, affordability, and quality in our health care system.**
- **The Council will work with governments, health care providers, and Canadians to push for accelerated change.**

For the full report, visit the Health Council Web site, at www.healthcouncilcanada.ca.

i Alberta and Quebec are not members of the Health Council of Canada.

In the fall of 2004, Ontario—the only province so far not to regionalize its health care system—announced the establishment of 14 Local Health Integration Networks (LHINs). According to the Ontario Ministry of Health and Long-Term Care, the purpose of LHINs is "to plan, co-ordinate, and fund the delivery of health care services in direct response to the distinctive health care needs of an area." They will not replace existing boards in programs and facilities or directly provide services themselves. This administration model became official in April 2005.[19] At about the same time, Prince Edward Island moved in the opposite direction, returning regional health authority functions to the provincial department of health.

Other provinces also restructured the administration of their health systems. In December 2003, for example, Quebec adopted a law laying out a plan to create a new organizational structure in each of the province's 18 health regions by providing multidisciplinary care through local integrated networks. In June 2004, 95 networks were created in the province. The aim of this new structure was to increase accessibility and continuity of care, and to improve coordination. At the heart of these new networks are centres for health and social services, called "Centres de santé et de services sociaux."[20]

Regionalization of Health Care

3

In the late 1980s and 1990s, most provinces and territories across Canada regionalized the delivery of health care. In some cases, further restructuring has recently taken place.

Province	Regional Structure	Established	Governance Model
N.L.	4 Regional Integrated Health Authorities	1994; restructured 2003–2004; 2005	Appointed
P.E.I.	Not regionalized	1993–1994; restructured 2003; abolished 2005	Elected/appointed
N.S.	9 District Health Authorities	1996; restructured 2001	Appointed
N.B.	8 RHAs	1993–1994; restructured 2002	Elected/appointed
Que.	18 Agences de développement de réseaux locaux de services de santé et de services sociaux	1989–1992; restructured 2003; ongoing 2005	Appointed
Ont.	14 Local Health Integration Networks	DHCs in 1973; LHINs in 2005	Proposed that they be appointed
Man.	11 RHAs; each RHA includes District Health Advisory Councils	1997–1998; restructured 2002	Appointed
Sask.	13 RHAs; each RHA includes Community Advisory Networks	1992; restructured 2001–2002	Appointed
Alta.	9 RHAs; each RHA includes Community Health Councils	1994; restructured 2003	Appointed
B.C.	5 RHAs and 1 PHSA	1997; restructured 2001	Appointed
Nun.	Not regionalized		
N.W.T.	8 Health and Social Services Authorities: 5 are regional boards, 2 are community boards, and 1 serves the entire territory.	1997–1998; restructured 2002	Appointed
Y.T.	Not regionalized		

Source: Canadian Centre for the Analysis of Regionalization and Health.

On the legal front, the Supreme Court of Canada (SCOC) faced two decisions with important implications for health policy. In the Auton case, the parents of autistic children in British Columbia argued that the failure of the government to fund intensive (and expensive) behavioural therapy violated the *Canadian Charter of Rights and Freedoms*. In its unanimous decision, the SCOC disagreed, and rejected the British Columbia Supreme Court's earlier judgement expanding the definition of "medically necessary" beyond the services enumerated in the *Canada Health Act*. The SCOC ruling was interpreted by some as a strong message that governments, not courts, should determine how resources are allocated.

The Chaoulli case in Quebec challenged the *Canada Health Act* prohibition against the use of private health insurance for payment of medical and hospital services. Dr. Jacques Chaoulli had a patient who had waited a year in considerable pain for a hip replacement. In his challenge, Dr. Chaoulli held that when the public system can no longer provide "reasonable" access to service, this prohibition violates the Charter right to security of the person. He further argued that doctors who have opted out of medicare (which is legal) should have the same access to hospitals to treat their private-paying patients as other doctors. The Quebec courts acknowledged that the patient's rights to security of the person were indeed violated, but that the violation was defensible because of an overriding public interest. At the time this report was published, the SCOC had not handed down its decision on this case.

Health Human Resources

Recruiting and retaining the right mix of care providers is an ongoing issue for Canada, as well as for other countries. In particular, how to ensure access to family physicians now and in the future continued to engage the attention of policy-makers in 2004.

They were responding in part to new research that suggests that the care that family physicians provide is changing. Younger physicians are seeing fewer patients than their same-aged peers did 10 years earlier.[21] In addition, 14% of family doctors said in 2004 that they planned to reduce their scope of practice in the next two years, while only 5% planned to expand it. One-quarter planned to work fewer hours, while just under 4% planned to work longer.[22] Today's doctors also tend to provide a different mix of services than in the past. Compared to 1992, in 2001 fewer family doctors were performing surgery, delivering babies, and providing care to patients in hospitals. More were doing mental health counselling in their offices.[23]

That said, the number of Canadians who reported having a regular family doctor remained stable at about 86% between 1994 and 2003. Why don't some Canadians have a regular family doctor? Some said that they did not have one because they did not look for one (9%); others reported that they could not find one (5%).[24]

Some provinces have launched new initiatives specifically aimed at increasing the number of graduates in family medicine. In March 2005, for example, the Ontario government announced that $10 million would be used to create 141 family doctor residency positions at medical schools in the province, forecasting it will result in 337 more family doctors ready to take on patients by 2008.[25] Other provinces are also working to address this issue. For instance, in 2004 the University of British Columbia announced it was expanding the enrolment of first-year medical students from 128 to 256 by 2010. In 2004, it almost doubled enrolment by opening up 72 spots, bringing its total to 200.[26]

It's not just the availability of doctors that is causing concern, but also of nurses. Researchers estimate that by 2006, 13% of registered nurses (RNs) working in 2001 will have left the workforce due to retirement and death.[27] But that assumes a retirement age of 65, later than many nurses currently leave the workforce. If RNs retired at 55, 28% of the RN workforce would be lost by 2006. Many initiatives are underway across the country to recruit and retain nurses to help offset this loss, including increased enrolment in degree programs across the country as diploma programs are being phased out. Nine university schools of nursing have accelerated programs that allow students to complete the Bachelor of Science in Nursing (BScN) in either two (five schools) or three (four schools) years.

This change is in reaction to the steady upward trend in the level of credentials needed for entry, from diploma to degree requirements (as in nursing, for example), and from undergraduate to graduate degrees. Professional credentials are critical in ensuring and demonstrating that providers have been adequately trained, and the credentials need to reflect the skills required to practise effectively. However, increased entry requirements lengthen time spent in training, which can affect supply and may drive wages upward. Historically, there has been no systematic method for assessing proposals for increased credentials, and provinces and territories typically made decisions on a case-by-case basis. The federal/provincial/territorial Conference of Deputy Ministers recently established the Entry to Practice Working Group to recommend an approach to processing proposals and criteria for assessing their merits.

Shining a Spotlight on Patient Safety

The biggest news on drugs in 2004 was not the unveiling of a miraculous new therapy, but the waning of an old one. Vioxx (rofecoxib), a Cox-2 (cyclo-oxygenase-2) inhibitor, is one of a class of non-steroidal anti-inflammatory drugs (NSAIDs) that alleviate joint pain. It was approved for sale in the U.S. in May 1999. Its manufacturer, Merck, made $2.5 billion (U.S.) in worldwide sales in 2003.[28]

In 2004, the results of several research studies, one of them Canadian, received a great deal of attention. They showed that patients on Vioxx had a higher risk of heart problems.[29] One large-scale prospective, randomized, placebo-controlled trial—the APPROVe study—was stopped early because of data showing that patients taking the drug had twice the risk of heart attack or stroke compared to those not taking it. Data showed that 25 patients taking a placebo had suffered a cardiovascular side effect, compared to 45 taking the drug—a relative risk[ii] of 1.8.[28] Merck voluntarily withdrew the drug on September 30, 2004. Stories subsequently appeared in the media claiming that Merck had withheld information about the risks. Lawsuits ensued (700 by January 2005).[30]

ii Relative risk is a measure of the strength of an association. The greater the relative risk, the stronger the association. A relative risk of 1.8 means those taking the drug were 1.8 times more likely to develop cardiovascular side effects.

In December 2004, the Food and Drug Administration (FDA) announced that a clinical trial of a similar drug, Celebrex (celecoxib), developed by Pfizer, had been stopped. The trial, a joint effort of the National Cancer Institute in the U.S. and Pfizer, had shown that Celebrex could more than triple the risk of cardiovascular problems. However, Celebrex has remained on the market.[31] In February 2005, a safety committee convened by the U.S. FDA held three days of hearings on the safety of the drugs Celebrex, Bextra (valdecoxib), and Vioxx. In April 2005, Pfizer voluntarily discontinued sales of Bextra, and Health Canada recommended new usage restrictions on Celebrex.[35]

Perhaps even more significantly, the controversy focused attention on the effectiveness of Health Canada and the U.S. FDA in protecting public safety.[36] Concerned observers strongly advocated reforms to the drug approval process, including the registration and disclosure of enrolment for all clinical trials.[37]

Even drugs whose medical uses have been established can be harmful if administered improperly. Two Alberta health regions were rocked by patient safety concerns in 2004 after three deaths resulting from the administration of the wrong medications. In Calgary, two patients died because they received an intravenous solution of potassium chloride instead of sodium chloride.[38] The region ordered both compounds from the same supplier, and the packaging was similar. In Red Deer, a man was given the wrong dose of a painkiller. Although hospital officials caught the error after he was discharged from the emergency department and notified the family, he died. Once again, a contributing factor was confusion related to similar packaging of drugs. In both cases, the facilities publicly reported the errors, as well as steps they would take to prevent such events in the future.

In these regions, as well as others, there is increasing focus on identifying and addressing the root cause of errors so as to reduce risk for future patients. That's also a focus for the new Canadian Patient Safety Institute. Headquartered in Edmonton, it joins a number of provincial organizations and initiatives that seek to improve the quality of care.

Taking Canadians' Pulse on Patient Safety

The Cox-2 controversy, emerging research, high-profile medication errors, and the spread of *C. difficile* in health care institutions have kept patient safety in the headlines over the past year. Individually, about one in four Canadian adults say that they or a member of their family have experienced a preventable adverse event. That translates to about 5.2 million people across the country. The majority (52% in 2004) report that the most recent event resulted in serious health consequences.

Inspired by similar studies in the U.S., Australia, and elsewhere, the largest-ever study of adverse events in Canada was released in 2004. It estimated that between 9,250 and 23,750 medical and surgical patients with overnight hospital stays in 2000–2001 experienced a preventable adverse event and later died.[32] A new survey suggests that this number is much higher than most Canadians believe. Only 7% of adults surveyed[iii] in 2003–2004 thought that 10,000 or more Canadians die in hospital each year from preventable adverse events.[33] Likewise, most respondents to a 2000 survey in the U.S. believed that fewer in-hospital deaths due to preventable errors occurred than estimated by authors of a landmark study by the Institute of Medicine.[34]

Further, the two surveys asked respondents about how often they thought mistakes that result in serious harm, such as death, disability, or additional or prolonged treatment, occur. Both surveys used the same definitions, but different terms. In Canada, these situations were called "adverse events"; the U.S. survey called them "medical errors." Canadians were more likely to say that they did not know the answer to this question (43% vs. 6%); 26% of Canadians and 49% of Americans said that adverse events or medical errors happen somewhat or very often.

What's Next?

While we can't predict the future, the first few months of the year suggest that 2005 will be at least as newsworthy as the year just past. Unforeseen events can have unexpected impacts on the best-laid plans—but good information can help us to navigate turbulent waters. This report is a part of the process of bringing information together and making it available to all those interested in where we are and where we might be going.

We look forward to looking back on another year.

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Part A: A Look Inside Canada's Health System

Based on more than 1.2 million votes from across the country, CBC recently declared Tommy Douglas, widely known as the "father of Medicare," the greatest Canadian of all time. This choice demonstrates the importance that Canadians place on health care.

One of the goals of the *Health Care in Canada* report series is to provide a window into what is happening within today's $130 billion health system. It highlights events from the past year—both good and bad. It also profiles ongoing trends, new directions, and emerging issues.

The three chapters in Part A of this year's report take an in-depth look at our health system, its resources, and what we, as Canadians, think about our care. Chapter 2 describes our health system's resources, the contribution from the public and private sectors, and how health spending varies across Canada. Chapter 3 profiles where we spend these health dollars, with a particular focus on the three main areas of expenditure—hospitals, retail drugs, and physician services. Finally, Chapter 4 provides a look at what we think about the care we receive.

2

Financial Resources

2 Financial Resources

From early in Canada's history, the financing, management, and development of health services have been woven into the fabric of Canadian life. As long ago as 1655, the Hôtel-Dieu de Montréal hospital began a medical plan under which physicians would dress wounds and prescribe treatment for a small annual fee. Twenty-six families subscribed to what became the first health care service in North America.[1]

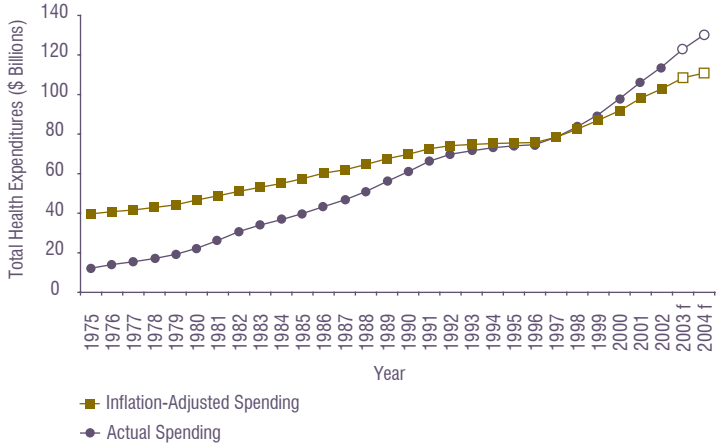
Canada's health system has long since evolved into a vital and complex segment of the economy. In 2004, Canada spent an estimated $130 billion on health care—about 10% of the economy, or gross domestic product (GDP). At $91.1 billion, or 70% of total health spending, the public sector remained the largest contributor to health care spending in 2004. However, private spending by individuals and insurance companies also played a significant role. It totalled an estimated $39.2 billion in 2004.

Our health dollars are used to purchase goods and services, provide capital investment for construction and renovation, administer public and private insurance plans and public health programs, and fund research. This chapter explores who spends what on health care and how this has changed over time.

4

Total Health Spending in Canada

Total public and private spending on health care continues to climb, even after adjustment for inflation.



Note: Data for 2003 and 2004 are forecasts.

View Data

Source: National Health Expenditure Database, CIHI.

Financial Resources: Spending on Health Care

A tenth of Canada's economic output goes to health care. GDP is the total market value of all goods and services produced in a country. Health care costs as a share of GDP rose sharply in the early 1980s, and then again in the early 1990s, when the economy stalled during two periods of recession. The economy began to recover in the 1990s, but growth in health spending slowed until 1997. This led to a decrease in health expenditure's share of the GDP. In recent years, however, this trend has reversed.

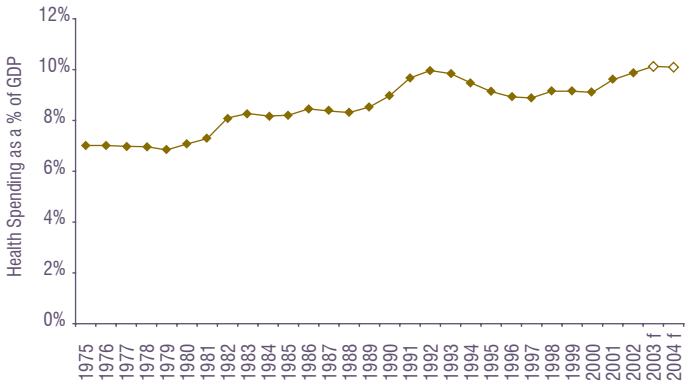
How does that compare with other countries that report health expenditures in a similar manner?[1] Spending patterns put Canada fifth among Organisation for Economic Co-operation and Development (OECD) countries in 2002. Only the United States, Switzerland, Germany, and France devoted a larger share of their GDP to health care.

Forecasts for 2004 show health spending in Canada at $4,078 per person, up 5% from 2003. Growth drivers include inflation, structural factors such as population growth, more use of existing and new services (for example, increases in the average number of prescriptions), changes in how services are organized and delivered, and a range of other factors, not all of which are fully understood.

Total per capita spending is currently highest in the territories, due partially to expenses related to serving small populations spread across large geographic areas. Among the provinces, Manitoba had the highest spending per person, at $4,406, followed by Alberta at $4,275, and Ontario at $4,274. The lowest forecast per capita expenditures were in Quebec ($3,667), New Brunswick ($3,865), and Prince Edward Island ($3,926). Demographic factors, such as age and gender, geography, differences in the delivery and coverage of services, the general health status of a population, and other factors, may contribute to different circumstances for each province.

5 Health Spending and the Economy

Health spending as a proportion of GDP increased significantly during the early 1980s and again in the early 1990s. It peaked at 10% of GDP in 1992, but then dropped until 1997. Since then, this proportion has been rising, passing the 10% mark in 2003 and 2004.



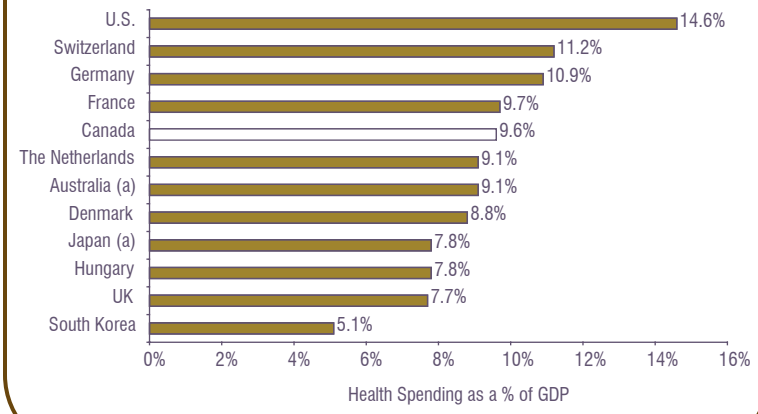
Note: Data for 2003 and 2004 are forecasts.

View Data

Source: National Health Expenditure Database, CIHI.

6 Canada Compared

In 2002, the U.S. had the highest health-spending-to-GDP ratio, at 14.6%, while South Korea had one of the lowest among OECD countries, at 5.1%. Canada was near the middle, at 9.6%.



Note: (a) Data are for 2001.

Source: Organisation for Economic Co-operation and Development, *OECD Health Data*, (CD-ROM), (OECD, 2004).

i The OECD (Organisation for Economic Co-operation and Development) has asked member countries to report health expenditures according to their system of health accounts. The 12 countries that most closely follow the proposed system of health accounts are Australia, Canada, Denmark, France, Germany, Hungary, Japan, South Korea, the Netherlands, Switzerland, the United Kingdom, and the U.S.

The Northern Expanse

The cost to transport one patient by emergency air service from Old Crow in the Yukon Territory to Vancouver was more than three times the average spent on health care per person across the country in 2003.[2] Transportation costs from remote areas are a unique challenge in the territories and remote parts of Canada.

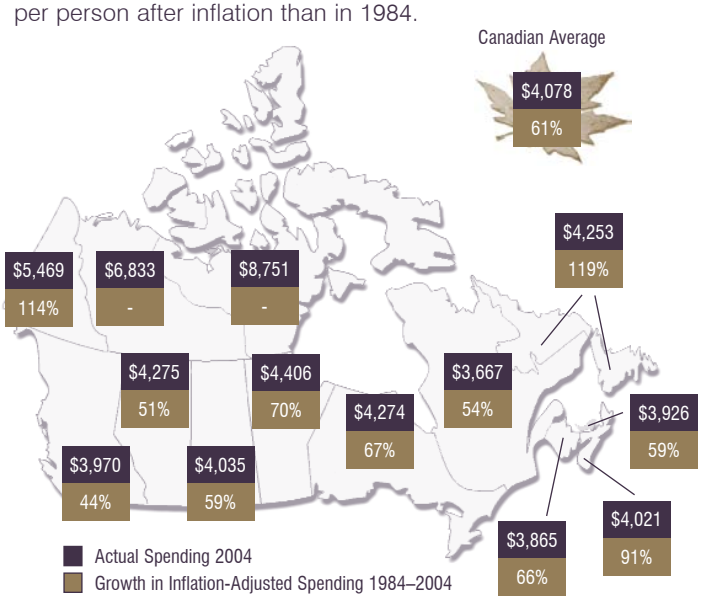
When a province or territory is sparsely populated (and some patients are therefore farther from health services), more health care dollars may be put towards transportation costs. For example, almost 13% of health care spending in the Northwest Territories goes toward medical transportation. That's significantly higher than the national average of less than 2%.

These figures partly (but not completely) explain why health care costs more in the territories. In total, per capita spending in Nunavut was $8,751 in 2004, more than twice the national average. Of the three territories, the Yukon had the lowest health care costs, at $5,469 per person; spending in the Northwest Territories was $6,833 per person.

Health Spending per Person up 40% or More Since 1984

7

Total per capita spending, adjusted for inflation-related price increases, has risen for all provinces and territories over the last two decades. In 2004, total health spending in all provinces and territories was forecast to have been at least 40% more per person after inflation than in 1984.



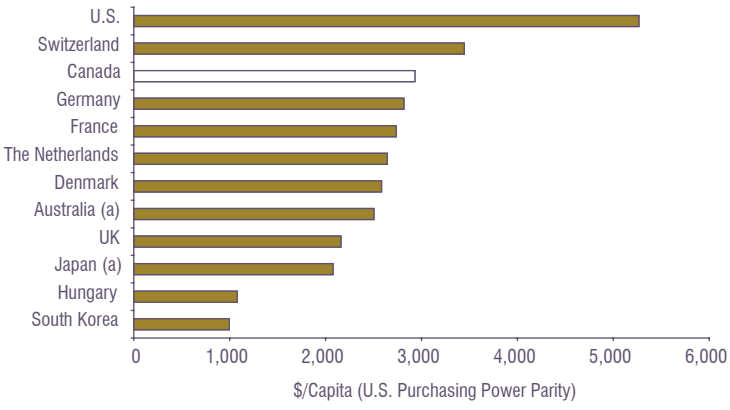
Note: Data for 2004 are forecast.

Source: National Health Expenditure Database, CIHI.

International Health Spending per Person

8

In 2002, health expenditure per person in some OECD countries was less than half what was spent in the U.S., the country with the highest spending levels.



Notes: (a) Data are for 2001.
(b) Health expenditures per capita were converted to U.S. dollars using purchasing power parities (PPPs), which are designed to eliminate differences in price levels between countries.

View Data

Source: Organisation for Economic Co-operation and Development, *OECD Health Data*, (CD-ROM), (OECD, 2004).

Just as health spending varies across Canada, expenditure per person differs from country to country. Of the 12 countries most closely following the OECD's system of health accounts, Canada ranked third in per capita health spending, at $2,931 U.S. in 2002. The U.S. had by far the highest health expenditure per capita, at $5,267. Switzerland had the second-highest expenditure per capita, almost a third less than the U.S., at $3,446.

Financial Resources: Public and Private Funding

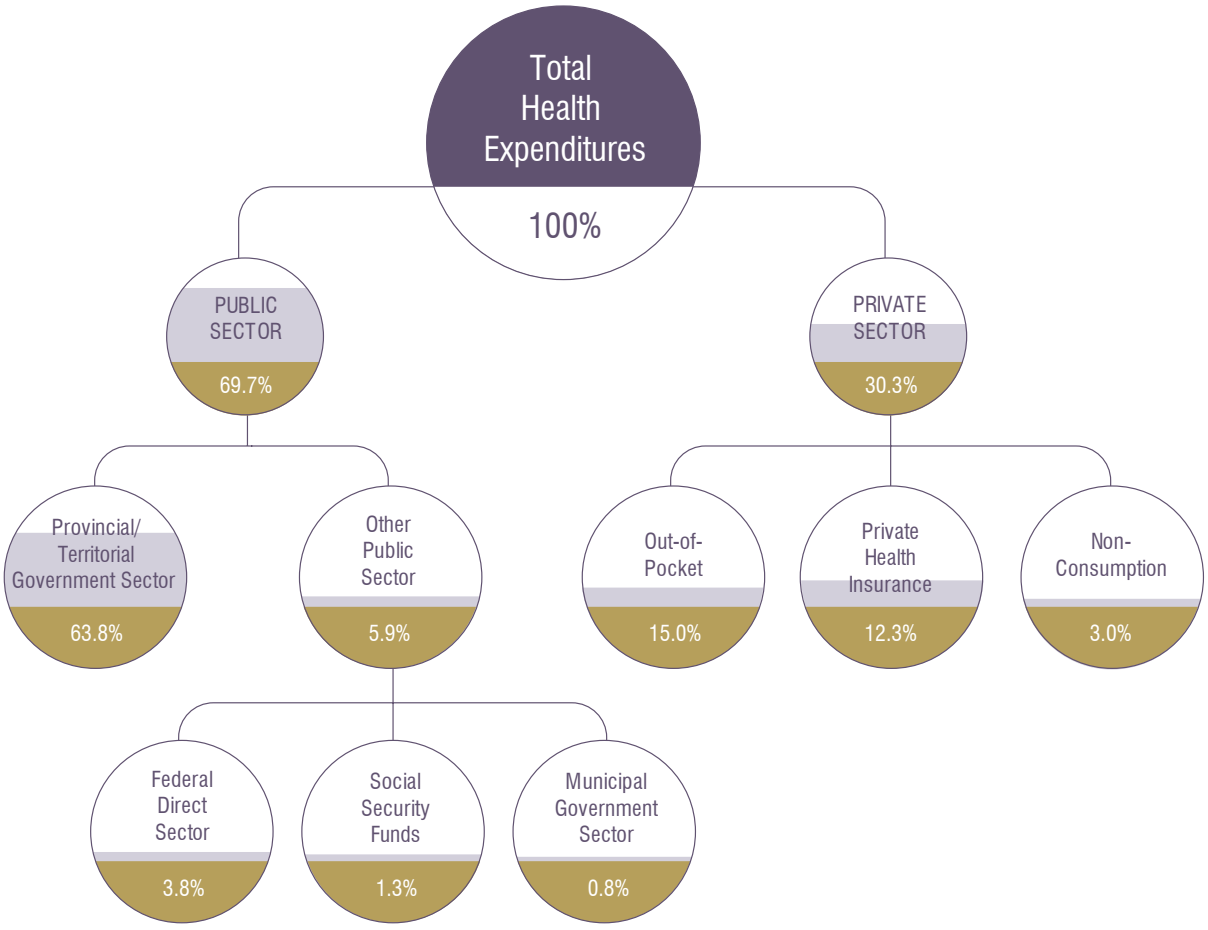
Knowing how much money is spent on health is only part of the picture. It is also important to know who is spending these dollars. In Canada, like in most other OECD countries, both the public and private sectors play a role in financing the health system. In 2004, the public sector covered about 70% of total health spending.

Three levels of government finance public-sector health spending: municipal governments, provincial and territorial governments, and the federal government. Worker's Compensation Boards and other social security programs also fund some health services. Private-sector funding comes from three distinct sources: household out-of-pocket spending, commercial and not-for-profit insurance, and non-consumption expenditures (for example, hospital non-patient revenue from parking lots, donations, and other sources).

9

Who Is Spending Canada's Health Dollars?

The public sector plays a larger role in financing health care in Canada than the private sector. In 2002, approximately $7 of every $10 came from public sources. Most (about $6.40) was paid from provincial and territorial government coffers, part of which is financed by transfers from the federal government. The approximately 60¢ still remaining came from direct federal spending, municipal governments, and social security funds.

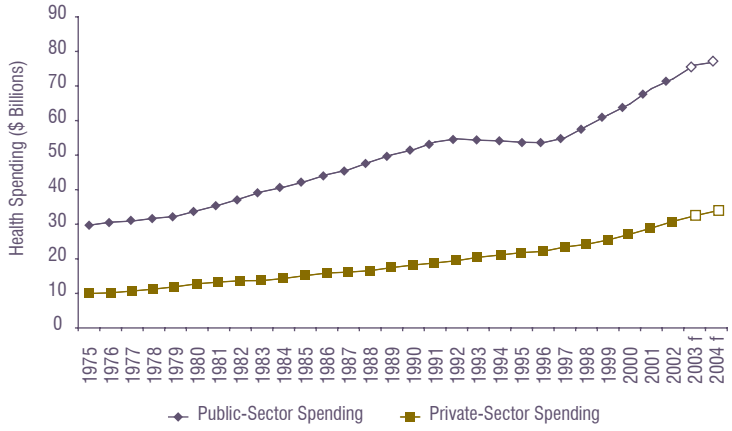


Source: National Health Expenditure Database, CIHI.

Inflation-Adjusted Health Spending by the Public and Private Sectors

10

Total health spending in Canada, adjusted for inflation, has consistently increased. While real private-sector spending increased steadily, there was a dip in public-sector spending during the mid-1990s. Between 1994 and 2004, public-sector health spending increased on average 3.6% per year, after figures were adjusted for inflation, compared to 4.8% in the private sector.



Note: Data for 2003 and 2004 are forecasts.

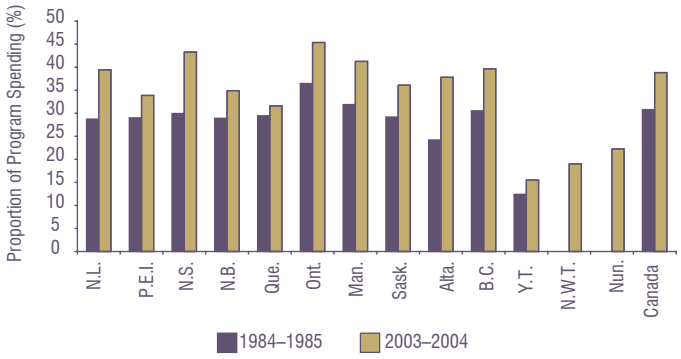
View Data

Source: National Health Expenditure Database, CIHI.

Biting Into the Budget

11

Provincial and territorial governments allocated 39% of their program spending to health services in 2003–2004. Rates ranged from 16% in the Yukon to 45% in Ontario. Territorial government health spending as a proportion of program spending is lower due to the role the federal government plays in funding care for Aboriginal peoples.



Note: Data for 2003–2004 are forecast.

View Data

Source: National Health Expenditure Database, CIHI.

Both public- and private-sector health spending have seen significant increases in recent years. The rate of growth slowed during the mid-1990s, partly due to a period of government fiscal restraint. Public-sector spending, after figures were adjusted for inflation, saw a decline of 2% between 1992 and 1996. Private-sector health spending, after figures were adjusted for inflation, grew by almost 14% over this period. Since then, health expenditures have risen steadily to today's record levels.

Shifting Health Costs

Over the last three decades, the relative contributions of the public and private sectors have fluctuated. In 1975, the private sector represented less than 24% of total health spending. In 2004, this proportion was forecast at about 30%, about the same as it had been for the past 10 years. That's less than in the U.S. (54% in 2002), but higher than that in many Western European countries, such as Denmark (17%), Germany (21%), and France (24%).

The public-private split in health funding also varies across the country. In 2004, public monies represented about 79% of health spending in Newfoundland and Labrador, compared to 67% in Ontario. In the territories, a significantly larger portion of the health care bill is paid for out of the public purse. This partly reflects the federal government's role in funding a broad range of health services for Aboriginal peoples.[3]

Information Gaps: Some Examples

What We Know

- How health care spending varies across the country and has changed over time.
- How health care spending in Canada compares internationally.
- How health dollars are spent, by sector.

What We Don't Know

- What investments, either within the health sector or outside of it, would produce the largest overall health gains? What is the relationship between how much is spent on different health interventions and potential benefits?
- What is the optimal level and distribution of health expenditures to maximize health outcomes and cost efficiencies?
- How do different combinations of public and private funding and service delivery affect costs, access, quality, and outcomes?
- How important are different drivers of growth in health spending? What is the scope for potential efficiencies within the health system?

What's Happening

- In 2005, CIHI will publish an analysis of trends in health spending by age and sex based on information from the National Health Expenditure Database and other sources.
- CIHI will also publish a report on the financing of different types of health services in Canada in 2005.
- Effective April 1, 2004, the Canada Health and Social Transfer (CHST) was split into two parts: the Canada Health Transfer and the Canada Social Transfer. More detailed information regarding federal government contributions to health spending is expected to be available within the next year.

For More Information

1 J. Bannerman, *Leading Ladies Canada* (Belleville, Ontario: Mika Publishing Company, 1977), p. 29.

2 CBC North, *The Mice That Roared* (2003), [online], cited January 28, 2005 from <http://north.cbc.ca/regional/servlet/View?filename=yir2003-1>.

3 Health Canada, "Aboriginal Health," *Health Care Renewal* (September 2004), [online], cited April 1, 2005 from <http://www.hc-sc.gc.ca/english/hca2003/fmm/fmm02.htm>.

3

Where Our Health Dollars Go

3 Where Our Health Dollars Go

In 1867, the Toronto General Hospital closed for a year because it ran out of money. Financial pressures have not disappeared, but much has changed since then. Modern hospitals are a cornerstone of Canada's health system and have substantial budgets, mostly made up of money from the public purse.

Spending on hospitals and other types of care has been rising, and expenditure patterns are changing. While hospitals are still the leading component of health spending, their share of overall health dollars has dropped. Retail drug sales and capital purchases, for example, are taking up a larger share of total health expenditure.

This chapter examines where our health dollars go, with a particular focus on the three largest areas of spending: hospitals, drugs, and physician services.

Following the Money

The $130 billion that was spent on health care in 2004 paid for a broad range of goods and services—millions of physician visits, immunizations, pills, lab tests, and hospital stays.

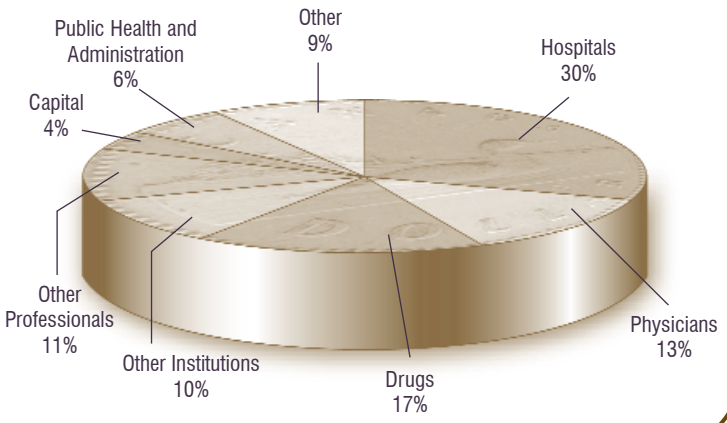
Hospital and physician services, the two core services insured under the *Canada Health Act*, continue to account for much of our health spending. They now represent 43% of the total, down from 57% twenty years ago. But that smaller share is part of a growing pie. Actual dollars going to these areas rose by 51% over the last decade.

Spending in other areas has grown even more quickly. Canadians have paid more for prescription and over-the-counter drugs and other pharmacy supplies than for physician services since 1997. Growth in spending on public health and administration, other professional services, and capital projects has also outpaced spending increases for hospital and physician services in recent years.

12

Distribution of Health Dollars

In 2004, spending on hospitals, physician services, and retail drug sales accounted for more than half of forecast health spending. Nursing homes and other institutions, other professional services, public health and administration, capital investment, and other costs (for example, research, medical transportation, and occupational health) make up the remainder of the total.

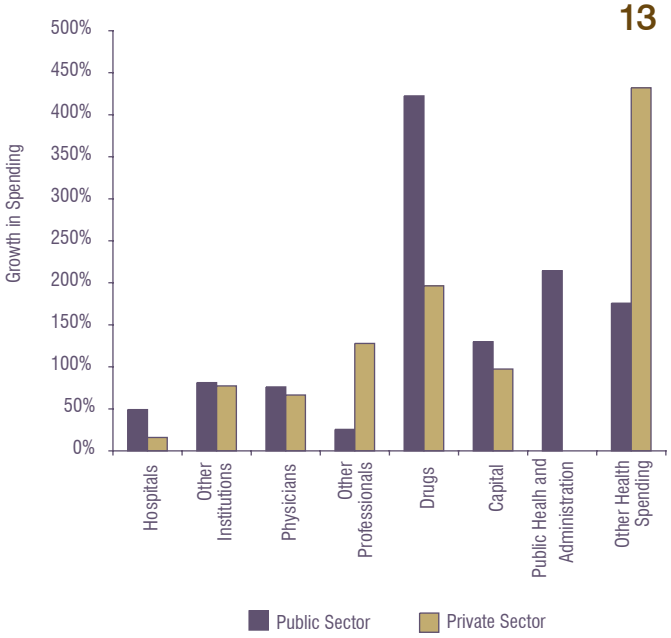


Source: National Health Expenditure Database, CIHI.

Changes in Spending Since 1984

13

Total health spending has risen significantly over the last two decades. Drugs have been one of the fastest-growing components of the total bill. Private-sector spending on prescribed drugs, over-the-counter drugs, and personal health supplies rose fourfold, even after inflation was accounted for. Public-sector spending on prescribed drugs nearly doubled over the same period.



Note: Public-sector spending was deflated using the implicit price index for government current expenditure. Private-sector spending was deflated using the health component of the consumer price index. Price indices specific to each category of spending are not available. Instead, the proportions of public- and private-sector health spending that each category represented in current dollars were maintained after adjustment of sector-specific spending for inflation.

View Data

Source: National Health Expenditure Database, CIHI.

Public Health and Administration

Public health costs have nearly doubled in the last six years, taking up a larger share of the public health and administration category. Spending per capita, especially in public health, has grown steadily since 1975. In 2004, NHEX divided public health and administration into two separate categories: *public health* and *government administrative spending*.

Provincial public health spending consists of:

- **Services to improve population health, such as health promotion, disease prevention, and health inspection;**
- **Mental health;**
- **Addiction; and**
- **Community nursing and miscellaneous services provided within the community (but not home care).**

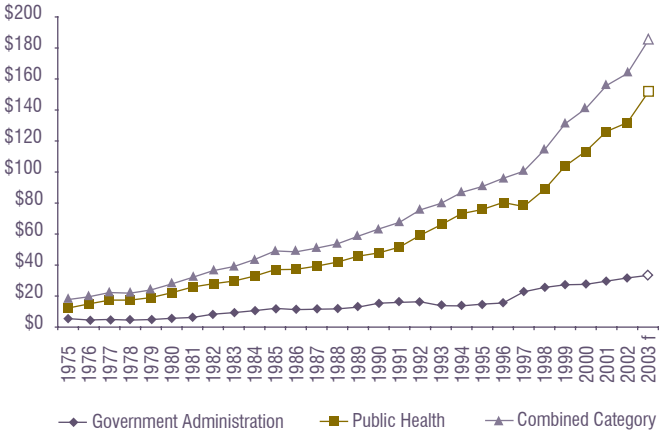
Provincial government administrative spending is made up of:

- **Costs of a government department or branch responsible for health programs; and**
- **General administrative services, such as health information services.**

Spending per Person

14

In 2003, provincial government spending on public health reached $151 per capita; spending on government administration was $33 per person.



Note: The figure for 2003 is a forecast.

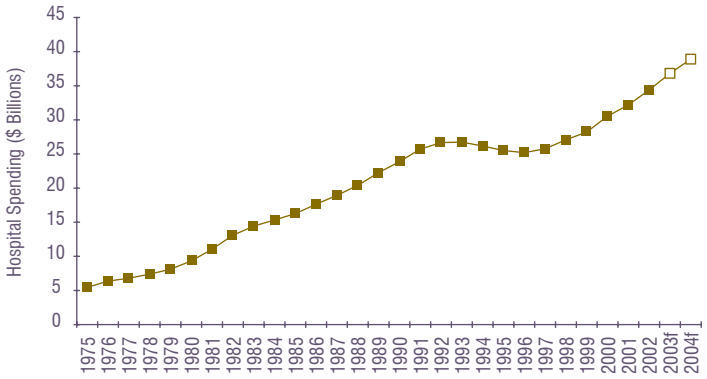
View Data

Source: National Health Expenditure Database, CIHI.

Hospital Spending in Canada

15

Hospital spending has grown an average of 7% per year since 1975. Year-to-year fluctuations do, however, occur. Following a dip in the mid-1990s, recent years have seen steady spending growth.



Note: Figures for 2003 and 2004 are forecasts.

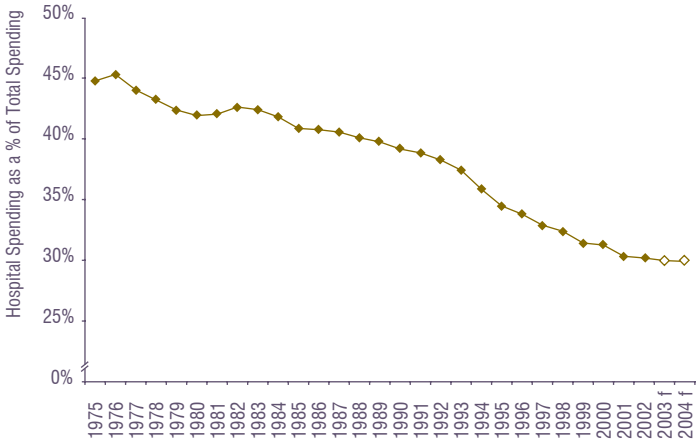
View Data

Source: National Health Expenditure Database, CIHI.

Hospital Spending Relative to Total Health Spending

16

Hospitals' share of total health spending is falling, but still represents the largest single category of health expenditure in Canada.



Note: Figures for 2003 and 2004 are forecasts.

View Data

Source: National Health Expenditure Database, CIHI.

Did You Know That in 2002–2003 . . .

- **744 active hospitals were listed in Canada.**
- **There were more than 115,000 hospital beds.**
- **Hospitals admitted over three million patients.**
- **More than 14 million visits were made to emergency rooms.**

Source: Canadian MIS Database, CIHI.

Hospitals in the Canadian Health System

Today's hospitals offer a much wider range of services than those that operated in the 1800s. Most hospitals provide short-term diagnostic and treatment services for patients with a wide range of illnesses and injuries. Some also have separate groups of beds, wings, or buildings devoted to long-term care. Other hospitals specialize in treating particular groups of patients, such as children, mothers giving birth, and patients with cancer.

Overnight stays in hospital have become less common in recent years, but day surgery programs are growing. Inpatient volumes fell to 2.8 million in 2002–2003, down from 3.2 million in 1995–1996. Circulatory diseases (15.1%), pregnancy and childbirth (14.2%), and respiratory diseases (10.8%) were the three leading causes of inpatient hospitalization in 2002–2003. In contrast, day surgeries are much more common. They grew by almost 57% between 1995–1996 and 2002–2003.

In 2004, hospitals spent a forecast $39 billion—roughly 30% of all health care dollars. Hospital spending as a share of the health care bill has declined over the past few years due to higher spending growth for other types of care.

Staff salaries and benefits were the largest part of hospital costs. They added up to $21 billion in 2001–2002, or about 68% of total hospital spending. Hospitals also spent $1.5 billion on physician payments, $1.3 billion on drugs, and $6.9 billion on other supplies (medical and non-medical) and sundries.

Emergency Substitution?

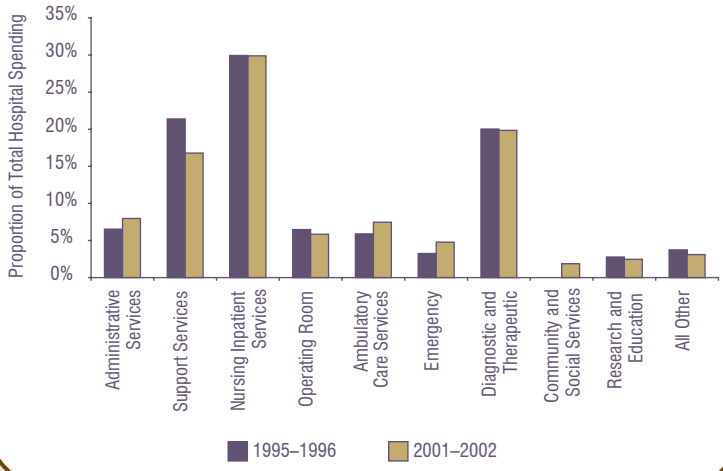
On average, Canadian hospitals spent $102 per emergency department visit in 2001–2002. Staff salaries accounted for most of this total. Physician payments also account for a growing proportion of this total, perhaps because of new alternative payment plans. Emergency department physicians may also be paid separately through provincial and territorial government fee-for-service programs.

Canadian adults made more use of emergency departments than residents of four other countries surveyed by the Commonwealth Fund in 2004.[1] More than a third (38%) reported visiting an emergency department (ED) in the past two years. Of those who went to an ED, almost one in five (18%) said that their regular doctor or other source of care could have treated their condition if that service had been available. That's about the same as in the United States, but higher than in Australia (9%), New Zealand (7%), and the United Kingdom (6%).

17

Hospital Spending by Service

Most hospital dollars go toward direct patient care. Spending to cover support services, such as maintenance, laundry, and food services, dropped from 21% of total hospital costs in 1995–1996 to 17% in 2001–2002.



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Source: Canadian MIS Database, CIHI, Statistics Canada.

Drugs in the Health Care System

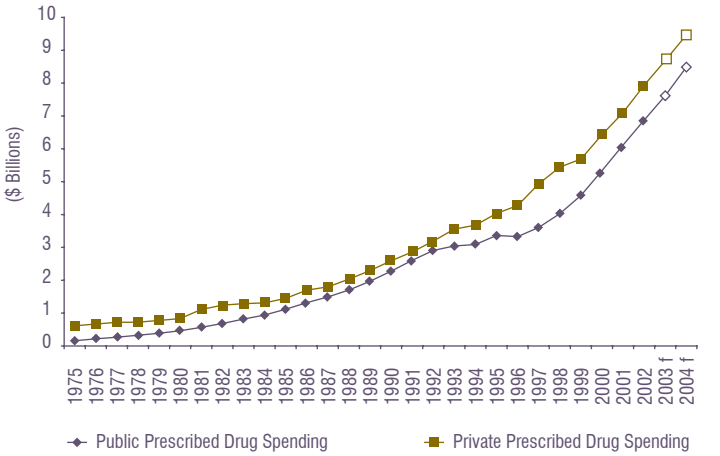
From medicine cabinet basics such as Aspirin, to prescription pills for managing cholesterol or sexual dysfunction, retail drug sales have been one of the fastest-growing segments of health costs in Canada for nearly three decades. Retail spending on prescribed drugs, over-the-counter medication, and personal health supplies has more than doubled since 1996, to an estimated $21.8 billion in 2004. Since 1997, it has been the second-largest category of the health bill. In 2004, it accounted for 17% of the total, well above spending on physician services.

The bulk of retail spending ($18 billion, or 83%, in 2004) goes towards prescribed drugs. This cost is split 47% to 53% between the public and private sectors respectively. Private payers also spent an estimated $3.8 billion on over-the-counter drugs and personal health supplies, such as diabetes test strips. These numbers exclude what hospitals and other health care institutions spend on drugs for their patients.

18

Prescription Drug Spending

Governments spent an estimated $8.5 billion on prescription drugs in 2004, compared with the $9.5 billion paid by individuals and insurance companies.



Note: Figures for 2003 and 2004 are forecasts.

View Data

Source: National Health Expenditure Database, CIHI.

Most public funding for drugs comes through government programs. Coverage under these programs varies across the country. All governments provide some benefits to seniors and to some recipients of low-income assistance, but co-payments, deductibles, and which drugs are included vary. Some programs also cover other groups, such as those with very high drug costs or particular health conditions. For example, they may include organ transplant donors or patients receiving palliative care. As well, first ministers recently agreed to provide universal access to catastrophic drug coverage in the future.[2]

Drugs—Cost and Consumption

Canadian medicine cabinets have become packed with prescription drugs. About $16.3 billion worth were sold in 2003, a 10% increase over the previous year. This growth is not due only to higher prices for existing drugs. In fact, the Patented Medicine Price Review Board estimates that manufacturer prices on patented drugs fell by 1.1% in 2003. This is in keeping with stable pricing patterns for existing drugs that began more than a decade ago, as measured by Canada's Patented Medicine Price Index.[3]

What else is happening? In some cases, medical breakthroughs, rising rates of chronic disease, and changes in practice patterns mean people are taking new, more, and/or more expensive drugs. Drugs to manage cholesterol, blood pressure, or depression are among the top new drug classes.[4]

A British Columbia study looked at reasons for the jump in average drug costs per senior between 1985 and 1999. They found that three major factors drove increases over this period:

- Higher prices for individual products, partially offset by substitution of lower-cost generic products for brand name drugs: 22% of the growth
- Prescriptions from more drug categories on average: 38%
- Different drugs prescribed within a category—for example, changing drugs within a category, increased doses, or additional prescriptions for other drugs within the same category: 40%[5]

Who Is Taking What

A 2003 Statistics Canada survey suggests that almost 43% of Canadian teens and adults take prescription drugs; over a quarter take two or more different prescription medications.[1] The situation is similar for non-prescription drugs or over-the-counter medications, including vitamins and herbal products. Surveys suggest that Canadians use many drugs at the same time. Nearly a third use both non-prescription and prescription drugs, and 13% use two or more non-prescription drugs simultaneously to treat the same symptoms.[6] Older people are more likely to use more prescription drugs and to use over-the-counter medications and prescription drugs concurrently.

Physicians: A Profile of Professional Practice

At the end of 2003, more than 59,000 physicians were practising in Canada. The physician-to-population ratio has hovered near 187 per 100,000 people in recent years (the 2003 rate). A near fifty-fifty split between family physicians and specialists currently exists, although traditionally, family physicians outnumbered specialists.

Spending on physician services reached a forecast $16.8 billion in 2004, up 4.8% from the year before. These costs now account for about 13% of total spending on health care.

The way physicians are compensated has changed over time. The total number of family physicians billing fee-for-service increased from 27,447 in 1992 to 28,493 in 2001.[7] In a 2004 survey, 7% of family doctors and 8% of specialists reported their method of remuneration had changed in the past two years.[8] An increasing number of physicians received part or all of their income from alternative payment plans. For example, in Nova Scotia in 2001–2002, 64% of physicians received part or all of their payments from alternative plans, up from 37% in 1999–2000.

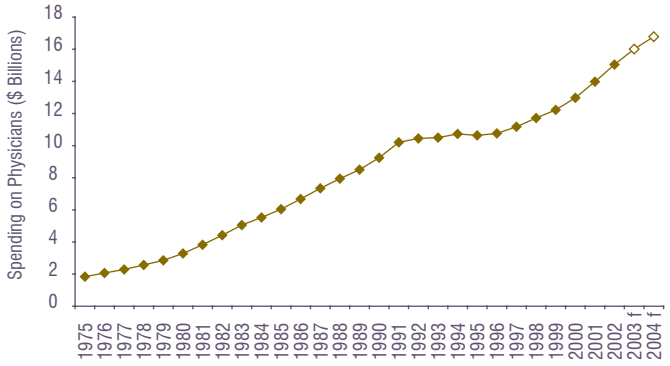
Payment plans are not the only feature of practice that is changing for Canada's physicians. Work settings and scope of practice are also changing over time. Most of Canada's family physicians work in group practices, which could mean sharing office space, support staff, patient records, or on-call duties. In 2003, one in four family physicians (26%) worked in a solo practice. This percentage is unchanged since 2001, but was down from 31% in solo practice in 1997.

In the 2004 National Physician Survey, 13% of family physicians reported that they had reduced their scope of practice in the past two years; only 4% said that they had expanded it. Today's doctors tend to provide a different mix of services than in the past. For example, fewer family doctors were performing surgery (down 32%), providing surgical assistance (down 31%), and delivering babies (down 43%) in 2002 than in 1992. The proportion providing care to patients in hospitals was also down: 62% in 2001, compared to 71% in 1992. However, there are some services that family doctors are providing more often. For example, more were providing mental health counselling in their offices—85% in 2001, compared to 82% in 1992.[8]

Physician Spending

19

Spending on physician services increased steadily between 1975 and 2004. The rate of growth slowed between 1991 and 1996, during a period of fiscal restraint by governments.



Note: Figures for 2003 and 2004 are forecasts.

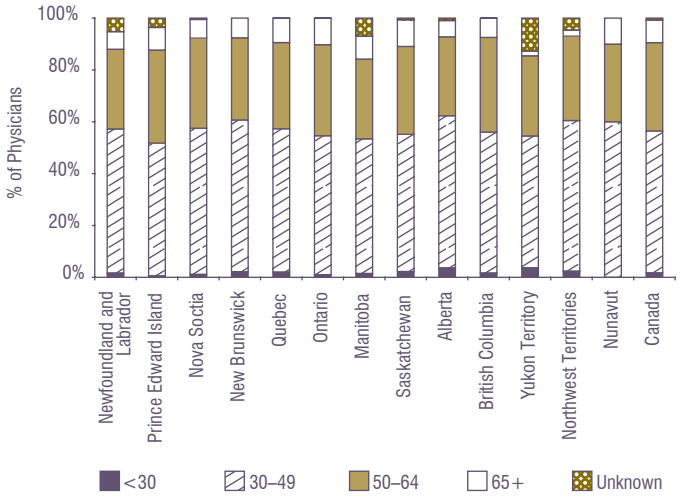
View Data

Source: National Health Expenditure Database, CIHI.

Physician Demographics

20

In 2003, nearly a third of physicians (31%) were women, 36% of whom were aged 39 or younger. In general, the average age of physicians is increasing. The graph below shows how the age distribution of active physicians varies across the country.



Note: Excludes residents and physicians with "no publication" status.
Includes physicians who provide both clinical and/or non-clinical services.

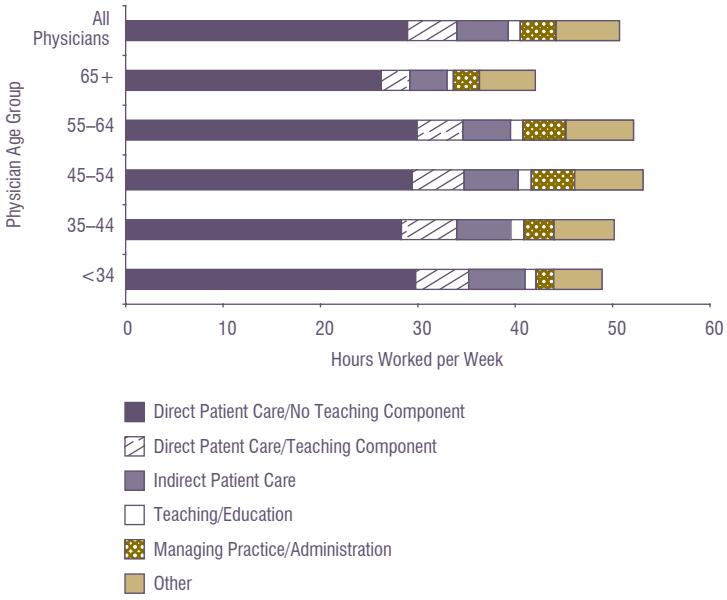
View Data

Source: Southam Medical Database, CIHI.

21

A Physician's Work Week

Physicians reported working an average of 50.7 hours per week in 2004. Most of their time, about 39 hours each, was spent on patient care. Younger physicians tended to work fewer hours, but spent a larger share of their time with patients.



Note: National estimates are considered to be accurate within ± 0.7 percentage points, 19 times out of 20.

View Data

Source: National Physician Survey: The Canadian Medical Association, the Royal College of Physicians and Surgeons of Canada, the College of Family Physicians of Canada, and CIHI.

In the 2004 National Physician Survey, as many as 3,800 physicians, mostly specialists, said that they planned to retire over the next two years. Overall, 5% of family physicians and 8% of specialists placed themselves in this group. Rates for some specialties were higher. For example, 14% of internal medicine specialists said that they intended to retire in the next two years.

Many physicians also said that they planned to change their activity levels. In 2001–2002, physicians working on a fee-for-service basis billed a total of 190 million visits and consultations, plus 50.7 million procedures. In the 2004 survey, 17% of physicians said that they had reduced their weekly work hours in the past two years. These trends are likely to continue, given that 25% reported that they intended to reduce their hours in the coming two years.

Information Gaps: Some Examples

What We Know

- How the use of hospital, physician, pharmaceutical, and other health services is changing across Canada.
- The supply, distribution, and demographics of specific health care providers and how they have varied over time.
- How a range of health indicators, such as use of mammography services or death rates in the first 30 days after initial hospitalization with a stroke, differ across the country and are changing over time.

What We Don't Know

- What effect do changes in the delivery of health services, such as rising day surgery rates, have on other parts of the health system, on quality of care, on patient outcomes, and on costs?
- What has been the impact of different public drug programs and formularies on health outcomes and health care costs? What strategies are most effective in achieving optimal use of prescription drugs while controlling costs?
- What explains regional differences in the use of health services and outcomes of care, such as readmissions and survival?
- How many and what mix of health professionals will be required to meet the health care needs of Canadians—locally, provincially, and nationally? How will changes in enrolments, entry-to-practice requirements, education programs, provider demographics, working conditions, and other factors affect this mix?
- How does the method of physician payment affect access to care, health outcomes, health care costs, and job satisfaction?

What's Happening

- Development of the National Prescription Drug Utilization Information System (NPDUIS) is well underway. This system will house information on drug benefit formularies, drug use, and drug plans. It aims to provide critical analyses of price, utilization, and cost trends so that Canada's health system has more comprehensive and accurate information on how prescription drugs are being used and on sources of cost increases.
- Through the Health Human Resources Databases Development Project, CIHI is developing databases for five regulated health professions in Canada: pharmacists, medical laboratory technologists, physiotherapists, medical radiation technologists, and occupational therapists. These databases will include information on demographics, education, employment practices, and other characteristics of the five groups.
- CIHI, in collaboration with Statistics Canada and Health Canada, is undertaking a national survey on the work and health of nurses. The survey is scheduled for the fall of 2005.

For More Information

1 C. Schoen, R. Osborn, and P. T. Huynh, *Primary Care and Health System Performance: Adults' Experiences in Five Countries*, (New York City: Commonwealth Fund, 2004).

2 Office of the Prime Minister, *A 10-Year Plan to Strengthen Health Care* (October 21, 2004), [online], cited January 18, 2005 from <http://pm.gc.ca/eng/news.asp?id=260>.

3 Patented Medicine Prices Review Board, *Patented Medicine Prices Review Board 2003 Annual Report* (Ottawa: Patented Medicine Prices Review Board, 2003), pp. 1–55, [online], cited April 1, 2005 from <http://www.pmprb-cepmb.gc.ca/CMFiles/ar2003e30LWY-1062004-5966.pdf>.

4 ESI Canada, *ESI Canada 2003 Drug Trend Report* (ESI Canada, 2003), pp. 1–12, [online], cited April 1, 2005 from <http://groupbenefits.manulife.com/canada/GB_V2.nsf/LookupFiles/MaritimeBulletinMaritimeBulletin1404/$File/BenefitsBulletin14English.pdf>.

5 S. Morgan, "Quantifying Components of Drug Expenditure Inflation: The British Columbia Seniors' Drug Benefit Program," *Health Services Research* 37, 5 (2002): p. 1243.

6 Canadian Pharmacists Association, Drug Information and Research Centre, and National Council on Patient Information and Education, *Survey on Canadians' Use of OTC Medications* (CPhA, DIRC, and National Council on Patient Information and Education, 2005), [online], cited April 1, 2005 from <http://www.bemedwise.ca/english/usagesurvey.html>.

7 Canadian Institute for Health Information, *The Evolving Role of Canada's Family Physicians: 1992–2001* Ottawa: CIHI, 2004), pp. 1–66, [online], cited March 31, 2005 from <http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_1171_E>.

8 The Canadian Medical Association, The Royal College of Physicians and Surgeons of Canada, and The College of Family Physicians of Canada, *Initial Data Release of the 2004 National Physician Survey* (CMA, RCPSC, and CFPC, 2005), [online], cited April 1, 2005 from <http://www.cfpc.ca/nps/English/pdf/Research_&_Reports/Archived/Initial%20Data%20Release%202004%20NPS_Oct%2004_Updated%20Nov.pdf>.

4

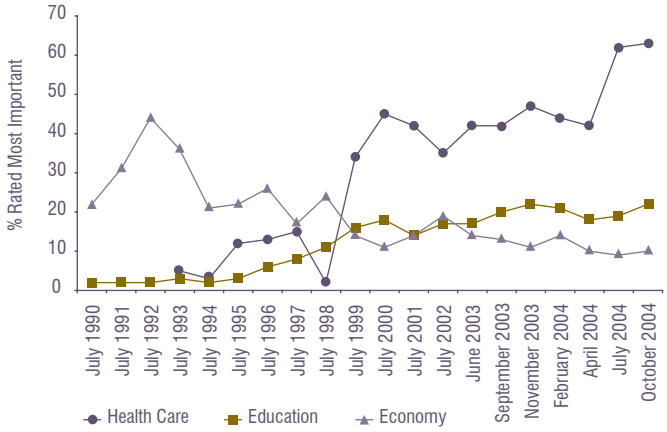
Our Views on Health Care

4 Our Views on Health Care

Primary Canadian Concerns

22

Which issue do you think should receive the greatest attention from Canada's leaders? The graph below shows how respondents rated the three issues that currently top the list—health care, education, and the economy—in Ipsos-Reid polls conducted between July 1990 and October 2004.



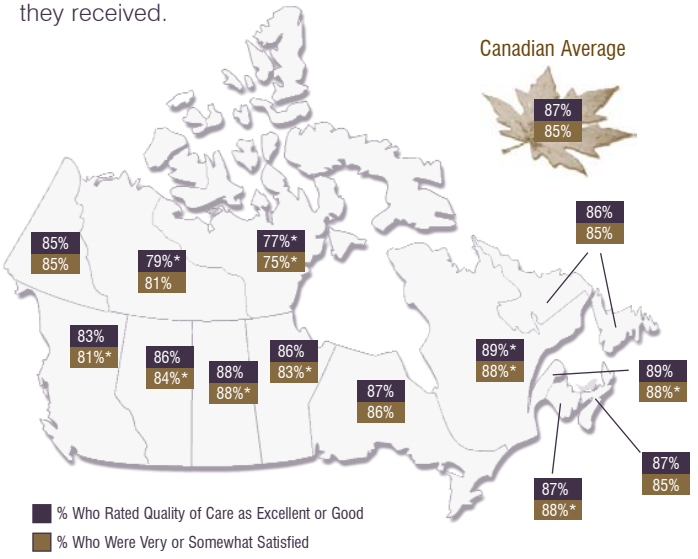
View Data

Source: Ipsos-Reid, 2004.

Satisfaction and Quality Go Hand in Hand

23

On a 2003 Statistics Canada survey, most Canadians (87%) aged 15 and older rated the quality of care they received in the past 12 months as excellent or good. The majority (85%) also reported being very or somewhat satisfied with the care they received.



* Statistically significantly different from the overall Canadian rate.

Source: Canadian Community Health Survey, Statistics Canada, 2003.

Health care is very important to Canadians. In recent polls, almost two-thirds of respondents (63% in October 2004)[1] said that it was the issue that should receive the greatest attention from our country's leaders.

What Do Canadians Think?

Almost all Canadians receive some type of health services each year. Visiting a doctor and taking medication are the most common types of care. In 2003, 80% of teens and adults said that they had consulted a physician in the past year. About the same number (84%) reported that they had taken prescription or non-prescription medication. Fewer said that they had visited a dental professional (64%), seen or talked with a chiropractor or other complementary or alternative health care provider (12%), used a telephone health line (10%), or had an overnight hospital stay (8%).

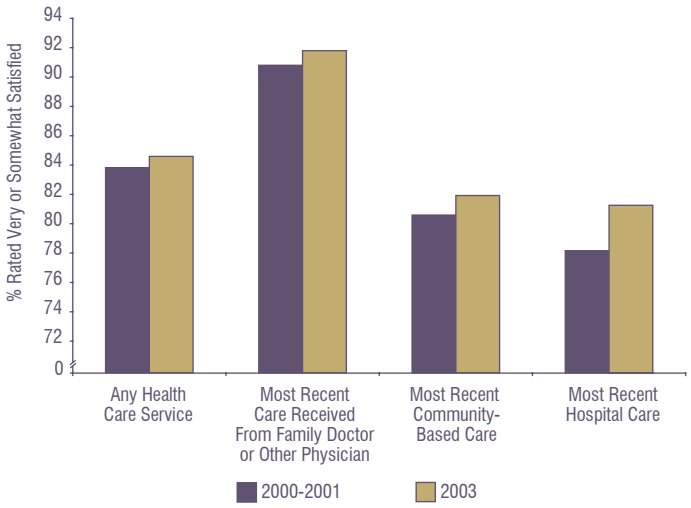
What do Canadians think about the care they receive and about the health system as a whole? Overall, most give high marks to the care they receive. A 2003 Statistics Canada survey found that 85% were very or somewhat satisfied with their care in the past 12 months, about the same as in 2000–2001.[2] Across the country, rates ranged from 75% in Nunavut to 88% in Prince Edward Island, Quebec, and Saskatchewan.

Across the country, men and women reported similar satisfaction levels overall. However, women were significantly more satisfied than men with the care they received from their physicians. For both men and women, satisfaction was higher for care provided by physicians than for hospital and community-based services.

Recent provincial surveys have similar findings. For example, in Ontario almost 90% of people surveyed said that the overall quality of their care was excellent or good. Almost three-quarters of Alberta residents (74%) rated the quality of the health system as good, very good, or excellent.

24 Satisfaction With the Health Care System

Statistics Canada regularly surveys Canadians aged 15 and older about their views on their health care. The Canadian Community Health Survey includes questions about satisfaction with care received in the previous year from doctors, community-based health services, and hospitals. The graph below shows slight increases in the proportion of respondents saying that they were very or somewhat satisfied with each type of care between 2000–2001 and 2003.



Source: Canadian Community Health Survey, Statistics Canada, 2000–2001 and 2003.

View Data

Newcomers to Canada: Health and Health Care

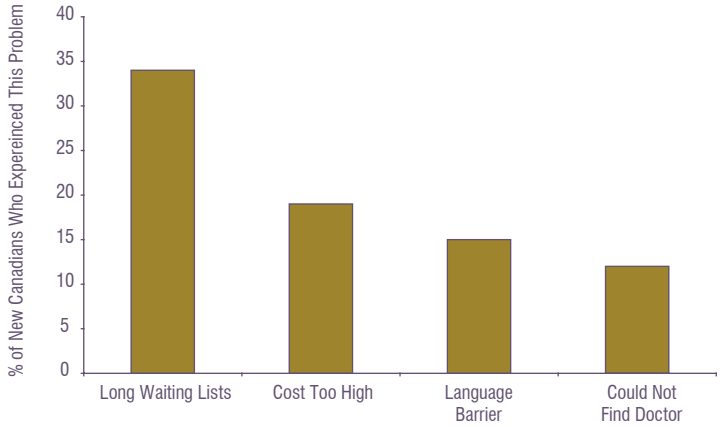
The vast majority of new immigrants report being in good health. According to Statistics Canada, 78% rated their overall health as excellent or very good in 2001.[4] That's higher than the rate for those born in Canada (61%).

Recent research suggests that this sense of positive health fades over time. In 2000–2001, immigrant women who had been in Canada at least 10 years were 30% more likely to report fair or poor health than Canadian-born women, even after taking into account a variety of demographic, social, cultural, and economic factors.[5] The change was particularly pronounced for women in low-income households. In contrast, men who came to the country at least a decade ago reported about the same levels of fair or poor health as those born in Canada.

These figures demonstrate that social, environmental, economic, and other factors can be vitally important in shaping our health. They may also affect our interactions with the heath system. The vast majority of new Canadians (97% of those aged 15 or older in 2001) report getting health cards within six months of arriving. However, almost a quarter (23%) reported difficulties in accessing the health system.

25 Barriers to Care for New Canadians

In 2000–2001, Statistics Canada interviewed 12,000 newcomers to Canada aged 15 or older about their education, jobs, new social networks, and access to the health system. About one in four (23%) reported encountering a serious barrier to accessing health care. The most often cited challenge was long waiting lists.



Source: Longitudinal Survey of Immigrants to Canada, Statistics Canada, 2000–2001.

View Data

In addition to overall measures of satisfaction, provincial and national surveys often explore what Canadians think about their access to care. In 2003, Statistics Canada asked those aged 15 and over whether there was a time in the past year when they had difficulties in accessing care. Most said no, but some reported encountering barriers. For example, 16% said that they had difficulties accessing services. The most common challenges reported were getting an appointment, waiting too long for an appointment, waiting too long in doctors' offices, and having problems contacting a physician.[3]

Attitudes Around the Globe

In Canada and other countries, people tend to give higher ratings to the care that they or their families receive than to the health care system in general. In 2004, only 1% to 3% of adults surveyed in Canada, Australia, New Zealand, the United Kingdom, and the United States said that their medical care in the past year was poor.[6] More—13% to 33%—said that their health system needed to be completely rebuilt. About one in seven Canadians (14%) felt this way. This is down from 23% in 1998, but considerably higher than the 1988 level of 5%.

Interestingly, hospital executives tend to express higher levels of confidence—except in the U.S. In 2003, 88% to 97% of Australian, Canadian, New Zealand, and UK hospital executives said that they were somewhat or very satisfied with their health care system.[7] In the U.S., only a slim majority of executives (51%) expressed this view.

Just as confidence in the health system varies across countries, so do particular aspects of care. For example, Canadians were more likely than people in Australia, New Zealand, and the UK to want to know about the quality of care provided by a new doctor—40% of Canadians expressed this view, compared with 18% to 28% of residents of Australia, New Zealand, and the UK. Only Americans (56%) were more likely than Canadians to want this information.

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Rebuilding Health Systems?

The Commonwealth Fund regularly asks residents of five countries (Canada, Australia, New Zealand, the UK, and the U.S.) about their health care systems. In 2004, the majority in all countries said that they would like to see improvements. A smaller proportion—one that has fallen in Canada and New Zealand in recent years—called for a complete rebuild, as the graph below shows.

View Data

Source: 2004 Commonwealth Fund International Health Policy Survey.

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International Comparisons

When surveyed in 2004, more than 4,000 adults in five countries gave their views about their recent care. Some highlights are shown in the table below.

	Australia	Canada	New Zealand	UK	U.S.
Wanted to know about quality of care a new doctor would provide	28%	40%	24%	18%	56%
Doctor always listens carefully	71%	66%	74%	68%	58%
Doctor always spends enough time with patients	63%	55%	66%	58%	44%
Left office without all questions answered	22%	19%	20%	13%	24%
Doctor always explains things so they understand	73%	70%	73%	69%	58%
Did not take medicine as prescribed	38%	35%	49%	48%	35%
Did not follow advice on lifestyle changes	33%	40%	24%	24%	37%

Source: 2004 Commonwealth Fund International Health Policy Survey.

Most of those surveyed felt that their personal needs for health information had been met. About three in four respondents in all five countries said that all their questions had been answered before they left their doctor's office. But not all followed their doctor's advice. Almost a quarter of Canadians (22%) said that they had not done so at least once over the past two years. That's higher than in the UK (14%), but lower than in the U.S. (31%). Canadians gave a variety of reasons for choosing not to follow their doctor's advice. Almost half (49%) disagreed with the recommendation or found it too difficult to follow; 15% felt better; 11% said that it would cost too much; and 10% did not understand what to do.

Information Gaps: Some Examples

What We Know

- How Canadians rank health care among issues that they believe their leaders should focus on.
- Satisfaction with various types of health services, with all services received in the past year, and with the health system overall.
- How many newcomers to Canada report encountering serious barriers to accessing health care.

What We Don't Know

- What factors explain higher and lower patient satisfaction? How is satisfaction with health care influenced by social, cultural, demographic, and other factors?
- How do health care providers use patient satisfaction survey results to change how they care for patients? What strategies are most effective?
- How do wait times for different types of care vary across the country? What effect does this have on patient satisfaction, public confidence in the health system, patient outcomes, and the cost of care?
- What most influences patients' decisions to seek care, their participation in the care process, and their satisfaction with care?

What's Happening

- Statistics Canada will conduct the next broad-based Canadian Community Health Survey, which will include questions on satisfaction with health services, throughout 2005.
- Provincial surveys are ongoing. For example, Alberta recently released results of a survey on patient safety and quality of care. As well, Ontario's redeveloped patient satisfaction survey will assess responsiveness, communication, respect and courtesy, and overall impressions of acute care.
- In September 2004, Canada's Premiers and the Prime Minister committed to an action plan to improve access to timely care. This includes establishing comparable indicators of access and evidence-based benchmarks for five areas by the end of 2005.

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Part B: A Focus on Volumes and Outcomes

Deciding whether or not to have surgery can be one of the most difficult choices a person will face. The choice involves balancing the risks with the likelihood of better health outcomes over the long term. Some of the potential risks and benefits are well understood. Others are unclear, or even unknown.

Our understanding of one factor that may influence surgical outcomes—where someone has surgery—continues to evolve. If emergency care is needed, there may be little choice about where the surgery is performed. But for procedures planned in advance, options may exist.

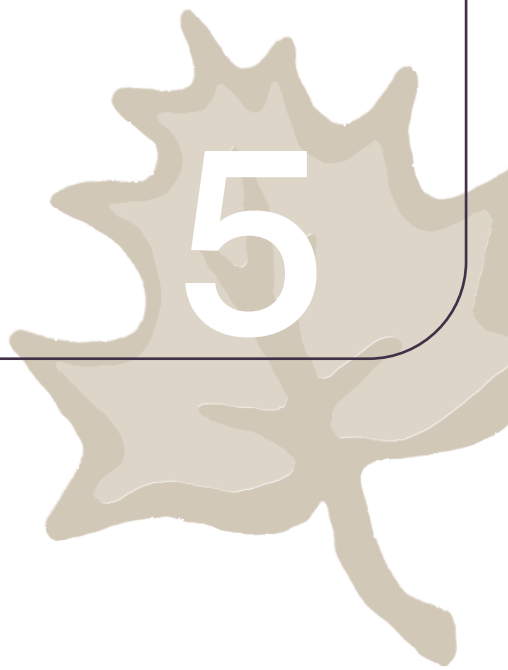
In recent years, many researchers have studied the relationship between how many patients a hospital or physician treats and the patients' outcomes. The first chapter in Part B reviews what these studies found. It offers a comprehensive review of the volume-outcome relationship, including two theories often used to explain the association between higher volumes and better patient outcomes.

Most of this research comes from the United States. To expand the scope of available evidence, the second chapter in Part B provides new analyses of the volume-outcome relationship for nine surgical procedures in Canada. Like many previous studies, it focuses on the risk of dying in a hospital within 30 days of admission for surgery.

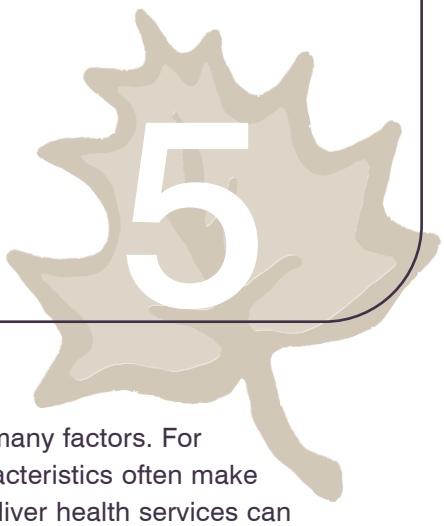
This topic is more than academic. Across the country, decisions are being made to concentrate care in centres of excellence—or not to—on a regular basis. The final chapter highlights examples of the consolidation of specialized services and discusses the trade-offs involved. It also examines the distribution of different types of surgical procedures in Canada.

Together, the three chapters look in depth at what we know and don't know about the relationship between surgical volumes and outcomes and the implications for health care delivery. With this focus, CIHI aims to provide up-to-date information to support sound health policy, to assist leaders in the health sector to make informed decisions, and to inform Canadians about issues that affect our health and health care.

When Volume Matters: What the Research Says



When Volume Matters: What the Research Says



For the thousands of Canadians who are rolled into operating rooms every year, surgery can be a stressful event. The likelihood of successful results depends on many factors. For example, age, severity of illness, and other patient characteristics often make a difference. Factors related to how we organize and deliver health services can also affect patient outcomes.

In recent years, considerable attention has focused on how the volume of cases that a hospital handles relates to patient outcomes. The research evidence generally shows a link between higher volumes and better outcomes, although the strength of the relationship varies from procedure to procedure.

Why Volume Matters: Results of Previous Research

Since the 1970s, a number of studies have found a striking relationship between volume and patient outcomes for a variety of surgical procedures. The outcome most often studied is short-term in-hospital mortality. Research suggests that patients treated in centres with higher numbers of cases are less likely to die. This relationship has been found for most types of care that have been studied—from rare procedures, like pediatric heart surgery, to more common ones, such as gall bladder removal. However, the findings are neither uniform nor clearly understood. Some studies have found only a weak association; a few, none at all.[1–5]

To summarize the latest research findings, CIHI commissioned the Institute for Clinical Evaluative Sciences (ICES) to conduct an up-to-date systematic review of studies on the volume-outcome relationship. A total of 161 relevant journal articles published between 1979 and the spring of 2004 were examined. Together, they contained 313 separate analyses investigating the relationship between volumes of care and patient outcomes. Most studies were carried out in the United States (80%). Another 9% were from Canada. Research was also conducted in Europe, Japan, and elsewhere (11%). Across all the countries, most studies (73%) used administrative data.

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Recent Research

Many researchers have looked at the relationship between surgical volumes and patient outcomes. Recent reviews, including a new CIHI-commissioned review and a large U.S.-based study led by Birkmeyer and colleagues, are described below. Most experts agree that hospitals with higher volumes have better results for many types of surgery; however, the strength of the relationship varies according to the procedure.

Study	Publication Source and Year	Data Source/Coverage	General Findings
1. Analysis of Current Research Related to the Impact of Low-Volume Procedures/Surgery and Care on Outcomes of Care	CIHI-commissioned review, 2004	Online search in Medline and Embase health research databases and manual search for studies between 1979 and spring 2004; covers 161 studies and 313 separate analyses looking at 13 clinical categories of procedures.	The literature showed that higher volume is associated with improved health outcomes for most procedures, surgeries, and care types studied. However, the strength of the relationship varies among procedures.
2. Is Volume Related to Outcome in Health Care? A Systematic Review and Methodologic Critique of the Literature	*Annals of Internal Medicine*, 2002	English-language, population-based studies in Medline between 1980 and 2000; covers 135 studies and 27 procedures and clinical conditions.	High volume is associated with better outcomes, but the degree of the association varies greatly. Differences in case mix and processes of care between high- and low-volume providers may partly explain this difference.
3. Selective Referral to High-Volume Hospitals—Estimating Potentially Avoidable Deaths	*The Journal of the American Medical Association*, 2000	Literature search in Medline, Current Contents and First Search Social Abstracts databases between 1983 and 1998; covers 72 articles and 14 procedures.	Referral of patients to high-volume hospitals can potentially reduce hospital mortality for 11 procedures and conditions. For knee replacement, AMI, and emergent abdominal aortic aneurysm repair, there was no relationship between volume and mortality.
4. Hospital Volume and Surgical Mortality in the United States	*The New England Journal of Medicine*, 2002	The national Medicare claims database and the Nationwide Inpatient Sample between 1994 and 1999; covers 14 cancer and cardiovascular procedures.	Deaths decreased as volumes increased for all 14 procedures. The relative importance of volume varied a great deal.

Sources:

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For More Information

The final report from the recent CIHI-commissioned review, *Analysis of Current Research Related to the Impact of Low-Volume Procedures/Surgery and Care on Outcomes of Care*, is available on the CIHI Web site (at www.cihi.ca). In addition to the literature review, this report contains the results of interviews with health care leaders in Canada and the U.S. Respondents agreed that there was a large body of existing research in the area, but they also said that more studies are needed to inform health policy and to more clearly understand why high-volume centres are linked to better outcomes.

Procedures Studied

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A systematic review of research published between 1979 and spring 2004 identified 161 relevant studies, which included 313 analyses of the volume-outcome relationship. The most common categories and types of procedures studied are shown below.

Categories of Procedures (Total Number of Studies)	Top Three Procedures Evaluated in Each Category	No. of Studies
Gastrointestinal procedures (76)	Colectomy	10
	Esophagectomy	9
	Gastrectomy	7
Vascular procedures (59)	Abdominal aortic aneurysm repair*	26
	Carotid endarterectomy	22
	Lower extremity arterial bypass	3
Cardiac procedures (36)	Coronary artery bypass graft	20
	Repair of congenital heart defects	5
	Aortic valve replacement	3
Percutaneous coronary artery procedures (22)	Percutaneous transluminal coronary angioplasty	11
	Percutaneous coronary intervention	4
	Cardiac catheterization	3
Orthopedic procedures (19)	Total hip replacement	8
	Hip fracture surgery	2
	Major hip and knee surgery	2
Pancreatic surgery (16)	Whipple procedure (pancreatico-duodenectomy)	10
	Pancreatectomy	5
	Whipple procedure or total pancreatectomy	1
Lung operations (13)	Pneumonectomy	5
	Lobectomy	3
	Lobectomy or pneumonectomy	3
Urological procedures (13)	Cystectomy	4
	Transurethral resection of the prostate	4
	Nephrectomy	3

*Includes the repair of ruptured and non-ruptured abdominal aneurysms.
Notes: Information on 59 other procedures and health conditions not reported in this table can be found in the full document, located on the *Health Care in Canada 2005* pages of the CIHI Web site (at www.cihi.ca). This material covers neurological and spine procedures, more general topics (for example, diagnoses and other health conditions), and categories with small numbers of studies.

Source: Urbach, D. R., T. A. Stukel, R. Croxford, et al. *Analysis of Current Research Related to the Impact of Low-Volume Procedures/Surgery and Care on Outcomes of Care*. (Review commissioned by the Canadian Institute for Health Information). Toronto: CIHI, 2004.

The CIHI-commissioned review showed that gastrointestinal operations, vascular procedures, and cardiac surgeries were studied most often. Of these areas, the top three procedures analyzed were related to the cardiac and vascular systems, including abdominal aortic aneurysm (AAA) repair, carotid endarterectomy, and coronary artery bypass graft (CABG).

Most research found that the greater the volume of procedures performed by a hospital or a physician, the better the outcomes. This was true in more than two-thirds (68%) of the 313 analyses. The strength of the connection between volume and outcomes also varied according to the type of surgical procedure. In almost a third of the analyses (31%), the relationship between volume and outcomes was either not statistically significant or it was undetermined. Only a few (1%) showed a significant association between higher volumes and poorer patient outcomes.

Other research has looked at outcomes other than mortality. For example, a study of pancreatic cancer patients in Ontario compared average lengths of stay for patients treated at low- (fewer than 22 cases), medium- (22 to 42), and high- (more than 42) volume hospitals.[6] Researchers found that average lengths of stay were significantly longer in low- and medium-volume hospitals. On average, patients stayed longer in low- (7.7 days longer) and medium- (9.2 days longer) volume hospitals than in high-volume hospitals.

The type of outcome examined was just one of many differences across studies. The CIHI-commissioned review identified a number of other challenges to summarizing the diverse research findings, including:

- **Conceptual challenges:** "Volume" was not consistently defined across studies. For example, some used hospital volume, while others used physician or geographic volume. It was also difficult to compare findings across studies because of differences in how procedures were defined, in the limits or thresholds set for high- or low-volume procedures, and in which outcome measures were used.
- **Methodological challenges:** Pre-existing risks and other characteristics affecting patient outcomes, such as age, severity of illness, and other medical conditions, were often not accounted for. If these characteristics vary systematically by hospital volume, they might affect results. Some researchers suggest using prospective clinical studies to help address this issue.
- **Statistical challenges:** Some studies did not use statistical models, and a few used inappropriate or limited models.
- **Data quality challenges:** While most studies used administrative data, the nature of the data and the degree of detail available varied considerably. Most studies (68%) did not provide information on data quality. The quality of data includes factors such as the completeness, validity, consistency, timeliness, and accuracy of the information.

Even if these challenges could be addressed, recent research suggests that the volume-outcome relationship is not straightforward. For example, a 2004 Ontario study showed that hospitals performing large volumes of surgery overall, not necessarily just higher volumes of a specific procedure, had better 30-day mortality rates.[7] The researchers suggest that this may reflect characteristics specific to hospitals performing high volumes of complex procedures. These institutions tended to be teaching hospitals, which may be better equipped with advanced technology and full-time specialists in established settings, such as cardiac care facilities.

Interpreting the Evidence

Two theories suggest why there might be a link between volumes and outcomes. One argues that "practice makes perfect." Proponents suggest that high-volume centres have better results because of experienced health care teams and a broader range of available resources.[8] The other theory suggests that the reason high-volume centres have better results is "selective referral." That is, primary health care physicians tend to refer more patients to centres of excellence.[9]

Regardless of which theory is correct (or if both have some merit), the precise nature of the relationship between volumes and outcomes is still unclear. For example, is there a specific number of cases needed to achieve the best outcomes? Do outcomes get steadily better with a higher volume of cases? In general, these questions remain unanswered, partly because different researchers have studied different volume cut-offs in different contexts.

Minimum Volume Thresholds?

Although controversial, a few organizations have suggested minimum numbers of surgeries that physicians or hospitals should perform. These targets are most common for cardiac surgery. For example:

- **The Cardiac Care Network of Ontario (CCN) recommended a minimum of 500 cardiac surgical cases for a hospital to ensure "quality patient outcomes."[10] In addition, its 2004 consensus panel suggested a minimum population referral base of 500,000 adults for a cardiac program if no cardiac surgical centre exists within a reasonable geographic distance.[11]**
- **In Manitoba, all cardiac surgery was centralized at St. Boniface General Hospital in Winnipeg following a cardiac care external review report recommendation. The province set 1,300 cases a year as the minimum target and specified that the rate be maintained.[12]**
- **In New Brunswick, an external review of the province's cardiac services recommended a rate of 120 bypass surgeries per 100,000 adults, based on a comparison of procedure rates in other areas of the country. The recommended target rate is designed to take into account the resources and infrastructure required to support the volume of such services.[13]**
- **The Leapfrog Group in the U.S., a group of large companies that purchases health care, recommends minimum volumes for bypass surgery (450 cases/year), angioplasty (400 cases/year), abdominal aortic aneurysm repair (50 cases/year), esophagectomy (13 cases/year), and pancreatic resection (11 cases/year).[14]**

As a result, some experts suggest investigating the relative contribution of other factors that might explain better outcomes.[15] They question whether the explanation is higher volumes, *per se*, or rather characteristics shared by these centres. For instance, some researchers suggest looking at how patients are selected; preoperative preparation; anaesthesia; the training, experience, organization, and composition of the surgical team; various processes of care; and individual attitudes of physicians.[16–18] Investigating what physicians and hospitals with better outcomes do differently may inform efforts to improve patient care in both high- and low-volume centres.[16, 19]

Consolidating Services: The Trade-Offs

Across the country and around the world, policy-makers are facing decisions about whether or not to consolidate surgical and other services. Concentrating procedures in centres that perform a large number of cases may lead to significant benefits for patients.[20, 21] Higher volumes have also been linked to better quality and more sustainable programs, particularly in regions with smaller populations.[22]

Other researchers suggest that consolidating services may reduce costs[23] and increase efficiency in the health system.[24] For example, there may be higher capacity utilization and/or economies of scale with larger volumes. Teams may also develop specialized expertise in caring for patients. On the other hand, some suggest that high-volume centres may have increased costs for surgical care.[25]

At the same time, there are questions about how best to balance the development of regional centres of excellence with providing access to care close to home, ensuring continuity of care, and supporting patient choice.[17, 21, 26–28] A variety of other potential considerations have also been raised, including:

- Hospitals with reduced surgical services may face difficulties caring for emergency and urgent patients.[29] For example, hip and knee replacement surgeries are among the most common procedures that orthopedic surgeons perform. A community that does not offer these services locally might have difficulties recruiting and retaining these specialists. Patients with serious orthopedic injuries would then need to be referred to another centre for care. The level and mix of work required to sustain emergency specialist services—and the frequency with which these services are needed—are likely to vary and are not well understood.

- While research suggests that higher-volume centres often have better outcomes, some lower-volume facilities may also have good results. However, because of the small number of cases involved, it may be hard to measure outcomes for individual low-volume centres.[30]
- Policy-makers typically also consider factors other than patient outcomes when deciding where to locate services. For instance, modern surgical care often requires access to sophisticated diagnostic tests and a range of specialists. These types of services are not available in all centres. In addition, a minimum number of care providers may be required for some services. For example, the number needed to sustain a 24/7 obstetrical service depends on how often professionals who deliver babies are on call and on the other services that they provide, among other factors.[26]
- Some researchers suggest physicians may burn out if they work in hospitals where only complex surgeries are performed.[29] Others believe that large hospitals may face difficulties in meeting increased demands for complex surgical procedures, especially those working within tight budgets.[31] As well, it has been suggested that consolidation in a small number of sites may increase the workload of staff in those centres.[17]

The issues involved are clearly complex. Deciding how and when to consolidate care is challenging, particularly given the many unanswered questions that remain.[32]

The "right" balance likely varies from procedure to procedure and place to place. In this context, systematic reviews of the literature such as the one presented in this chapter, an understanding of current Canadian volume patterns, and better information about patient outcomes at individual hospitals may all help to support decisions about how best to organize health services and distribute health care resources.

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6 The Canadian Volume-Outcome Experience

6 The Canadian Volume-Outcome Experience

Although the organization and funding of health services differs greatly between Canada and the United States, a common base of research evidence often informs health service delivery on both sides of the border.

A number of recent research studies show that patients treated in high-volume centres have better outcomes. Most of this research on whether patients treated in high-volume centres have better outcomes comes from the U.S. Researchers there conducted 80% of existing studies, according to a 2004 literature review commissioned by CIHI.[1] This review is the largest of its kind and covers the longest time period. It found that high-volume hospitals tended to have better outcomes for many surgical procedures, but the strength of the association varied by procedure and across studies. These conclusions echo those from two previous reviews by Halm (2002)[2] and Dudley (2000)[3] and their colleagues. The strength of the evidence has led experts on volumes of health services and health-related outcomes to conclude that volume is an important factor in health outcomes. For example, expert participants of an Institute of Medicine workshop concluded that although volume is not a perfect measure, it may be the best available indicator of quality of care, particularly for infrequently performed surgeries such as esophagectomies.[4]

To further explore the relationship between surgical volume and patient outcomes in Canada, CIHI conducted new analyses for nine elective (planned) procedures. We used methods similar to Birkmeyer and colleagues,[5] who conducted one of the largest volume-outcome studies in the U.S.

Point of Origin

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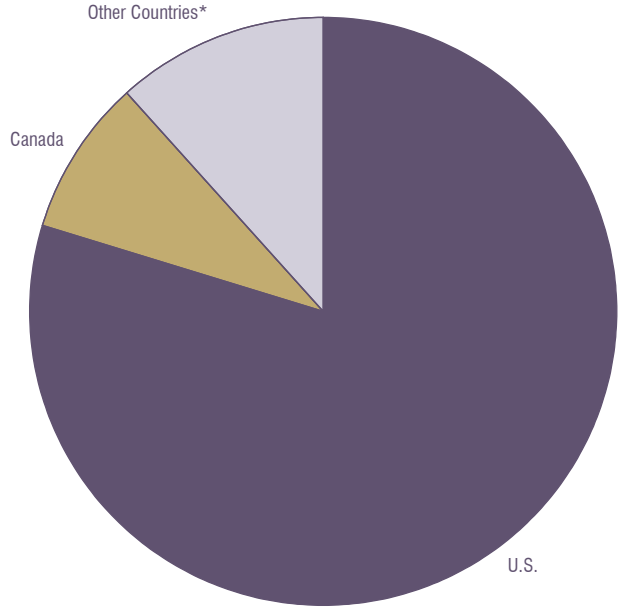
Between 1979 and spring 2004, the vast majority (80%) of volume-outcome studies were conducted in the U.S. Other studies were performed in Canada, the United Kingdom, Finland, Germany, the Netherlands, Europe, Japan, and Norway, or were multinational.



Notes:
* "Other countries" includes studies conducted in the UK, Finland, Germany, the Netherlands, Europe, Japan, Norway, the U.S./Canada, and the UK/the U.S., among others.

View Data

Source: D. R., Urbach, T. A. Stukel, R. Croxford, et al. *Analysis of Current Research Related to the Impact of Low-Volume Procedures/Surgery and Care on Outcomes of Care*. (Review commissioned by the Canadian Institute for Health Information.) Toronto: CIHI, 2004.

What We Did

Our analyses focus on 30-day in-hospital mortality rates for nine different procedures performed between 1998–1999 and 2003–2004. These surgeries were selected based on a review of published literature, external consultations, the frequency and complexity of the procedures, and the availability of data. In addition, the short-term mortality rates for these procedures were high enough that death was a meaningful outcome measure.

Short-term mortality is widely used as a measure of quality of care.[1] Some argue that 365-day (or longer) mortality may be a more meaningful measure of survival. However, as time passes, the link between mortality and surgical factors weakens. Other things—such as after-care and rehabilitation, other diseases, and supports in the community—may affect patients' experiences.[6] In addition, tracking one-year survival requires linking hospital data with vital statistics records. This remains challenging in many parts of the country. Data gaps also exist for other potentially interesting outcome measures, such as recovery time after surgery, patients' functional status, and changes in quality of life.

The Nine Procedures

- **Unruptured abdominal aortic aneurysm (AAA) repair** involves opening the abdomen, removing the aneurysm (a bulge in a weakened blood vessel or an area in the heart), and sewing a synthetic tube in its place.
- **Carotid endarterectomy** is the surgical removal of plaque deposits that are reducing or blocking blood flow in the carotid artery. Carotid arteries are located on the left and the right sides of the neck, delivering oxygen-rich blood from the heart to the head and brain.
- **Colon/rectal surgery** is the complete or partial surgical removal of the colon and/or rectum.
- **Coronary artery bypass graft (CABG)** is surgery that reroutes (bypasses) the blood flow around blocked arteries near the heart, restoring blood supply to the heart.
- **Esophagectomy** is the complete or partial surgical removal of the esophagus, typically used to treat cancer.
- **Lobectomy** is the surgical removal of a lobe of the lung, typically used to treat lung cancer.
- **Pneumonectomy** is the surgical removal of an entire right or left lung, typically used to treat lung cancer.
- **Percutaneous transluminal coronary angioplasty (PTCA)** opens a blocked coronary artery using a balloon-tipped catheter that is guided to the obstruction and inflated to restore blood circulation to the heart.
- **Whipple surgery (pancreaticoduodenectomy)** is the surgical removal of the head of the pancreas and the duodenum, and sometimes a portion of the stomach and other tissues; it is typically used to treat cancer.

The Fine Print

Our methods are based on those used by Birkmeyer and colleagues (2002).[5] Key features of our approach are highlighted below. Please see the technical report on the *Health Care in Canada 2005* section of our Web site (www.cihi.ca) for further details.

Data Source: The data are from the Discharge Abstract Database for fiscal years (April 1 to March 31) 1998–1999 to 2003–2004. Canadian hospitals outside of Quebec and parts of Manitoba provide CIHI with these data. These analyses primarily use data on procedures, patient demographics, and discharge status, including deaths. Reabstraction studies suggest that the information on procedures and deaths are accurate. The studies have found high levels of agreement for these variables (over 90% for procedures and for the variable we used to determine deaths in 2001–2002 and 2002–2003). Detailed information about the quality of data in the Discharge Abstract Database is available on CIHI's Web site.

Patient Selection: Our study focuses on adults aged 20 years or older who had planned (not emergency) surgery requiring an overnight stay in an acute care hospital. To avoid duplication, only patients who had the procedure assigned as the first procedure performed during their hospital stay were included in our analyses. Since combined procedures are more complex, we excluded bypass surgery patients who also had valve repair/replacement or carotid endarterectomy. Similarly, we excluded carotid endarterectomy patients who had this procedure in combination with bypass surgery or valve repair/replacement. Patients who underwent repair of unruptured abdominal aortic aneurysm (AAA) were included only if they had both a diagnosis of AAA (without mention of rupture) and a procedure code indicating unruptured AAA repair. This excludes patients having aortic surgery for occlusive disease (atherosclerosis).

We examined the relationship between hospital volume and 30-day in-hospital mortality for nine procedures. Some of these procedures are performed both in day surgery and in-hospital. However, a patient undergoing a procedure in day surgery may be clinically different from one undergoing the same procedure as an in-hospital patient. Because we focus on in-hospital procedures, all patients undergoing a procedure in day surgery were excluded from these analyses. As well, patients whose procedures were cancelled or performed out-of-hospital were excluded.

Analytical Methods: We used a statistical technique known as logistic regression to assess the relationship between hospital volume and the rate of deaths in-hospital within 30 days of admission for each procedure group.[i] The effects of age, sex, the presence of other diseases (called comorbidities), and the year of the procedure were adjusted for, to avoid potential confounding. We measured comorbidities using the Charlson Comorbidity Index.[10] The Charlson index is a weighted score based on the number and type of diagnoses on the hospital discharge abstract. A higher score generally indicates a greater severity of illness. We calculated this index on the basis of preoperative diagnoses, with the exception of the most responsible diagnosis entered in the hospital discharge abstract.[11, 12]

What Is Counted: Deaths from any cause within 30 days of hospital admission in any hospital were counted, not just deaths in the hospital where the patient was first treated. Deaths within 30 days that occurred outside of hospital were excluded.

What the Data Show

Our analyses of more than 180,000 surgeries between 1998–1999 and 2003–2004 showed that hospital and patient characteristics vary by procedure. Men were more likely than women to undergo each of the procedures studied, possibly indicating sex differences in disease rates or other factors.

Colon or rectal excision was the most common type of operation studied, followed by bypass surgery and angioplasty. However, in hospitals where cardiac procedures were performed, there were an average of 310 bypass surgeries and 168 angioplasties each per year, compared to 45 colon or rectal excisions.

At the other extreme, esophagectomy, pancreatic cancer surgery (Whipple), and pneumonectomy were the least common procedures included in the analyses. Hospitals doing these operations performed, on average, four or five per year.

i The potential effect of clustering of patients within hospitals (that is, correlated outcomes) on standard errors was accounted for in separate analyses using generalized estimating equations (GEE).[7] Correlated outcomes could occur since patients could share the same provider in the same hospital. Consideration of this "relatedness" in the analyses can be thought of as a correction factor.[8] The statistical significance (if one exists) of hospital volume on outcome for a particular procedure may be less exaggerated with this correction.[8, 9] Since estimates using this method were similar to estimates produced using simple logistic regression, results using the latter method are reported here.

Although relatively uncommon, as shown in the table below and in the literature, esophagectomies and Whipple procedures are associated with a higher risk of surgical complications and death. These operations are frequently performed on older patients, who are also at higher risk of adverse events (that is, undesired or unplanned outcomes associated with health care).

What, How Many, and Who

31

The frequency and complexity of the nine procedures we studied, as well as the characteristics of the patients who receive them, vary considerably. Also, not all procedures are performed in hospitals. The table below outlines these differences based on the typical adult inpatient experience between 1998–1999 and 2003–2004 in Canadian hospitals outside of Quebec and parts of Manitoba.

Procedure	Total No. of Inpatient Procedures Included in Analyses	Average No. of Procedures per Hospital per Year	Average Age	% Female Patients
Unruptured abdominal aortic aneurysm repair (AAA repair)	12,221	24	71	19
Carotid endarterectomy	14,551	40	69	35
Colon/rectal surgery (colon or rectal excision)	67,490	45	64	49
Bypass surgery	41,886	310	64	19
Esophagectomy	1,038	4	63	19
Lobectomy	8,610	20	65	47
Pneumonectomy	1,668	5	63	34
Angioplasty (PTCA)	35,710	168	62	26
Whipple procedure	1,395	5	62	46

Note: The table above reflects cases included in our analyses.

Source: Discharge Abstract Database, CIHI.

What Is an Odds Ratio?

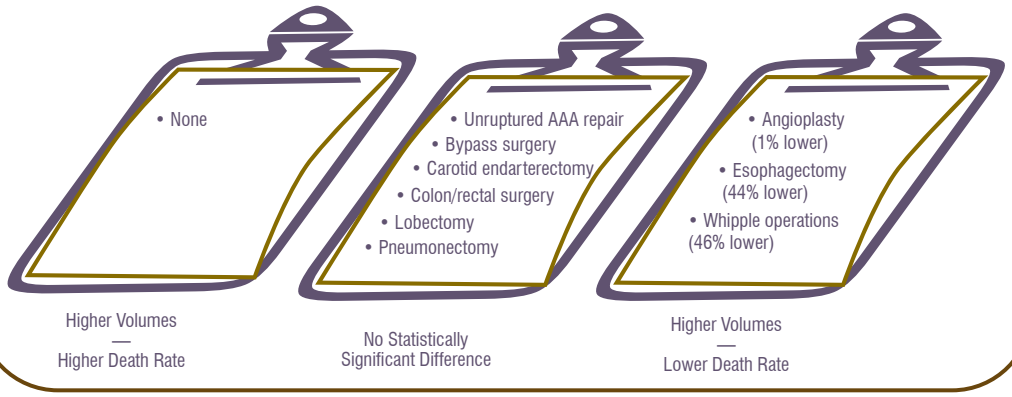
An odds ratio indicates the strength of the association between a predictor and an outcome (for example, age and mortality).[13, 14] It is a way of comparing the likelihood of an outcome for multiple groups.[13, 15] For example, using males as the reference group, an odds ratio of one means an event is equally likely for both sexes. If greater than one, the event is more likely for females; if less than one, the event is less likely for females.[13, 16]

An odds ratio is a point estimate of the association.[16] Confidence intervals tell us about the precision of the estimate and help determine whether the estimate is statistically significant. The confidence interval also provides a range within which the true value falls 95 percent of the time. For example, in the analysis of unruptured abdominal aortic aneurysm (AAA) repair, an odds ratio of 1.35 was obtained for every five-year increase in age after adjusting for hospital volume, comorbidity, sex, and year of procedure. Thus the risk of dying in-hospital within 30 days of admission for unruptured AAA repair among patients aged 80 was 35% higher than for 75-year-olds. Because 1.0 is outside the confidence interval of 1.3 to 1.5, we know that this association is statistically significant based on our study sample.

32

What Are the Odds?

When we think of the relationship between volume and outcomes, we can consider three scenarios: higher volume may be linked to a higher adjusted death rate; higher volume may be linked to a lower adjusted death rate; or, there may be no association between the two. Based on our results, for every 10 additional procedures a hospital performed, there was a lower risk-adjusted mortality rate for three procedures (angioplasty, esophagectomy, and Whipple). For the remaining six procedures, there was no significant linear association between hospital volume and 30-day in-hospital mortality after adjusting for patient characteristics and year of procedure.



Source: Discharge Abstract Database, CIHI.

Comparing Mortality

Fortunately, relatively few patients die during or immediately after surgery. For the nine procedures that we looked at in detail, only one percent (1.2%) of patients died in hospital within 30 days of their admission. Risk-adjusted mortality rates ranged from less than half of one percent for patients who underwent carotid endarterectomy (0.2%) or angioplasty (0.2%) to almost six percent (5.9%) for pneumonectomy patients.

Most volume-outcome studies use one of two methods to identify which factors are associated with patient deaths. In the first, volume is examined as a "continuous" variable (for example, checking if for each additional 10 procedures per year, the risk of death changes). In the second method, volume is categorized into volume groupings (comparing the chance of death in the highest-volume category to the chance of death in the lowest-volume category). In these analyses, we used both approaches, as they provide complementary perspectives. Our results confirm that hospitals that treat more patients tend to have better outcomes for some types of surgery, but the nature and strength of the relationship varies from procedure to procedure.

The first approach (using hospital volume as a continuous variable) consisted of checking to see whether age, sex, hospital volume, comorbidities, and the year the procedure was performed mattered. Some of these factors were linked to an increased risk of dying; others were associated with better patient outcomes. For example, older patients had higher mortality rates across all procedures. Patients with more health problems also tended to have higher death rates, but not always. Likewise, sex mattered in some cases. Compared to men, women who had colon/rectal surgery, lobectomy, or Whipple procedures were less likely to die in hospital—their risk of death was 36% to 47% lower than that of men. But women were more likely to die after bypass surgery—they had a 49% higher risk of death than men.

We also used this approach to look at the relationship between the volume of surgery performed in a hospital and the outcomes of its patients. It asks "Is more always better?" The answer: in three of nine cases there was a steady decrease in risk-adjusted death rates as surgical volumes increased. For every 10 additional procedures a hospital performed, the risk of mortality was 44% lower for esophagectomies and 46% lower for Whipple operations. A smaller, but still statistically significant effect, was also seen for angioplasty (1% reduction). For the remaining six procedures, a steady increase in volume was not associated with significantly lower—or higher—mortality.

What Is the Risk?

33

For all procedures, older patients had a higher 30-day in-hospital mortality risk. Associations for other factors, as measured by odds ratios, varied by procedure. Higher hospital volume was associated with lower mortality rates for esophagectomy, angioplasty, and Whipple procedures. For the remaining six procedures, a steady increase in volume was not associated with significantly lower mortality. Some other studies with larger samples, however, have shown a significant association between volumes and outcomes for these six procedures.

		Changes in the Likelihood of Dying Within 30 Days			
Procedure	Death Rate*	For Every 10 Additional Procedures	For Every Five-Year Increase in Age	For Women (Relative to Men)	Comorbidities
Unruptured abdominal aortic aneurysm repair (AAA repair)	2.3%	-3%	+35%†	+27%	+39%†
Carotid endarterectomy	0.2%	-6%	+38%†	-18%	+99%†
Bypass surgery	0.7%	0%	+40%†	+49%†	+38%†
Colon/rectal surgery (colon or rectal excision)	0.6%	0%	+56%†	-36%†	+15%†
Esophagectomy**	4.3%	-44%†	+27%†	-14%	+1%
Lobectomy‡	1.3%	-3%	+35%†	-47%†	+15%†
Pneumonectomy‡**	5.9%	-4%	+33%†	-18%	0%
Angioplasty	0.2%	-1%†	+34%†	+30%	+81%†
Whipple procedure**	3.0%	-46%†	+19%†	-47%†	+6%

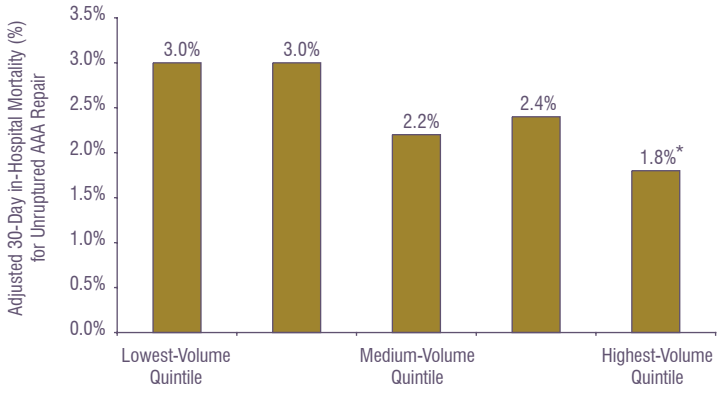
Notes:
* Adjusted for age, sex, comorbidity, hospital volume and year procedure was done.
** Mortality rate was not adjusted for year the procedure was done due to small counts.
† Statistically significant at $p<0.05$.
‡ Based on advice from clinical experts, hospital volume for lung surgeries is the combined volume of lobectomy and pneumonectomy.

Source: Discharge Abstract Database, CIHI.

Complex Relationships?

34

Our study includes more than 12,200 repairs of unruptured abdominal aortic aneurysms (AAA) conducted between 1998–1999 and 2003–2004. When hospital volume was looked at as a linear relationship (that is, as an increase of 10 procedures), there was no association between volume and 30-day in-hospital mortality, even after risk adjustment (adjusted for age, sex, comorbidity, and the year the procedure was done). Another approach is to sort hospitals performing these procedures into five evenly sized groups (quintiles) based on the average number of operations performed each year. Short-term (30-day) in-hospital death rates for unruptured AAA repair patients (adjusted for patient and hospital characteristics), appear to vary across these volume groups. There was a significant difference only between the lowest and highest volume quintiles.



Note: *Statistically significantly different from the lowest hospital volume quintile, at $p<0.05$.

Source: Discharge Abstract Database, CIHI.

The second set of analyses (using volume categories, or in this case, quintiles) answers a different question: "Is doing a lot better than doing a few?" This method sorts hospitals into five evenly sized groups (quintiles) based on the average number of operations they perform each year. We then checked to see whether risk-adjusted death rates differed between the group doing the least surgery and the one doing the most.

Due to the nature of the method, meaningful quintiles can be formed only for procedures that are relatively common. One such procedure is the repair of unruptured abdominal aortic aneurysms (AAA). The initial analyses looked for a linear relationship between hospital volume and 30-day in-hospital mortality rates. They asked whether there was a consistent difference between death rates in hospitals performing 10 versus 20 versus 30 cases per year. No such association was found for unruptured AAA repair, even after risk adjustment.

The quintile analyses offer a different perspective. Hospitals were divided into groups performing less than 19, 19 to 34, 35 to 52, 53 to 83, and 84 or more unruptured AAA repairs per year. Short-term in-hospital death rates in the lowest-volume hospitals (3.0%) exceeded those in the highest-volume hospitals (1.8%). If all hospital groups had been able to achieve the 1.8% adjusted mortality rate, about 83 fewer patients would have died.

Thus, the two methods together can help to untangle the sometimes complex relationship between volumes and outcomes of care. We found that a relationship does exist, at least for some types of care. Our study, like previous research from the U.S., suggests that the nature and strength of this association varies from procedure to procedure. For some types of surgery, mortality rates fall steadily as volume increases. For others, the difference in death rates between hospitals doing 10 versus 20 cases may not be the same as between those doing 50 versus 60 cases. When this occurs, it may *appear* that there is no significant association between volumes and outcomes. Yet, as the unruptured AAA repair example illustrates, this is not always the case. For this type of surgery, patients at the highest-volume centres were less likely to die than those in the lowest-volume centres, but there was no significant difference in outcomes for the remaining volume categories.

Understanding the nature of the volume-outcome relationship—both in general and for specific procedures—may help inform decisions about where to locate care. Better information about outcomes other than short-term mortality—such as long-term survival, patients' quality of life, and the costs of care—may also provide insight into the effects of concentrating care in a few centres. So might an understanding of other factors that may influence the observed volume-outcome relationship. Our analyses suggest that associations exist for some procedures, but they do not necessarily imply causation (that is, higher hospital volume may not in itself cause improved outcomes). Hospital volume is often used as a proxy for quality because it can be easily measured, but it may be correlated with other factors or processes that underlie differences among hospitals.[17] We were able to address some of these factors in our analyses (for example, differences in patient demographics), but not all. Previous research suggests that characteristics of physicians, such as their surgical volume, expertise, education, practice patterns, and referral networks, may matter.[5, 17, 18, 19] Likewise, processes of care within various hospital volume categories—such as infection control procedures[20] or the use of evidence-based therapies such as statins and/or beta-blockers for cardiac patients[21]—may be important.

Information Gaps: Some Examples

What We Know

- The average number of procedures performed in Canadian hospitals for a range of surgeries.
- Variations in risk-adjusted 30-day in-hospital mortality rates for patients who have had various types of surgery.
- The relationship between hospital volume and 30-day in-hospital mortality for selected procedures, adjusted for patient characteristics and the year the procedure was performed.

What We Don't Know

- Of the broad range of procedures performed in hospitals today, which, if any, surgeries performed in hospitals with low volumes put patients at higher risk of complications, poor functional status or quality of life, and/or long-term mortality?
- When volume-outcome relationships are observed, what is the relative contribution of various factors such as hospital resources, organization/surgeon/team characteristics, and processes of care within and outside the hospital to this association? What happens when volumes change over time?
- For surgeries where a volume-outcome relationship exists, how many deaths could be prevented if surgery was provided only at higher-volume centres? What would be the trade-offs if such procedures were centralized?

What's Happening

- In Saskatchewan, the Health Quality Council (HQC), working closely with Saskatchewan Surgical Care Network (SSCN) and an advisory group of physicians and surgeons, is using administrative data to study the impact of surgical volumes on patient outcomes. They are examining a number of procedures, including ruptured and unruptured abdominal aortic aneurysm (AAA) repair, carotid endarterectomy, coronary artery bypass graft (CABG), percutaneous coronary intervention, pancreatic resection, esophageal resection and hepatic resection. Outcome measures include in-hospital and 30-day mortality, and combined stroke/mortality for the carotid endarterectomy procedure. Where the analyses identify opportunities to improve quality of care, the HQC will work with key stakeholders to plan and implement appropriate change strategies.
- Researchers at the University of Toronto and the Institute for Clinical Evaluative Sciences are studying the determinants of two outcomes for hospitalized patients: 30-day mortality and 30-day unplanned hospital readmission. Factors being explored include nurse staffing, physician expertise, work environment, preparation for discharge, and routine use of care maps or protocols.
- Researchers at the Hospital for Sick Children and the Institute for Clinical Evaluative Sciences recently examined the effect of subspecialty training on patient outcomes for children who had an inguinal hernia repair. Children operated on by general surgeons were more likely than those cared for by pediatric surgeons to have their hernia recur—1.10% versus 0.45%. For pediatric surgeons, the recurrence rate was independent of surgeon volume. However, for general surgeons, the risk of inguinal hernia recurrence decreased as surgeon volume increased. The highest-volume general surgeons had recurrence rates similar to the average for pediatric surgeons.

For More Information

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7

Distribution of Care in Canada

7 Distribution of Care in Canada

Today, only one site in Western Canada—Edmonton—performs open-heart surgery on children. In part, this reflects what was learned from the deaths of 12 children who had surgery in Winnipeg in 1994.[1] An inquest found that each died under very specific circumstances. Nevertheless, it concluded that "the limited number of cases [of pediatric cardiac surgery] that can be undertaken in a province like Manitoba, with a population of over one million represents an increased risk of morbidity and mortality, particularly in the case of high-risk surgery."[2]

Ontario, too, has debated this issue. In 2002, a review suggested that the pediatric cardiac surgery program at the Children's Hospital of Eastern Ontario in Ottawa be closed due to low patient volumes. The Minister of Health initially accepted the findings of the report. However, the decision was reversed following another review.[3]

Children's open-heart surgery is just one of many areas where policy-makers have faced decisions about whether to consolidate care in higher-volume centres. Many issues are typically considered when making these often-difficult decisions. Examples include evidence about volume and patient outcomes, geographic location of services, public views, hospital size and resources, and availability of skilled health care providers.

This chapter provides a snapshot of where we are now—and where we have come from. It focuses on the distribution and volumes of different types of care and how they have changed over time. In addition, the chapter also explores the challenge that distance to services poses in a country as large as Canada.

More Than Surgery?

In 2001, Nova Scotia reviewed provincial health services, including the distribution of hospital care throughout the province.[4] One of the review's key findings was the variation in the number of services provided by different hospitals. The authors argued that higher hospital volumes aid in the "development and maintenance of physician skill sets" and help improve quality of care. Several recommendations of the review related to hospital volumes, including:

- **Categorizing hospitals by demand for care and complexity of services**
- **Developing an optimal set of sustainable services for each hospital category**
- **Developing benchmarks for the minimum number of physicians needed to provide quality patient care for each program or service that each category of hospital provides**

The review recommended categorizing the 39 hospitals in Nova Scotia based on "distinct high-quality service offerings." It suggested two community-level categories, two district-level categories, and one provincial category. "Community A" hospitals, for instance, would provide family practice, basic radiography, basic laboratory, and Level 4 emergency care. "District" hospitals would support them with paramedics and ancillary, clinical, and infrastructure services. The clustering of services in these categories was based on analyses that showed that certain services work best together.

In the same year, Saskatchewan's Commission on Medicare also recognized that "a critical mass of patients who need care is essential to allow specialists to maintain their skills."[5] While it recommended that everyday care and emergency services be available close to patients' homes, the Commission proposed six requirements for a quality specialist care program:

- **A minimum of three to five specialists to meet emergency needs around the clock**
- **Skilled staff, such as anaesthetists and specially trained nurses, for assessment, treatment, and care**
- **Advanced diagnostic and monitoring services with staff to operate and maintain equipment and interpret results**
- **Enough cases that all the required specialists can maintain their skills**
- **Peer support and opportunities for professional development**
- **Enough specialists to sustain the program if one leaves**

The Commission's vision was for a network of regional hospitals that would provide medical care, basic emergency and outpatient services, x-rays, and laboratory tests. These hospitals would work with a small number of tertiary hospitals in larger centres that would provide a full range of acute care services.

More recently, Prince Edward Island has also debated which types of services should be available and where they should be located. In 2004, for example, while some residents fought to keep local services, the province announced that the hospital in Tyne Valley would no longer provide emergency services because of quality concerns raised in an accreditation report.[6]

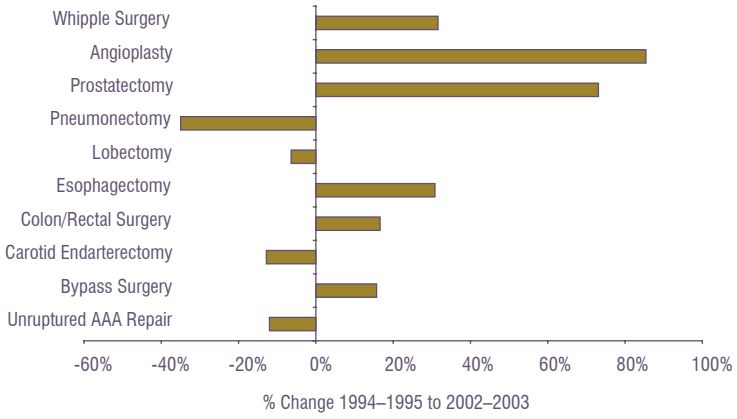
Distribution and Care Volumes in Canada

Few Canadians undergo highly specialized operations each year, but thousands have some type of surgery. How many procedures of a given type occur depends on a wide variety of factors. Volumes also fluctuate over time as technology, training, resources, and the health of the population change. For example, Canadian angioplasty rates rose 85% between 1994–1995 and 2002–2003. The increase was almost as large for prostatectomy (73%). Other types of surgery, such as lobectomy, are on the decline.

The Rise and Fall of Surgeries

35

Many, but not all, types of surgery have become more common in recent years. The graph below shows the percentage change in rate of procedures performed on inpatients in acute care hospitals per 100,000 adults aged 20 and over for 10 types of procedures between 1994–1995 and 2002–2003. Trends varied considerably—from an 85% increase in angioplasties to a 35% drop in pneumonectomies.



Note: Includes all procedures performed in acute care hospitals and patients 20 years of age and older.

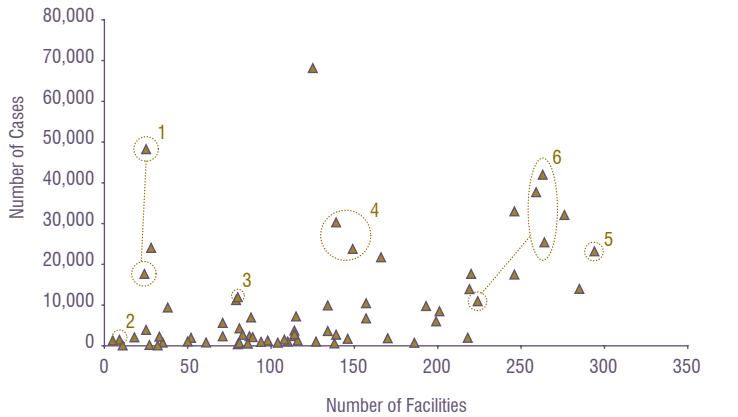
View Data

Source: Hospital Morbidity Database, CIHI.

Distribution of Procedures

36

Some types of cardiac surgery, such as bypass surgery and angioplasty are performed in a relatively small number of facilities. For other procedures, such as the surgical removal of the appendix, the reverse is true—a relatively small number occur in many facilities. The graph below shows how many hospitals provided different types of inpatient surgery in 2003–2004 and the number of adult cases they performed. (Each dot on the graph represents a surgical case mix group.)



1 Heart Bypass Surgery
2 Heart or Lung Transplant
3 Vascular Surgery
4 Hip and Knee Replacement
5 Surgical Removal of Appendix
6 C-Sections

Note: Data from Quebec and parts of Manitoba are not included in the Discharge Abstract Database, and therefore are not captured in the above figure.

View Data

Source: Discharge Abstract Database, CIHI.

For both relatively rare operations and more common procedures, there are large variations in the number of hospitals performing different types of surgery. In 2003–2004 for example, nine hospitals performed just under 1,500 heart or lung transplants that took place outside of Quebec. In the same year, about half as many patients had their spleens removed, but they received care in 104 hospitals.[i]

Consolidation of Care—Or Not

For most types of surgery, there are large variations in the numbers of cases performed by different hospitals. Many hospitals provide a very small number of procedures. A much smaller number of centres perform higher volumes of surgery.

In 2003–2004, hospital volumes varied significantly for the 10 procedures examined.[ii] For example, over this period, more than 12,000 adult colon/rectal surgeries were performed in 245 hospitals outside of Quebec and parts of Manitoba. Among these, 72% were performed in hospitals treating 60 or more cases annually; 4% were in facilities that treated less than 16 cases per year. For carotid endarterectomy, over 2,000 procedures were performed in 58 hospitals—8% were carried out in hospitals that did less than 17 procedures. For all procedures examined, most care was provided at higher-volume centres.

i, ii Data from Quebec and parts of Manitoba are not included in CIHI's Discharge Abstract Database.

Why Does Volume Vary?

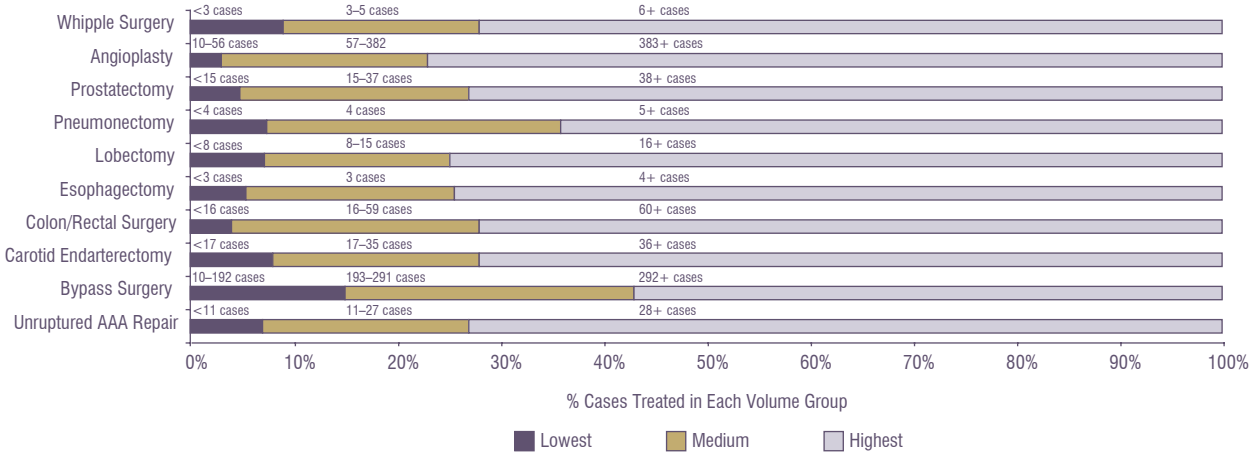
Reasons for disparities in volume include:

- **Prevalence of disease:** Some procedures occur less often than others because they treat less common diseases. For example, fewer patients need Whipple procedures for pancreatic cancer than require bypass surgery for heart disease. The underlying burden of illness often varies across the country, which may partly explain regional variations in rates of surgery.
- **Population profile:** Certain populations have unique characteristics and conditions. If a region has a large elderly population, for example, certain conditions may be more common. This may create a greater need for specific services.
- **Demand:** Services are not concentrated equally across the country. Areas with large populations tend to have correspondingly large numbers of patients needing care. As a result, it may be easier for these areas to achieve higher volumes in individual centres.
- **Supply/capacity:** The availability of qualified professionals, suitable facilities, and other resources may affect volumes of surgery.
- **Practice patterns and patient preferences:** Volumes may depend on local approaches to treating disease. For example, although the prevalence of prostate cancer may be the same in two provinces, physicians and/or patients in one may choose to operate more often, while those in another may tend to choose less invasive treatments, such as medication or "watchful waiting." Likewise, past trends in surgery may affect current rates. For example, mothers with previous caesarean sections are more likely to deliver subsequent babies surgically.

Concentration of Select Procedures

37

Some procedures are more concentrated than others. For 10 different operations, we divided hospitals into three equally sized groups (tertiles) based on how many adult inpatient cases they treated in 2003–2004. The graph below shows the percentage of cases treated in each group (lowest-, medium-, and highest-volume facilities). It also indicates the range of cases treated in each group.



Notes: Data from Quebec and parts of Manitoba are not included in the Discharge Abstract Database, and therefore are not captured in the figure above. The data include all patients 20 years of age or older, patients who had the procedure assigned as the first procedure performed during their hospital stay, and inpatients receiving care in acute care hospitals. Day surgeries are excluded.

View Data

Source: Discharge Abstract Database, CIHI.

Cardiac surgery, in contrast, is much more concentrated. Researchers suggest that coronary artery bypass graft (CABG) surgery is a good candidate for regionalization because it is highly complex.[7] Many studies have found a relationship between higher CABG volumes and lower rates of morbidity and mortality.[7–10]

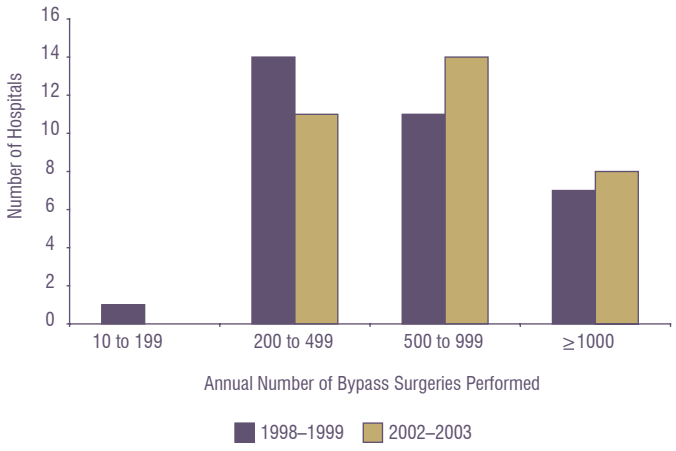
A number of provinces have consolidated open-heart surgery in regional centres. For example, since the procedure was first introduced in the 1970s, bypass surgery patients in Ontario have been directed to high-volume hospitals.[11] In 1998, the Cardiac Care Network's Consensus Panel on Cardiac Surgical Services recommended to the Ontario government that surgical services be provided as close as possible to a patient's home, while maintaining minimum volumes "to ensure quality and efficiency are achieved and maintained."[12] Other provinces have similar approaches. For instance, located at the Saint John Regional Hospital, the New Brunswick Heart Centre provides adult cardiac care and surgical procedures for all of New Brunswick. For certain specialized cardiac services—bypass surgery among them—provincial residents may also receive care outside New Brunswick. Following a 2004 review of patient outcomes and other factors, changes were made at the Heart Centre, including expanding the cardiac care program.[14] Likewise, Canada's Premiers (with the exception of Quebec's) have jointly endorsed shared centres of excellence in pediatric cardiac surgery.[13]

In 2002–2003, over 23,000 adult bypass surgeries[iii] took place in Canada. These procedures were spread among 33 hospitals. There were 11 hospitals performing between 200 and 499 bypass surgeries. In contrast, eight centres performed more than 1,000 surgeries each. As time goes on, more patients are receiving bypass surgeries in higher-volume hospitals. In 1998, 55% of hospitals performing bypass surgery each did 500 operations or more. By 2002–2003, two-thirds (67%) did.

Centralization of Bypass Surgery

38

Between 1998–1999 and 2002–2003, there was a decrease in the number of hospitals across the country performing the lowest volumes of bypass surgery. In fact, in 2002–2003, no hospitals performed less than 200 adult cases.



Notes: Includes patients 20 years of age or older treated in acute care hospitals.

Source: Hospital Morbidity Database, CIHI.

View Data

iii Includes patients 20 years and older who had a procedure as an inpatient in an acute care hospital that reported performing at least 10 surgeries. Data were extracted from CIHI's Hospital Morbidity Database.

Coming and Going for Care

A large and changing mix of factors influences decisions about where to provide care. Patient outcomes are often considered, but a desire to reduce costs and/or improve efficiency may also drive efforts to consolidate surgical services.[4, 11, 12, 15] On the other hand, some researchers suggest that increased travel time may affect access to care,[16] particularly for people in rural areas.[17] Others argue that access would not necessarily be affected.[18] As well, it has been suggested that consolidating surgery might affect the availability of emergency care in places no longer offering scheduled procedures and/or might reduce their ability to attract and retain specialists.[17] These and many other factors contribute to the balancing act that health care planners and policy-makers face when making decisions about where to provide care.

Today, most patients—particularly those who need more common procedures—receive care in their home regions. One measure of the balance between the number of people who travel into an area to receive care ("inflow") and those who leave it for care ("outflow") is an inflow/outflow ratio. This ratio compares the number of patients who underwent a procedure in a given region (regardless of where they live) to the total number from the region who had the procedure (regardless of where they had their procedure). A higher ratio suggests more consolidation, with many patients coming from outside a region for care. For example, bypass surgery tends to be more centralized than more common types of operations, such as hysterectomies.

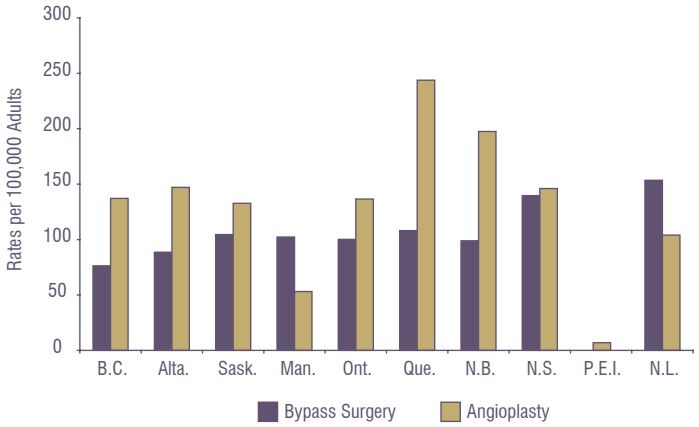
Variations in Cardiac Care

Bypass surgery and percutaneous transluminal coronary angioplasty (PTCA) both aim to improve coronary artery circulation. Some patients may benefit from either of the procedures; others may need to have both. Still others may benefit from one procedure more than the other. CIHI data show that rates of these types of surgery vary significantly across the country, but so does the mix of procedures performed.

A Look at Cardiac Surgery

39

Some provinces, such as Quebec, perform more than twice as many angioplasties as bypass surgeries in acute care hospitals. In others, such as Newfoundland and Labrador, the mix of care is very different. The graph below shows rates of inpatient surgery per 100,000 adults aged 20 and over in 2002–2003. Consistent with other volume-based analyses in this chapter, these rates reflect where care was provided, not where the patients lived.



Note: Territories are not included due to small cell sizes. Day surgeries are excluded.

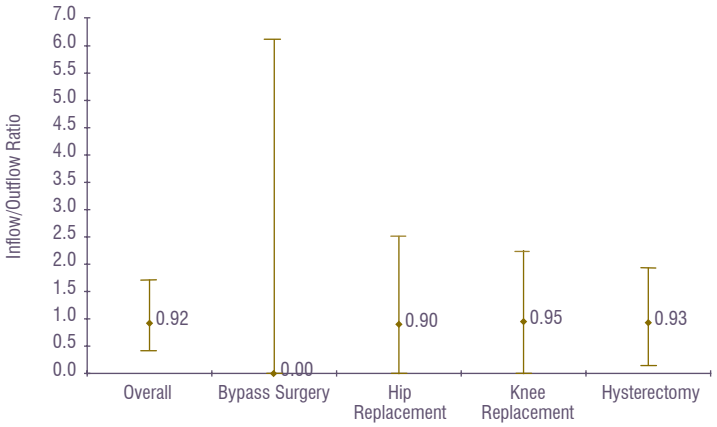
View Data

Source: Hospital Morbidity Database, CIHI.

Getting Care in Your Home Region

40

The graph below shows the range of inflow/outflow ratios for health regions with populations of 75,000 or more. The median—the point that half of all regions' scores are above and half below—is also shown. The overall inflow/outflow ratio is presented, along with ratios for four specific procedures: bypass surgery, total hip replacement, total knee replacement, and hysterectomy. A higher ratio indicates more consolidation of services. Data are for 2002–2003.



Note: A ratio of zero means that a particular procedure was not performed in the region in question; residents of the region received care outside of their home region.

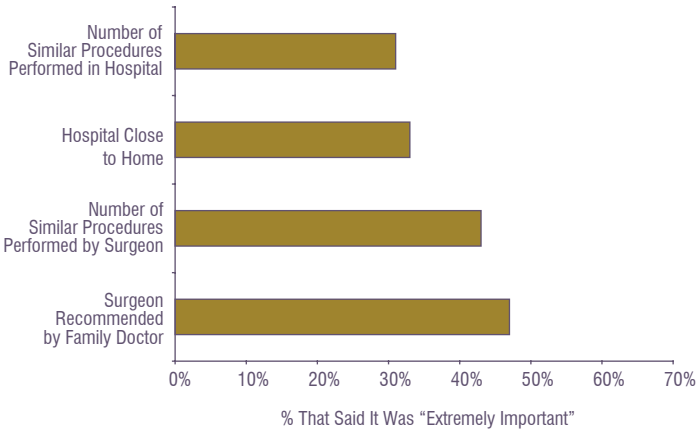
View Data

Source: Hospital Morbidity Database, CIHI.

What Matters to Canadians

41

In 2004, CIHI commissioned a survey of Canadian adults to find out what factors would be important to them should they need planned surgery. Almost half said that having a surgeon recommended by their family doctor (47%) and the number of similar cases performed by the surgeon (43%) were extremely important.



View Data

Source: CIHI-commissioned survey (Research House), 2004.

Travelling for Care—What Canadians Say

Quality is more important than closeness for many Canadians, according to a December 2004 survey commissioned by CIHI. On our behalf, Research House asked 1,230 Canadians aged 20 years or older about the extent to which they would consider the following issues when undergoing planned surgery:

- Proximity of a hospital to their home
- Reputation of the surgeon
- The surgeon was referred by a family doctor
- The number of similar procedures performed in a hospital or by a surgeon

Overall, 33% of respondents said that it would be "extremely important" that the surgery take place at a hospital close to their home (at an error rate of about ±2.8%). Percentages varied from 17% in Manitoba to 55% in Prince Edward Island.

Age also makes a difference. Younger adults were less likely to value travelling short distances for care than older Canadians. About a quarter (24%) of respondents in their 20s said that it was "extremely important" that surgery take place at a hospital close to their home. This compares with 38% of respondents aged 50 to 64 and 41% of those over 64.

However, when forced to choose, only 9% of those surveyed were primarily concerned with how close to home they received their care. More valued having a surgeon recommended by their family doctor (42%) or the number of similar procedures the surgeon had performed in the past (41%).

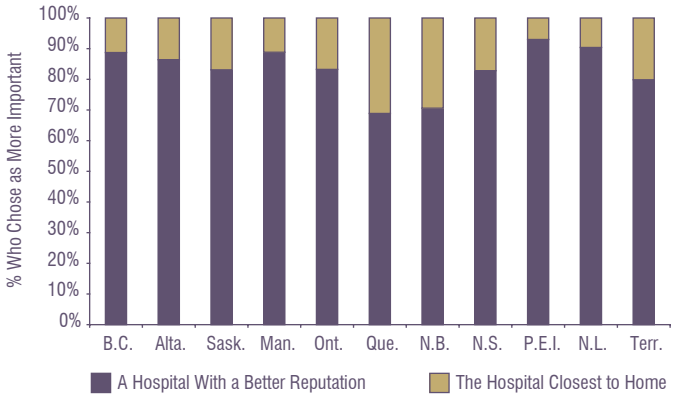
Does Age Matter?

In a 2004 survey of Canadians, how close to home a planned surgery would take place was more important for seniors than for younger adults. This finding is consistent with previous research from the United States. Parents of children referred to a pediatric cardiology clinic in California were recently surveyed. Most (63%) said that they would travel two hours more to a regional referral hospital if this would reduce their child's chance of dying after cardiac surgery from 4% to 3%.[19] In contrast, patients at a veterans' hospital in Vermont (median age of 65) were less willing to travel. Almost half (45%) said that they would prefer local care even if 6% of pancreatic cancer surgery patients died at their local hospital, compared to 3% at the regional centre.[20]

Quality Trumps Closeness

42

When forced to choose between going to a hospital further away that had a better reputation for performing a certain procedure versus going to the hospital closest to home, survey respondents in all provinces and territories placed more value on the hospital's reputation. More respondents in Quebec valued closeness of the hospital to home, while fewer people in Prince Edward Island valued this factor.



Note: A small percentage (less than 2% overall) of respondents did not answer the question or said they did not know.

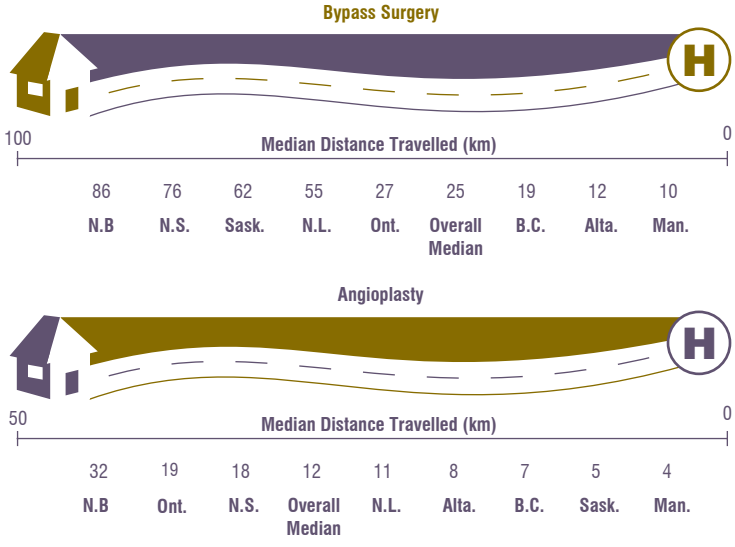
View Data

Source: CIHI-commissioned survey (Research House), 2004.

Travelling for Cardiac Care

43

Across Canada, adults treated in their home province travelled a median distance of 25 kilometres to undergo bypass surgery and 12 kilometres for angioplasty in 2001–2002. The median is the point at which half the patients travelled shorter distances and half travelled longer.



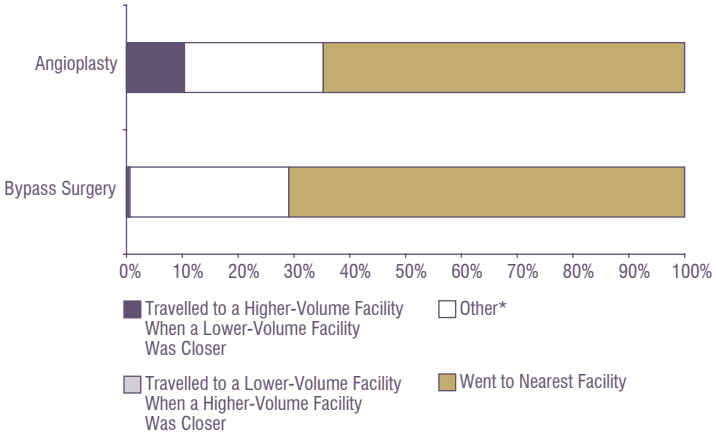
Notes: Patients treated outside of their home province or territory, and patients transferred between hospitals, were excluded from these analyses. Data from Quebec were not available. The territories and Prince Edward Island did not have any cases after exclusions were applied.

Source: Hospital Morbidity Database, CIHI.

Passing By Hospitals for Care

44

Most patients receiving bypass surgery (CABG) and angioplasties (PTCA) were treated at the hospital closest to their home in 2001–2002. However, some patients travelled relatively long distances—passing by up to 9 hospitals for CABG and 15 for PTCA—to receive care. The graph below shows the percentage of patients who were treated at a higher-volume facility when a lower-volume centre was closer, and vice versa. It also shows those who were treated at their nearest hospital.



Notes: Data only included hospitals that performed 10 or more bypass surgeries and angioplasties. Patients treated outside of their home province or territory and patients transferred between hospitals were excluded from this analysis. Only hospitals in the province of residence of the patients were included. Data from Quebec were not available. Hospitals were categorized into three equally sized groups called "tertiles," based on the number of surgeries that were performed in them. A third of the procedures occurred in each of the three-volume categories (lowest, medium, and highest groups).
* "Other" includes patients travelling past a lower-volume facility to go to a medium-volume facility, medium- to higher-volume facility, medium- to lower-volume facility, and higher- to medium-volume facility.

View Data

Source: Hospital Morbidity Database, CIHI.

A Focus on Cardiac Care

Even though cardiac surgery is more centralized than most types of surgery in Canada, most patients travelled relatively short distances to receive care. Using a straight line, half of all patients treated in their home province travelled 25 kilometres or less for bypass surgery in 2001–2002.[iv] Angioplasty tended to be provided even closer to home—half of all patients travelled 12 kilometres or less. However, some travelled greater distances. Out of every 100 patients, 10 travelled 210 kilometres or more for bypass surgery and 150 kilometres or more for angioplasty.

Most patients who had bypass surgery or an angioplasty were treated at the hospital closest to their home that provided that type of care. But that was not the case for about a third of patients who had bypass surgery (29% in 2001–2002). More than a third (35%) of patients who had angioplasties also went elsewhere. There are many potential reasons for this finding, including availability of specialists, equipment, or other facilities; policies and practice patterns; patient preferences; and other factors.

Given that not all patients receive care at their nearest hospital, how does the distance travelled relate to patient outcomes? Overall, 2.7% of adult bypass surgery patients died in hospital within 30 days of their hospital admission in 2001–2002. Those who received care at the hospital closest to their home had a mortality rate of 1.7%. Patients who passed by one or more lower-volume hospitals[v] on their way to a higher-volume centre had a similar death rate: 2.1%.[vi] (The difference between these rates was not statistically significant.) In contrast, there was a statistically significant difference in mortality between angioplasty patients who passed by one or more low-volume centres (0.7%) and those treated at the hospital closest to home (1.6%).

iv Data from Quebec are not included.
v Hospitals were categorized into three equally sized groups called "tertiles," based on the number of surgeries that were performed in them. A third of the procedures occurred in each of the three-volume categories (lowest, medium, and highest groups).
vi These rates are not adjusted for differences in patient characteristics, such as age, sex, or co-existing illness.

Information Gaps: Some Examples

What We Know

- How many selected surgical procedures are performed on inpatients in acute care hospitals, and the number of facilities across Canada performing these procedures.
- Trends in the number and rate of selected surgical procedures, and how rates of care vary across the country.
- How many patients receive care in their home region, compared to those who travel into another health region for care (that is, the inflow/outflow ratio).
- The importance Canadians place on getting care close to home, compared with other factors that go into decisions about where to seek care.

What We Don't Know

- What mix of health services would best respond to the needs of people living in different parts of the country? What does this imply for rates of surgery? How is this rate likely to change over time?
- How do patient outcomes, satisfaction, access to care, and health care costs change as the volume and distribution of surgery shifts over time? What about the impact on patients' families, health professionals, and those providing other types of health care?
- To what extent do patients have choices about where to seek care? What factors affect their decisions?
- What physician, institutional, and process factors are most important in predicting patient and other outcomes? In this context, what is the relative importance of the volume of services provided?

What's Happening

- Average volumes of care provided in hospitals for some services, such as cardiac bypass surgery, have risen in recent years. The distribution of many other types of care has remained stable.
- At the September 2004 first ministers' meeting, some mentioned the importance of Western Canada centres of excellence for services such as pediatric cardiac surgery and gamma knife procedures.
- Some jurisdictions are increasing funding for medical transportation. For example, as part of the first ministers' 10-year plan, the federal government committed to increasing funding for transportation in the territories. More recently, the British Columbia Ministry of Health Services announced an investment of $6 million to assist rural and remote residents with transportation costs and preferred accommodation rates when travelling to large health centres to receive physician-referred, non-emergency medical services that are not available in their home communities.
- In July 2004, the Ontario Ministry of Health and Long-Term Care announced plans to organize health services in Ontario into 14 Local Health Integration Networks (LHINs). The Institute for Clinical Evaluative Sciences (ICES) provided statistical analysis to inform choices about boundaries for LHINs. By design, each LHIN contains access to at least one high-volume hospital.
- Likewise, Cancer Care Ontario's surgical oncology program is developing care standards for common, rare, and complex cancer procedures. This is part of a quality improvement program that includes monitoring indicators of surgical practice and promoting the use of clinical practice guidelines.

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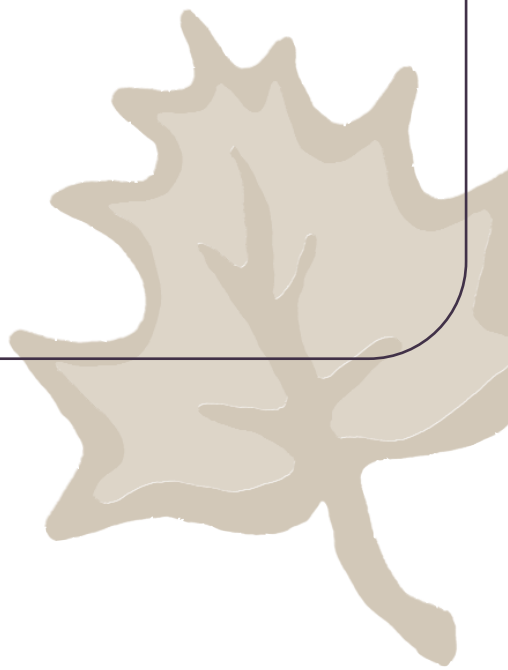
Conclusion



Conclusion

Consistently identified as a top issue for Canadians, access to care is a priority from coast to coast. What matters most differs between regions of the country and over time—sometimes wait times for hip replacements take priority, sometimes the focus is on finding a family doctor—but the underlying challenge is shared. Reflecting this reality, in the *Ten-Year Plan to Strengthen Health Care*, Canada's first ministers put timely access to quality care for all at the top of their agenda.

Underlying this pledge are important policy questions about what care will be provided where, and by whom. While the scope, nature, and timing of primary health care renewal vary across the country, the core objectives are broadly shared. There's a widespread effort to provide common everyday health services close to home—and around the clock. For example, some governments are introducing nurse-staffed telephone health lines. Almost unheard of a decade ago, they are now available in many parts of the country. In 2003, about one in ten Canadian adults reported having called a health line in the previous year.[1]

Access to care is also important for specialized services. Much attention focuses on wait times. (Watch for upcoming work by CIHI in this area.) This year's *Health Care in Canada* report, however, focuses on another important issue: the distribution of surgical services and resultant outcomes of care. Research suggests a link between volumes of care and patient outcomes. About 70% of analyses worldwide have found better outcomes with higher volumes, but the strength of the relationship varies from procedure to procedure.

The vast majority of studies to date come from the United States. *Health Care in Canada 2005* provides a new Canadian perspective. We found that for both relatively rare operations and more common procedures, there are large variations in the number of hospitals performing different types of surgery. Many hospitals provide a very small number of procedures. A much smaller number of centres perform high volumes of surgery. Cardiac surgery is among the most highly concentrated, reflecting decisions in many parts of the country to consolidate care within high-volume centres of specialized care.

We then took a detailed look at cardiac bypass surgery and eight other procedures. Our analyses covered more than 180,000 surgeries performed between 1998–1999 and 2003–2004. For some procedures, we found a steady drop in the risk of death with higher volumes. For example, for every 10 additional procedures a hospital performed, the risk of mortality was 44% lower for esophagectomies and 46% lower for pancreatic cancer surgery. A smaller but still statistically significant effect was also seen for angioplasty (1% reduction). In other cases, a difference was seen only between hospitals performing the highest and lowest volumes of cases, or no statistically significant relationship was observed.

These results may be a consideration when deciding where to provide different types of care, but other factors also matter, and the trade-offs can be highly complex. When we asked Canadian adults what would be important to them if they had to have surgery, most said that they would prefer to have surgery close to home. But if forced to choose, quality was more important than closeness. More valued having a surgeon recommended by their family doctor or knowing the number of similar procedures that a surgeon had done in the past over how close to home they received their care. However, less than half (38%) of those who had actually undergone a procedure in the past two years said that they had been aware of the number of cases their surgeon had recently performed.

These findings are part of *Health Care in Canada 2005*, CIHI's sixth annual report that takes the pulse of the country's $130 billion health system. Monitoring key trends is another important function of this yearly report series. The companion *Health Indicators 2005* also highlights how health, health care, and patient outcomes vary across the country.

We hope that taking stock of what is will help to inform debates about what should be. We also hope that Canadians inside and outside the health system will continue to use these results to improve care locally, provincially, and nationally. To this end, we will continue to work on converting what we don't know to solid information that can be used to plan and to act. Our upcoming collaborative projects and special reports continue to focus on areas identified as priorities by our partners across the country. Further details are available on our Web site (www.cihi.ca). As these initiatives develop, the results will unfold in future editions of *Health Care in Canada*.

For More Information

1 Statistics Canada, *Contact With Telephone Health Line, by Sex, Household Population Aged 15 and Over, Canada, Provinces and Territories*, 2003 (Table) (Statistics Canada, 2003), [online], cited April 14, 2005 from <http://www.statcan.ca/english/freepub/82-401-XIE/2002000/tables/html/bt004_en.htm>.

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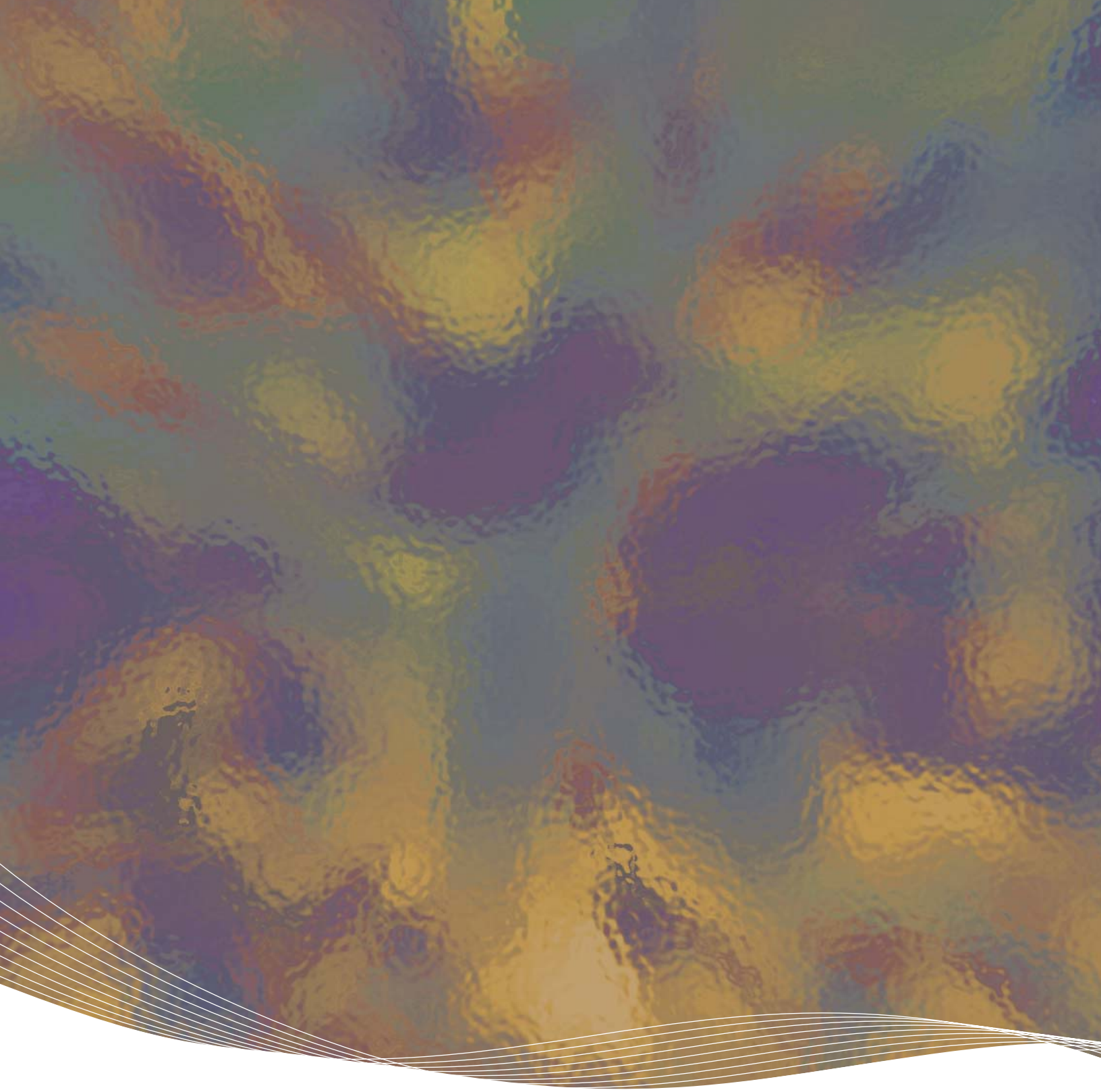

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