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Quality of Healthcare in Canada: A Chartbook
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TECHNICAL APPENDIX

ACRONYMS

REFERENCES
For more than a decade, the Canadian Health Services Research Foundation has brought together researchers and decision makers to create and apply knowledge to improve health services in Canada.

CHSRF and its national, provincial and regional partners involve healthcare providers and decision makers in shaping and using the knowledge gained through research. Through the use of innovative programs, CHSRF aims to connect healthcare “thinkers” with healthcare “doers” to develop timely, appropriate and high-quality services that improve the health of Canadians. Its strategic priorities focus on engaging and supporting citizens, accelerating evidence-based change, and promoting policy dialogue.

CHSRF is funded through an agreement with the government of Canada.
Canadians see our universal healthcare system as an important part of our national identity, reflecting values we hold dear, such as equity and solidarity.

In certain key areas – wait times and patient safety being two prominent examples – policy makers and healthcare leaders have made concerted efforts to address the challenges. But what about the system as a whole? Do Canadians in fact enjoy high-quality healthcare across the country?

Quality of Healthcare in Canada: A Chartbook provides the best available evidence as to where Canada’s healthcare stands, internationally and across jurisdictions within our borders. The charts enable us to begin to discern where Canadian healthcare should be celebrated and where it is falling short. Among the reasons to celebrate: compared to other OECD countries, Canadians experience fewer premature deaths from cancer, and fewer deaths from circulatory disease such as heart attack and stroke than all comparator countries except the United States.

In other areas, Canada performs relatively poorly: low rates of childhood immunization; poor access to family physicians; and limited uptake of health information technology. In addition, the data reveal startling discrepancies in the quality of care and health outcomes between Canada’s north and south – as well as between high- and low-income Canadians – in a number of areas, including life expectancy, diabetes care, and immunization rates. The structures and processes for collecting, collating and reporting Canadian health data vary substantially across our country, which can hamper our ability to conduct comparative work within Canada and internationally. These data are essential to our understanding of what is working well, and not so well, in our healthcare system, and the impact on Canadians.

Overall, the Chartbook reveals that Canada, when compared to other nations, usually sits in the middle of the pack with respect to most measures of quality in healthcare. Should Canadians be satisfied with average performance (and below-average performance the further one gets from Canada’s southern, urban centres)? Or should we aspire to higher quality in all areas of healthcare and in all regions of the country?

The Canadian Health Services Research Foundation commissioned this Chartbook for a number of reasons: to be able to compare Canada’s performance to that of other countries; to help raise awareness of the quality of care in Canada; and to provide a foundation for an informed public debate on the quality of healthcare. We appreciate the support of the Canadian Patient Safety Institute, Statistics Canada and the Canadian Institute for Health Information in helping to gather these data. The information presented in this Chartbook will contribute to the work conducted under CHSRF’s three strategic priorities:

- It will support and engage citizens in the public discussion of what matters in our healthcare sector in terms of quality.
- It will help accelerate evidence-based change by providing data that enable us to understand what actions are required and to assess progress.
- It will promote policy dialogue, encouraging the many partners in healthcare in Canada – providers, administrators, researchers and policy makers – to work together to identify the best ways to improve healthcare quality.
I would like to thank Sheila Leatherman and Kim Sutherland for the tremendous work they have done in collecting this information. The strengths and weaknesses in Canada’s healthcare system revealed by this work, as well as the gaps in data that have been highlighted, provide a roadmap for progress. CHSRF is committed to working with healthcare leaders from across Canada to ensure that this Chartbook can support improvements in the quality of healthcare for all Canadians, in all parts of the country.

Maureen O’Neil, President
Canadian Health Services Research Foundation
Does Canada have a high-quality healthcare system? Do Canadians receive quality healthcare? If so – or if not – how would we know? Current health system data and performance indicators provide some answers but, regrettably, do not allow these questions to be consistently answered with confidence for all aspects of the healthcare system.

While pockets of excellent data are reported by national organizations such as the Canadian Institute for Health Information and Statistics Canada, and by various provincial health quality councils, the reality is that alignment between healthcare data organizations across the country – national, provincial/territorial and regional – is minimal. It is important to respect and acknowledge that each province and territory has unique data and reporting requirements that are generated by their priorities. However, healthcare decision makers and providers will be the first to tell us that there is too much fragmentation in the requirements for data from various credible sources. I frequently hear them ask, “Can all of you please get your act together, streamline and co-ordinate the data requirements, reduce the workload imposed by these reporting requirements, and improve the value of the process and reporting?”

Quality of Healthcare in Canada: A Chartbook is the result of an extensive review of publicly reported performance indicator data from across the country. This review is an important first step and a seminal platform upon which to obtain an overview of the existing status of healthcare-related data in Canada.

I challenge you to carefully review the content of this chartbook and identify areas of meaning and significance. However, you are also encouraged to focus on the many unanswered questions posed as a result of the significant gaps of data. The selection, collection and application of performance indicators will be improved when we acknowledge what truly exists – including the data’s quality and deficiencies.

It is essential that the patient/client remain in the centre of our thinking as indicators are critiqued and examined. The Accreditation Canada standards consider a population health focus as fundamental to the provision of healthcare, whether within a clinical program or by the organization as a whole. Consider the wealth of knowledge that could be gained when we can all review a consistent, comprehensive pan-Canadian population health-based data set. Our ability to more effectively design and provide healthcare would escalate dramatically and the overall benefits would be vast.

The stage is set. Stakeholders from across the country have indicated their strong desire for improvement and alignment of data. Accreditation Canada is devoted to this goal and is a committed partner in this strategic journey. We all have a vested interest in collaboratively building on the excellent information that currently exists and taking it to a new level – a level within which healthcare data will support increasingly effective decision-making and enable measurable improvements in the quality of healthcare and in the quality of health of Canadians.

Wendy Nicklin
President and Chief Executive Officer
Accreditation Canada
This chartbook is a compendium of data, encapsulating the efforts of many analysts and researchers who study and report on healthcare systems in Canada and internationally. We are indebted to all those who have produced useful data and who are involved in efforts to further the field of quality measurement and reporting.

We are grateful to the Canadian Health Services Research Foundation (CHSRF) and in particular to Susan Law, who invited us to undertake the chartbook project. We would also like to express our appreciation to Kaye Phillips, Denice Lewis, Beth Everson, Anique Turgeon, and Kerrie Whitehurst from CHSRF, who have worked tirelessly behind the scenes in critically important support roles. CHSRF provides support to a wide range of quality improvement work and is a staunch supporter and enabler of evidence-based decision-making in healthcare systems around the world. It has been a privilege to work with them.

Special thanks go to the members of the chartbook project’s steering committee: Claudia Sanmartin of Statistics Canada; Greg Webster of the Canadian Institute for Health Information (CIHI); Diane Watson from the Centre for Health Services and Policy Research, University of British Columbia; Marie Owen from the Canadian Patient Safety Institute (CPSI); Christopher Dean from Accreditation Canada; Don MacDonald from the Newfoundland and Labrador Centre for Health Information; and Alan Katz from the Centre for Health Policy, Departments of Family Medicine and Community Health Sciences, University of Manitoba. The committee provided invaluable advice and assistance, guiding us through the maze of data and contextual issues in Canada and its composite jurisdictions.

Without the invaluable input of these colleagues, the chartbook would not have been possible.

KS and SL
Sheila Leatherman CBE, FRCP (Hon) is a Research Professor at the School of Public Health, The University of North Carolina at Chapel Hill, and Visiting Professor of the London School of Economics. She conducts research and policy analysis internationally, focusing on quality of care, health systems reform, and methodologies for evaluating the performance of healthcare systems. She has received various honors for her work, including being elected to the U.S. National Academy of Sciences in 2002 as a member of the Institute of Medicine and being made an Honorary Fellow of the Royal College of Physicians (2006).

Since 1997 she has worked in the U.K. as an independent evaluator of the impact on quality of care in the National Health Service of Labour Government reforms, resulting in three books. In 2007, she was awarded the honour of Commander of the British Empire (CBE) by Queen Elizabeth for her work over the past decade with the National Health Service. In the U.S., she has authored a series of books on quality of healthcare: general (2002), child and adolescent health (2004), and Medicare population (2005).

She is the research advisor to a four-year demonstration project, funded by the Bill and Melinda Gates Foundation, to develop and test innovations to link health programs with microcredit in India, West Africa, Bolivia and the Philippines as a global strategy for poverty reduction and health protection. She is also conducting a two-year project to assess the global evidence of the impact of systematically integrating microfinance and health access interventions for the poor.

She has a broad background in healthcare management in state and federal health agencies, as chief executive of an HMO and as a senior executive of United Health Group in the U.S. She is active in humanitarian relief in the developing world through serving for two organizations as a trustee and active volunteer: Freedom from Hunger (microcredit and health) and the American Refugee Committee (refugees and displaced persons in six countries).

Kim Sutherland MSc, MBA, PhD is a Fellow at the Judge Business School, University of Cambridge. Her work concentrates on the interactions between research evidence, policy and clinical practice in healthcare systems. Her current research interests focus on quality of healthcare and organizational change. Together with Sheila Leatherman, she has undertaken a series of studies evaluating the British Labour Government’s 10-year quality agenda for the National Health Service (NHS). She has co-authored a series of chartbooks depicting quality of healthcare from a range of perspectives: geographical (within England and across the countries of the United Kingdom); disease-focused (e.g. stroke patients); and in different quality domains (e.g. patient-centredness).

Dr. Sutherland is currently working as co-principal investigator in a multidisciplinary, multi-year project, funded by the U.K.’s Health Foundation, which seeks to monitor performance and inform efforts to improve quality and cost-effectiveness in the NHS.

Her work has been published in numerous books and peer-reviewed journals.

ABOUT THE AUTHORS
The availability of robust, coherent, defensible and credible data on healthcare system performance is an essential component of any effort to improve quality. Decision makers need a shared understanding of the magnitude and nature of problems facing healthcare systems, along with a basis for communication and co-operation among the many stakeholders responsible for the delivery of health services and enhancing health outcomes. In recent years, the amount of available data and information relevant to the quality of healthcare in Canada has grown – produced by national, provincial, territorial, academic, professional and patient organizations. This chartbook seeks to draw these disparate pieces of data together to build a broad and coherent picture of the quality of healthcare in Canada. The approach adopted for this Canadian chartbook builds upon that developed by the authors for similar chartbooks in Australia, the United States, and the United Kingdom.

The chartbook takes a multifaceted approach to assessing quality and examines international, national and provincial/territorial data. It has been designed using four guiding principles – accessibility, validity, diversity of perspectives, and balance in presentation of data.

The data are presented in six key domains: the effectiveness of the healthcare sector in improving health outcomes; access to healthcare services; the capacity of systems to deliver appropriate services; the safety of care delivered; the degree to which healthcare in Canada is patient-centred; and equity in healthcare outcomes and delivery. Below are key findings from each of the six domains.

**Effectiveness**

Effectiveness in healthcare refers to the extent to which an intervention, whether a service, visit, procedure or diagnostic test, produces the intended result. It also refers to the appropriateness of care – whether interventions are provided to those who would benefit from them and/or withheld from those who would not. Effectiveness measures focus on both outcomes and processes. As in many other countries, Canada has seen a significant decline in mortality rates from major killers such as cancer and heart disease in recent years.

Immunization rates, both childhood immunizations and influenza vaccination in people aged 65 and over, are relatively low in Canada compared to other developed countries.

There is considerable variation across provinces for a wide range of effectiveness indicators. While the provinces typically outperform the territories, there is no clear pattern across provinces, with no one either excellent in all areas or performing uniformly poorly.

Lack of standardized information about healthcare delivery and adherence to evidence-based processes of care across the country hampers the ability to draw more conclusions about the effectiveness of healthcare in Canada.

**Access**

Access to healthcare is a prominent concern of patients and the public around the world. In Canada, a 2007 public survey found that wait times were the most commonly cited concern among a range of healthcare issues.
The majority of Canadians (more than 80%) have access to a regular doctor. However, lack of access is a problem in the territories: in the 10 largest communities of Nunavut in 2007, only 13.4% of respondents to the Canadian Community Health Survey indicated that they had a regular doctor; 40.8% of respondents in the Northwest Territories did so. The situation was better in Yukon, where 77.9% reported such access, closer to the Canadian average.

Canada does not fare well in a number of international comparisons. Patients in Canada wait longer for primary care appointments than those in many other developed countries, and a significant proportion of emergency department visits in Canada are attributed to limited availability of primary care. This greater use of the emergency department for primary care may be a factor in the longer wait times found in Canadian emergency departments compared to those in other countries, although there is evidence that simply having a general practitioner does not necessarily reduce emergency department use.1

Within Canada, there is considerable variation across provinces in wait times for key procedures ranked by priority in the 10-Year Plan to Strengthen Health Care (joint replacements, cataract surgery, radiotherapy, coronary artery bypass graft, MRI). The longest waits were for joint replacements.

Capacity

The provision of reliable, high-quality healthcare depends upon having sufficient capacity to meet individual and population needs. Capacity encompasses the necessary financial resources (spending), personnel, equipment, information technology, and pharmaceuticals.

Across developed economies generally, spending per person on healthcare has grown steadily in the past decade or so. Canada is in the top 20% of OECD countries in per-person spending on healthcare. However, as a proportion of GDP, healthcare spending in Canada in 2006 was almost the same as it was in 1992. This differs from the situation in many other developed countries, which have seen (sometimes dramatic) increases in the proportion of national wealth dedicated to health. Across provinces, spending varies from a low of $4,653 per capita in Quebec to a high of $5,730 per capita in Alberta. Spending is much higher in the territories than in the provinces, reflecting stark differences in geography, population density, healthcare needs, and delivery models.

In terms of healthcare personnel, Canada has a relatively low level of practising physicians per person, at 1.0 per 1,000 population. However, when these data are further stratified into general practitioners and specialists, Canada fares better in terms of general practitioners. There is marked variation within the country, with practising physicians at a low in Nunavut, with 0.4 per 1,000 population, and at a high in Nova Scotia, with 2.6 per 1,000 population in 2006. Offseting the shortage of physicians, to some extent, is a higher number of practising nurses in the territories; there were 14.2 practising nurses per 1,000 population in the Northwest Territories/Nunavut in 2006, compared to 6.7 per 1,000 population in British Columbia.

Capacity also encompasses the use of health information technology, which can enable dramatic transformations in the delivery of healthcare, particularly in a country like Canada, with its large size and dispersed population. The use of information technology in Canada appears less well developed than in many comparable countries. This may change if a national plan to introduce electronic health records is implemented.

1 See “Myth: Emergency room overcrowding is caused by non-urgent cases” (Mythbusters, October 2009), www.chsrf.ca
Safety

Safety – the elimination of unnecessary risk of harm to patients – is a fundamental attribute of quality in healthcare. In recent years, safety has come to the fore as a pressing concern for policy makers, patients, managers, and healthcare professionals. As is the case with many developed countries, it is difficult to find detailed data on adverse incidents across Canada. It is also difficult to interpret the data that do exist. There is a perennial question of whether a measured increase in adverse events reflects a negative situation of worsening safety or care, or a positive situation of better reporting of safety problems, making it possible to analyze and improve them.

Juxtaposing staff-reported adverse events with patient reports can help unravel what is actually happening in healthcare settings. According to patient surveys, up to one-fifth of patients in Canada report experiencing a medication error or medical mistake (although the veracity of the patients’ perspective has not been corroborated).

Hospital-acquired infections are a serious safety issue for Canada. Within Canada, western provinces report the highest rates of MRSA, a common hospital-acquired infection.

Process measures that gauge the extent to which healthcare providers comply with evidence-based guidelines for improving safety (e.g. hand hygiene regimens, alert systems in place for potentially dangerous prescribing) can provide valuable information on safety of care. While country-wide data on the level of investment in, and operationalization of, safety strategies are not available, Ontario does release such data for hospitals and reports a steady improvement in compliance with safety advice over the past few years.

Patient-Centredness

A concern for and responsiveness to patient preferences, attitudes and experiences are also key components of quality. Responsiveness can entail improving access to treatment and information, ensuring participation in healthcare decision-making, and supporting involvement in policy-making.

Canada, unlike many countries with quality performance frameworks, does not include an explicit focus on patient-centredness or responsiveness in the conceptualization underpinning quality measurement and reporting. International surveys, however, reveal that Canadians are relatively satisfied with the healthcare they receive. One such study found that 61% of Canadian respondents rated the care they had received in the preceding year as excellent or very good, compared to 62% of respondents in the United Kingdom and 55% of respondents in the United States. Another international survey, this time of adults with health problems, found that 56% of Canadian respondents indicated that their doctor always involved them in decisions about treatment, a similar percentage to that in many other countries and higher than in France, the United Kingdom and the United States.

Equity

Equity is an underlying value and much-cherished tenet of healthcare across Canada, such that all people in Canada receive care based on clinical need, and that healthcare contributes to reduced differences in health status and outcomes across groups. It is a value that is difficult to track, due to the paucity of timely data on equity and disparities. An exemplary model of comprehensive data analysis exploring the impact of socioeconomic status, sex and age on processes and outcomes of care has been undertaken by the Manitoba Centre for Health Policy.
Despite a lack of a comprehensive national data set on equity, it is possible to draw some conclusions from the data that are available. Notably, there are serious concerns about deficiencies in the health status of aboriginal people and their ability to access high-quality healthcare.

Furthermore, as is the case in many developed countries, there is a clear correlation between low income/socioeconomic status and poor health status in Canada. This does not appear to be related to healthcare cost concerns. However, an international survey did find that 16% of Canadian respondents indicated that they did not fill a prescription or skipped doses, and that 29% did not seek needed dental care – both areas that are not publicly funded in Canada – because of cost concerns.

**Concluding Comments**

The data presented in this chartbook identify areas where Canada performs well in terms of the quality of the healthcare provided to Canadians and areas that require improvement. The findings should be useful in informing the development of policies and initiatives to address specific quality problems in Canada’s healthcare, and lead to better outcomes for patients. They provide a baseline against which the impact of future quality improvements can be measured. Perhaps most significantly, they underscore the need for improved national data standards, collection and analysis, so that further aspects of quality can be assessed and monitored over time. Patients, practitioners, policy makers and health administrators would all benefit from such an initiative.
Assessing healthcare quality is a crucial step in improving care and service delivery. Data on the quality and performance of healthcare hold the potential to guide quality improvement activities; redesign services; keep people and organizations accountable for their performance; change policy and practice; and inspire public debate. By collecting, analyzing and reporting healthcare data, it becomes possible to identify the areas where performance is deficient, develop solutions, galvanize action, and monitor progress.

Many national, provincial, territorial and regional healthcare organizations in Canada have undertaken initiatives to report on the state of quality for a specific jurisdiction, area of delivery or unique dimension of quality. To date, other countries – including the United States, the United Kingdom and Australia – have successfully embarked upon activities to draw together data to assess various aspects of quality, compare themselves on an international scale and ultimately, improve the quality of care and service delivery to patients (Leatherman and McCarthy, 2002; Leatherman et al, 2008; Clinical Excellence Commission, 2008).

However, there have been no reports that provide a comprehensive and rigorous account of the overall quality of healthcare in Canada in relation to national and international benchmarks.

Building on the success of the chartbook model, the Canadian Health Services Research Foundation (CHSRF), the Canadian Institute for Health Information (CIHI), and the Canadian Patient Safety Institute (CPSI) have jointly commissioned, with support from Statistics Canada, the first-ever Canadian chartbook on healthcare quality. This chartbook provides data on the quality and performance of healthcare, serving as a tool to support and inform policy and management decision-making, to identify gaps in data, to highlight potential areas for investment in quality improvement, and to provide a baseline for future analysis.

Defining Quality in Healthcare

Quality in healthcare is a multifaceted concept, with no single, universal definition or framework for assessment. There is, however, a growing consensus about the key domains of quality in healthcare and the relevant measures and indicators to populate these domains (Institute of Medicine, 2001; OECD, 2002; AHRQ, 2007). Table 1 outlines the six key domains that have been adopted by the authors to evaluate and monitor quality of care in different jurisdictions (Leatherman and Sutherland, 2003; 2005; 2008). This framework has also been adopted for the development of this Canadian chartbook on quality.
Table 1: Six domains used as organizing principles for quality chartbooks

<table>
<thead>
<tr>
<th>Quality domain</th>
<th>Principle</th>
<th>Examples of measures</th>
</tr>
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<tbody>
<tr>
<td>Effectiveness</td>
<td>Healthcare services should be based, as far as possible, on relevant rigorous science and research evidence.</td>
<td>• Mortality rates&lt;br&gt;• Compliance rates with evidence-based guidelines</td>
</tr>
<tr>
<td>Access</td>
<td>Healthcare services should be provided at the time they are needed within the appropriate setting.</td>
<td>• Provision of emergency care&lt;br&gt;• Availability of specialist care or rehabilitation</td>
</tr>
<tr>
<td>Capacity</td>
<td>Healthcare systems should be sufficiently well resourced to enable delivery of appropriate services.</td>
<td>• Staffing levels&lt;br&gt;• Number of scanners&lt;br&gt;• Information technology</td>
</tr>
<tr>
<td>Safety</td>
<td>Patients should not be harmed by the care that they receive or exposed to unnecessary risk.</td>
<td>• Nosocomial infections&lt;br&gt;• Medication errors&lt;br&gt;• Falls</td>
</tr>
<tr>
<td>Patient-centredness</td>
<td>Healthcare should be: &lt;br&gt;1. based on a partnership between practitioners and patients (and where appropriate, their families) &lt;br&gt;2. delivered with compassion, empathy and responsiveness to the needs, values and preferences of the individual patient.</td>
<td>• Patient evaluations of care&lt;br&gt;• Shared decision-making&lt;br&gt;• Patient experiences and interactions with staff</td>
</tr>
<tr>
<td>Equity</td>
<td>Healthcare should be provided: &lt;br&gt;1. on the basis of clinical need, regardless of personal characteristics such as age, gender, race, ethnicity, language, socioeconomic status or geographical location &lt;br&gt;2. in such a way as to reduce differences in health status and outcomes across various subgroups.</td>
<td>• Comparisons of care provided across different sub-populations (for example, older people versus entire population)&lt;br&gt;• Mortality rates by socioeconomic status</td>
</tr>
</tbody>
</table>

Source: Leatherman and McCarthy, 2002; Leatherman et al, 2008
Introduction to the Charts

This chartbook has been designed with three key guiding principles in mind:

1. **Accessibility**: in presenting charts that are, to the degree possible, comprehensible and comprehensive, the chartbook provides an accessible overview of quality in healthcare in Canada for both expert and non-expert audiences. Technical information (such as sample size, confidence intervals, standardization techniques, as well as hyperlinks, where available, to the site from which the source material has been drawn) and metadata are provided in the Technical Appendix.

2. **Diversity of perspectives**: drawing on relevant data sets from general and specialist sources, and combining them in a way that illustrates the multifaceted nature of quality, the chartbook presents views from different perspectives and different stakeholders within the healthcare sector.

3. **Balance in presentation of data**: presenting data in varied formats, the chartbook provides different types of information:
   - longitudinal data to show changes over time;
   - “snapshot” accounts of quality at a particular point in time (generally the most recent data available in the public domain); and
   - comparative data to show differences in performance and facilitate benchmarking across countries, regions or provinces and territories.

Several criteria were used to determine which indicators to include in the chartbook:

- **relevance**: indicators are clinically meaningful in terms of processes and outcomes of care or important reflections of patient experience
- **methodological rigour**: the data have credibility and validity and the indicators are derived from a sound evidence base
- **balance**: the data contribute to a multifaceted picture of quality in care
- **timeliness**: the data provide an up-to-date assessment of quality
- **availability**: for some key indicators national data were unavailable. Rather than omit such indicators, the chartbook presents data from specific provinces to act as exemplars for future data-reporting development.

The selection of indicators to be included in this chartbook has been driven by a desire to be fair and rigorous. Normally this would mean excluding data that are more than five years old, based on a concern that including out-of-date data in the rapidly developing arena of healthcare could be potentially misleading.

However, the situation in Canada is complicated by the jurisdictional arrangements for healthcare policy-making and delivery, and historical variation among provinces and territories with respect to standards, data definition and collection, analysis and reporting. The chartbook balances issues of relevance, timeliness and availability. This means that, in an effort to provide a comprehensive picture of quality, some datasets are more than five years old and some data focus on a single province, rather than being national in scope.

In order to provide a picture of quality in Canada as a whole, the chartbook utilizes secondary data, bringing together disparate analyses and information that are already in the public domain. Data were collected through extensive searches of peer-reviewed, grey and electronic literature and an examination of large amounts of data produced by a wide range of international and Canadian organizations. In all cases, the data were the most current available at the time of completing this work. Ongoing releases of information will, of course, mean that some chartbook data may be superseded after publication. To address this issue, the chartbook provides links to sources so that interested readers can gain access to relevant updates. There are some cases (for instance,
data to support inter-provincial/territorial analysis of “mortality from causes considered amenable to healthcare”) where more up-to-date data may be available, but resource limitations have meant that requisite data analysis has not yet been done. In those cases, already-analyzed data are used.

Quality data reporting in Canadian healthcare: Areas for improvement

In compiling this chartbook, the paucity of national-level data that are uniform with respect to standards, collection and storage was striking. This is a significant impediment to assessing the quality of healthcare in Canada.

The lack of a comprehensive, national data set on quality is probably a legacy of the historical, cultural and political context in Canada, which has meant that each province and territory has built its own system for collecting, collating and reporting quality-of-care data. In recent years this has been recognized as a problem, and efforts to resolve it have begun. Issues persist, however, particularly with data compatibility and the lack of standardized data sets and reporting conventions. This deficit in national-scale, readily accessible and standardized data has been somewhat addressed by heavy

At a glance: The Canadian healthcare system

The term “healthcare system” as it applies to Canada is actually a misnomer. It is more properly a set of 14 separately administered systems including ten provincial, three territorial and one federal system (the federal system provides primary and supplementary health services to aboriginal populations, federal police, military personnel and prisoners, among others).

The Canada Health Act sets out five principles under which these systems must operate:

1. **Public administration**: The health insurance plan of a province or territory must be administered and operated on a non-profit basis by a public authority accountable to the provincial/territorial government.

2. **Comprehensiveness**: The provinces and territories must provide medically necessary hospital and physician services and, where permitted, also cover services rendered by other healthcare practitioners.

3. **Universality**: Provincial and territorial health insurance plans must entitle 100% of eligible residents to insured health services on uniform terms and conditions.

4. **Portability**: All citizens can travel throughout Canada and remain eligible for coverage in all provinces and territories.

5. **Accessibility**: Services should be provided on a basis that does not impede or preclude (for example, through additional charges) reasonable access to those services.

Healthcare systems in Canada provide “medically necessary hospital care, physician services and dental surgery requiring hospitalization” (Health Canada, 2008). They do not, as a rule, cover non-surgical dental care, eyecare, prescription medications, ambulance services, medical devices or out-of-country healthcare. However, provincial and territorial systems vary considerably in financing and administration and some cover a range of services that would otherwise not be part of the healthcare system, based on local health priorities, policy preferences and financial circumstances (Flood and Archibald, 2001).

While healthcare in Canada is constitutionally a provincial and territorial responsibility, the federal government also plays a role. It administers the principles of the Canada
reliance on patient survey data. Surveys such as the Canadian Community Health Survey are sent to Canadians across the country, and responses provide a picture of quality that is based on common metrics. While this is useful information, it gives only one perspective: that of the patient. A comprehensive review of quality data should ideally encompass clinical data, supplemented by routinely collected administrative data on access, capacity, equity, and responsiveness, among other critical topics.

While it is often difficult to navigate the labyrinth of reporting systems across the country, there are areas where progress has been made. Data on wait times is one such area. Following pan-Canadian agreements on standardized measurement and reporting for key procedures (joint replacement, coronary artery bypass graft, radiotherapy, cataract surgery, and MRI) it has become possible to make more meaningful comparisons across the country and to use benchmarking and shared knowledge to drive improvements in healthcare. Further, there are pockets of excellence in reporting on quality data, including cancer reporting in Ontario, reporting on health disparities in Manitoba, and stroke reporting in Saskatchewan. This expertise and practice can and should be applied on a pan-Canadian basis.

Health Act and provides financial support to the provinces and territories. In addition, the federal government has a regulatory role (for example, in pharmaceutical regulation), collects and provides health data, funds health research, and delivers public health programs. In addition, the federal government is a direct provider of primary and supplementary health services to select populations as above (Health Canada, 2005).

A 10-Year Plan to Strengthen Healthcare

In 2004, the Prime Minister and the 13 premiers of the provinces and territories agreed on a 10-year plan to strengthen healthcare in Canada. The agreement emphasized the following principles:

- commitment to the principles of the Canada Health Act;
- access to medically necessary health services based on need, not ability to pay;
- reforms to ensure that all Canadians have timely access to needed healthcare services;
- collaboration between all governments, working together in common purpose to meet the evolving health care needs of Canadians;
- advancement through sharing of best practices;
- continued accountability and provision of information to make progress transparent to citizens; and
- jurisdictional flexibility.

The plan sought to secure improvements in the quality of healthcare across Canada; many of the time-series data presented in the chartbook indicate that there have been improvements in several dimensions, although the work is not yet done.
Unlike many other countries, Canada has very few clinically driven national medical quality studies or evaluations that study the quality of care, particularly disease or specialty areas. England, for example, has an influential set of national clinical audits that were instigated by the Royal College of Physicians, and the United States has a number of national-level quality measurement systems. These evaluations look at the process and outcomes of care for specific clinical conditions and have been very successful in highlighting deficiencies in quality of care, catalyzing action to develop consensual standards, and engaging healthcare providers in quality improvement activities. In Canada, the first step in establishing national clinical audits or quality-measurement initiatives – defining key performance indicators – has, in many areas, been taken. For example, the Canadian Cardiovascular Outcomes Research Team (CCORT) has published evidence-based sets of performance indicators for heart failure and for coronary heart disease (Tu et al., 2008). However, questions remain about how best to implement the use of established indicators and stimulate other changes required to drive quality improvement.

Outcome measures such as mortality rates are available on a national basis; however, these outcomes are not accompanied by critical data on adherence to evidence-based care standards – an essential element of being able to develop effective quality improvement strategies.
Effectiveness
## EFFECTIVENESS

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Effectiveness

Introduction

In the context of the quality of healthcare, effectiveness is concerned with the extent to which an intervention (service, visit, procedure, diagnostic and others) produces the intended result for the patient. It also encompasses the concept of appropriateness; that is, the extent to which interventions are provided to those patients who would benefit and withheld from those who would not. Effectiveness indicators can measure:

- outcomes, such as mortality rates, survival rates or changes in health or functional status, which reflect the impact of prevention, diagnosis and treatment of disease or ill-health; or
- processes, such as prescribing rates, medical procedures and compliance with evidence-based guidelines, which have been proven to affect outcomes in specific clinical conditions and can provide a more immediate measure of quality.

The chapter opens with two broad indicators of effectiveness: mortality rates from diseases amenable to healthcare and life expectancy. Data are then organized into separate sections focusing on disease areas that:

1. have the most impact on Canadians in terms of mortality, morbidity, economic burden (see for example, rankings shown in Table 1.1, below);
2. are amenable to healthcare;
3. have a strong evidence base in terms of best clinical practice; and
4. have relevant data available.

The disease areas included in this chapter are:

- Cancer
- Circulatory disease
  - Coronary heart disease
  - Cerebrovascular disease/stroke
- Diabetes
- Respiratory disease
- Mental health

The chapter closes with sections on health promotion and prevention, and appropriateness.

Table 1.1: An overview of diseases important in Canada

<table>
<thead>
<tr>
<th>Rank</th>
<th>Mortality</th>
<th>Morbidity (total days stay in acute care)</th>
<th>Economic Burden</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cancer</td>
<td>Circulatory disease</td>
<td>Cardiovascular disease</td>
</tr>
<tr>
<td>2</td>
<td>Heart disease</td>
<td>Cancer</td>
<td>Musculoskeletal disease</td>
</tr>
<tr>
<td>3</td>
<td>Stroke</td>
<td>Mental health</td>
<td>Cancer</td>
</tr>
<tr>
<td>4</td>
<td>Chronic respiratory disease</td>
<td>Injuries/poisoning</td>
<td>Injuries</td>
</tr>
<tr>
<td>5</td>
<td>Accidents</td>
<td>Digestive disease</td>
<td>Respiratory disease</td>
</tr>
</tbody>
</table>

Sources: Statistics Canada, online a; CIHI, 2001; Health Canada, 1998
A measure of mortality from causes considered amenable to healthcare developed by Nolte and McKee (2004) gauges the extent to which healthcare services in different countries save lives and contribute to population health. “Amenable” mortality rates refer to deaths (in this case, of people under the age of 75) that should not occur in the presence of effective and timely healthcare (for details of diseases considered to be amenable to healthcare, see Technical Appendix). Nolte and McKee (2008) drew on World Health Organization (WHO) mortality data to compare amenable mortality rates across a range of countries. The results for a subset of countries studied are shown below. Over the five-year period 1997–1998 to 2002–2003, Canada recorded a 13.6% drop in the mortality rate from causes amenable to healthcare.

### Change, 1997-1998 to 2002-2003

- **Australia**: -18.9%
- **Canada**: -13.6%
- **France**: -14.3%
- **Sweden**: -7.2%
- **United Kingdom**: -20.9%
- **United States**: -4.4%

Source: WHO mortality database, analysis by Nolte and McKee (2008)
Life expectancy is the number of years a person is expected to live if current age-specific mortality rates continue. Quality of healthcare is only one of many factors that influence life expectancy. Others include social and behavioural norms, relative wealth, and socioeconomic disparities. The chart shows that life expectancy has been steadily increasing across developed countries. Between 1986 and 2006, the greatest increase was seen in France (5.3 years; 7% increase) and the smallest increase in the U.S. (3.1 years; 4.1% increase). Canada recorded an increase of 3.8 years (a 5% increase).

**Chart 1.2 Life expectancy at birth: International**

<table>
<thead>
<tr>
<th>Country</th>
<th>Change in life expectancy, 1986-2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>6.6%</td>
</tr>
<tr>
<td>Canada</td>
<td>5.0%</td>
</tr>
<tr>
<td>France</td>
<td>7.0%</td>
</tr>
<tr>
<td>Sweden</td>
<td>4.9%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>5.7%</td>
</tr>
<tr>
<td>United States</td>
<td>4.1%</td>
</tr>
</tbody>
</table>

*Source: OECD, 2008*

*Note: Canada, U.K. and U.S. data are 2005, not 2006.*
Chart 1.3 Life expectancy at birth: Canada

In the 15-year period between 1991 and 2006, life expectancy increased across all provinces of Canada, ranging from a 1.5-year increase (2.0%) in Newfoundland and Labrador to a 3.6-year increase (4.7%) in Quebec. The difference between shortest and longest life expectancy, by province, has increased over the period. In 1991, life expectancy at birth in British Columbia was 2.0 years (2.6%) higher than that in Prince Edward Island. In 2006, life expectancy at birth in British Columbia was 3.2 years (4.1%) higher than that in Newfoundland and Labrador. Differences are greater when comparisons with the territories are included (data available only for 2006). In 2006, life expectancy at birth in British Columbia was 5.7 years (7.5%) higher than that in the territories.
Cancer arises from abnormal and uncontrolled cell division. The proliferating cells that result invade and destroy surrounding tissue. Spread of cancer (or metastasis) can occur via the lymphatic system or the blood stream or across body cavities such as the pleural and peritoneal spaces, resulting in secondary tumours.

There are more than 200 types of cancer, each with different causes, symptoms and treatments. In 2009, it is estimated that there will be 171,000 new cases of cancer (excluding non-melanoma skin cancer) in Canada and 75,300 deaths attributed to the disease. On the basis of current mortality rates, approximately one in every four Canadians will die from the disease. Cancer is the leading cause of premature death in Canada, and is responsible for more than one million potential years of life lost in Canada (Canadian Cancer Society, 2009).

Cancer is predominantly a disease of the elderly, with around 70% of cases occurring in people aged 60 and over. Breast, lung, bowel and prostate cancer are the most common types of cancer in Canada. Together they account for more than half of all new cancers each year.
Comparisons of mortality rates can give some indication of quality of care but should be interpreted with the understanding that many other factors, such as lifestyle, genetics and environment, also contribute to both incidence and mortality. International comparisons can give insight into the extent to which deaths may be amenable to healthcare, or preventable. The chart illustrates that Canada has high mortality rates overall, relative to many comparator countries. However, these data refer to all age groups. When the potential years of life lost are calculated, Canada’s relative performance is stronger (see next page) indicating that, compared to other countries, there are fewer premature deaths from cancer in Canada. At a provincial level, mortality rates for all cancers combined are higher in Atlantic Canada and Quebec (and for females in Manitoba) and lower in Western Canada (data not shown, see Canadian Cancer Society, 2009).

% change 1992-2005

<table>
<thead>
<tr>
<th>Country</th>
<th>% Change 1992-2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>-13.2%</td>
</tr>
<tr>
<td>Canada</td>
<td>-8.9%</td>
</tr>
<tr>
<td>France</td>
<td>-11.8%</td>
</tr>
<tr>
<td>Sweden</td>
<td>-4.5%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>-16.5%</td>
</tr>
<tr>
<td>United States</td>
<td>-15.1%</td>
</tr>
</tbody>
</table>

Note: Australia data, 2003; Canada and Sweden data, 2004.
Potential Years of Life Lost (PYLL) is a summary measure of premature mortality. It is calculated by totalling the deaths from cancer occurring at each age and multiplying this figure by the number of remaining years of life up to a selected age limit (in the case of OECD data, 70 years). Canada saw a steady reduction in the years of life lost to cancer between 1992 and 2004 and has maintained its position relative to comparator countries.

% change 1992-2005
- Australia: -22.6%
- Canada: -20.3%
- France: -16.6%
- Sweden: -17.2%
- United Kingdom: -25.6%
- United States: -22.9%

Note: Australia data, 2003; Canada and Sweden, 2004.
Chart 1.6 Cancer mortality: Canada

Cancer mortality rates in 2005 varied across provinces, from 152.5 deaths per 100,000 population (age standardized) in British Columbia to 196.2 deaths per 100,000 in Newfoundland and Labrador. This means that mortality rates in Newfoundland and Labrador were 29% higher than those in British Columbia.

Sources: Statistics Canada, Canadian Vital Statistics
Note: Rates for Yukon, the Northwest Territories and Nunavut should be interpreted with caution due to small underlying count.
In 2009, there will be an estimated 23,400 new cases of lung cancer in Canada. The disease is expected to account for 20,500 deaths in 2009, making it the most common cause of cancer death (Canadian Cancer Society, 2009). Of the countries shown, the U.K. recorded the steepest fall in death rates: a 22.8% fall between 1992 and 2005. France and Sweden both recorded increases in mortality (3.7% and 8.3% respectively). In Canada, the mortality rate fell by 7.6% between 1992 and 2004, reflecting, to a large extent, the fall in smoking rates among the Canadian population. Survey data for Canada show that, in 1994, 29.3% of the population aged 12+ years were smokers, compared to 21.9% in 2007. Notably, provincial-level smoking prevalence data show significant differences across Canada. In British Columbia in 2007, 17.8% of those aged 12+ years were smokers, compared to 58.5% in the 10 largest Nunavut communities (CANSIM Table 105-05120).
In 2009, an estimated 22,000 new cases of colorectal cancer are expected to occur across Canada and the disease will account for about 9,100 deaths (Canadian Cancer Society, 2009). The charts illustrate that, between 1992 and 2004, mortality rates from colorectal cancer fell by 9% in Canada, compared to the 26% fall recorded in the U.K., albeit from a substantially higher starting point. Canadian data also show that potential years of life lost per 100,000 population fell by 16% between 1992 and 2004. Provincial-level data show substantial differences: colorectal cancer mortality rates are approximately twice as high in Newfoundland and Labrador as they are in British Columbia (data not shown—see Canadian Cancer Society, 2009).
Chart 1.9 Breast cancer: Mortality and potential years of life lost, international

Worldwide each year, approximately 1.3 million women are diagnosed with breast cancer; some 519,000 will die from the disease (WHO, 2009). Although breast cancer incidence rates are rising in many western countries, deaths from the disease have decreased, generally attributed to improved screening and treatment (for screening uptake data, see Chart 1.45). The latest Canadian estimates suggest that, in 2009, there will be 22,900 new cases of breast cancer and 5,400 deaths from the disease (Canadian Cancer Society, 2009). Between 1992 and 2004, mortality rates in Canada fell by 25% and the number of years of life lost to breast cancer decreased by 29%.
The Public Health Agency of Canada estimates that, in 2009, there will be 25,500 new cases of prostate cancer diagnosed and the disease will be responsible for some 4,400 deaths (Canadian Cancer Society, 2009). Between 1992 and 2005, mortality rates from prostate cancer in Canada fell by 26%. Only the U.S. recorded a steeper decline (a 39% decrease between 1992 and 2005). Among the countries shown, Canada has the fewest years of life lost per 100,000 men under 70 years of age. The Canadian Cancer Society (2009: 31) notes that the role of screening via prostate-specific antigen (PSA) testing in reducing mortality is unclear, and that decreases in potential years of life lost and mortality rates probably reflect improved treatment.
Relative survival ratios (RSRs) provide insight into the impact of different types of cancer on life expectancy. RSRs are defined as the ratio of the observed survival for a group of cancer patients five years after diagnosis to the survival expected for members of the general population. This general population is assumed to be practically free of that cancer and to have the same main characteristics associated with survival (such as sex, age, and area of residence) as the cancer patients (Statistics Canada, online b). Cancer survival is affected by a range of factors outside of the control of the healthcare system, such as tumour characteristics, patient demographics and lifestyle. However, RSRs do reflect quality of care in terms of timeliness of diagnosis and provision of appropriate treatment. Examined over time, and together with incidence and mortality trends, RSRs can indicate progress in cancer control. The chart illustrates RSRs for the most common cancers in Canada over a decade and shows increases in survival for all except lung cancer. Of patients diagnosed with lung cancer between 2002 and 2004, only 15% survived for five years, a ratio comparable to other developed countries.
The five-year relative survival ratio for all cancers combined across Canada was 62%. In other words, patients diagnosed with cancer between 2002 and 2004 were 62% as likely to live for another five years as comparable members of the general population. The chart illustrates RSRs for the most common cancers across Canadian provinces. While there was little provincial variation for breast cancer, age-standardized RSRs for prostate cancer ranged from a low of 87% in Saskatchewan to a high of 97% in Nova Scotia. RSRs for colorectal cancer ranged from 53% in Prince Edward Island to 63% in Ontario and, for lung cancer, ranged from 11% in Prince Edward Island to 19% in Manitoba. Possible explanations for this variation include differences in population attributes or differences in health system performance, such as differential patterns of use and diffusion of screening and early detection tests; varying patterns of diagnosis; and availability and access to specialized cancer treatments.
Effectiveness

Chart 1.13 Guideline-compliant cancer care: Ontario

Measures of cancer mortality, survival and potential years of life lost, although extremely valuable in contributing to judgments about quality in healthcare, are all imprecise indicators of performance. Based on “life and death” outcomes, they reflect many factors outside the control of the healthcare system. It can be difficult to draw conclusions about performance because of long delays between changes in disease management and resultant changes in mortality/survival/PYLL data. Much more immediate insight into the quality of care is provided by process measures. These measures seek to ascertain the extent to which patients are receiving evidence-based care. Such data are not available for Canada as a whole. However, Ontario has a very comprehensive cancer-care reporting initiative. In the absence of national data, this report focuses on Ontario’s performance.

Guidelines against which performance is judged are:

- Stage I and II breast cancer patients should receive radiation treatment following breast-conserving surgery. Patients are treated within guidelines if they receive radiation treatment within 12 weeks of surgery.
- Stage III colon cancers are typically treated by surgical removal of the tumour. It is recommended that patients subsequently receive chemotherapy to improve outcomes. Patients are treated within guidelines if they receive 5-FU (5 Fluorouracil)-based post-operative chemotherapy at a regional cancer centre within 120 days of surgery.
- Stage II non-small cell lung cancer is usually treated by surgical removal (resection) of the tumour. Some Stage IIIA cases may also be resectable. Research shows that, for medically fit patients, treatment with chemotherapy after surgery improves survival. Patients receiving platinum-based chemotherapy at a regional cancer centre within 120 days of the date of surgery are considered to be treated according to the lung cancer treatment guidelines.
- For locally advanced non-small cell lung cancers with tumours that cannot be surgically removed, research shows treatment with combined chemotherapy and radiation improves survival. Patients who begin radiation therapy and platinum-based chemotherapy within 180 days of diagnosis are considered to be treated according to the lung cancer treatment guidelines.
Source: Cancer Care Ontario

Guideline-complaint cancer care, 2007 and 2008

% of patients receiving guideline-complaint care

- **Lung cancer chemotherapy stage II or IIIA non-small cell**
- **Lung cancer chemoradiation unresected stage IIIA or IIIB non small cell**
- **Colon cancer chemotherapy post op treatment of stage III**
- **Breast cancer radiation treatment following breast conserving surgery**

- lung cancer chemo-radiation unresected stage IIIA or IIIB non small cell
- lung cancer chemotherapy stage II or IIIA non-small cell
- colon cancer chemotherapy post op treatment of stage III
- breast cancer radiation treatment following breast conserving surgery

<table>
<thead>
<tr>
<th>Year</th>
<th>Lung Cancer Chemo-radiation</th>
<th>Lung Cancer Chemotherapy Stage II or IIIA</th>
<th>Colon Cancer Chemotherapy Post Op Treatment of Stage III</th>
<th>Breast Cancer Radiation Treatment Following Breast Conserving Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>30</td>
<td>43</td>
<td>45</td>
<td>NA</td>
</tr>
<tr>
<td>2008</td>
<td>84</td>
<td>52</td>
<td>50</td>
<td>NA</td>
</tr>
</tbody>
</table>
The circulatory system moves blood and lymph around the body and consists of the heart and blood vessels. Circulatory system disease, which includes coronary heart disease (also known as ischemic heart disease) and stroke, is the leading cause of illness, disability and death in Canada. In 2005, the last year for which there are published data, there were 71,749 deaths from circulatory disease – almost one-third of all deaths in Canada that year. Circulatory disease is a major cause of premature death and, in 2005, was responsible for 20,294 deaths in Canadians under the age of 75. It is the leading cause of hospitalization, accounting for 18% of total admissions (Conference Board of Canada, online).

Circulatory disease can be genetic or acquired. Lifestyle factors, such as diet and smoking, have a large influence on the likelihood of developing a circulatory disease. Circulatory disease is also largely age-related. The three leading conditions contributing to circulatory-system disease burden and mortality are stroke, high blood pressure, and coronary heart disease, with coronary heart disease being the most prevalent.

It has been estimated that heart disease and stroke cost the Canadian economy more than $18 billion every year in physician services, hospital costs, lost wages and decreased productivity. Canadian acute care hospitals handled almost three million (2.8 million) hospitalizations in 2004, a slight increase from the previous year and approximately 14% fewer than in 1995 (Heart and Stroke Foundation, online).
Deaths from circulatory disease have been falling in developed countries in recent years. The latest OECD data show that mortality rates in Canada fell by one-third between 1992 and 2004 and that, relative to comparator countries, Canada performs well.

% change 1992-2005
Australia: -41.1%
Canada: -33.7%
France: -28.2%
Sweden: -33.1%
United Kingdom: -39.5%
United States: -30.3%

Note: Australia data, 2003; Canada and Sweden data, 2004.
Because of treatment advances, many individuals who in the past would have died of circulatory disease are now living with the disease. This is reflected in the potential years of life lost (PYLL) data, which show a generalized reduction in all developed countries, including Canada, where PYLL fell by one-third between 1992 and 2004. However, it is important to note that there are quality-of-life implications for patients with circulatory disease. According to a survey conducted by the Heart and Stroke Foundation in 2000, 90% of the population with no history of circulatory disease reported “good, very good, or excellent” health. Respondents with self-reported circulatory disease claimed much lower levels of “good, very good, or excellent health” – 51% for heart disease patients and 37% for stroke patients (Heart and Stroke Foundation, online).

**Chart 1.15 Potential years of life lost to circulatory disease: International**

<table>
<thead>
<tr>
<th>Country</th>
<th>% Change 1992-2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>-38.7%</td>
</tr>
<tr>
<td>Canada</td>
<td>-33.5%</td>
</tr>
<tr>
<td>France</td>
<td>-29.3%</td>
</tr>
<tr>
<td>Sweden</td>
<td>-33.1%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>-39.7%</td>
</tr>
<tr>
<td>United States</td>
<td>-24.1%</td>
</tr>
</tbody>
</table>

*Note: Australia data, 2003; Canada and Sweden data, 2004.*
Circulatory disease mortality rates vary considerably across Canada. In 2005, rates across provinces ranged from 148.1 deaths per 100,000 population (age standardized) in Quebec to 243.1 deaths per 100,000 population in Newfoundland and Labrador. This means that mortality rates in Newfoundland and Labrador were 64% higher than those in Quebec.
Coronary Heart Disease

Coronary heart disease, also known as ischemic heart disease, is a largely preventable disease that, in 2005, was responsible for the deaths of 38,480 Canadians (Statistics Canada, CANSIM table 102-0529).

Coronary heart disease is characterized by the accumulation of fatty deposits (atheroma) in the wall of the coronary arteries. A build-up of these deposits in a process known as atherosclerosis leads to narrowing or hardening of the coronary arteries, resulting in poor blood supply to the heart muscle. It can present in two main forms:

• Angina pectoris (chest pain on exertion, in cold weather or emotional situations)
• Acute chest pain due to acute coronary syndrome (i.e. myocardial infarction, or unstable angina)

Diagnosis of coronary heart disease is accomplished with an electrocardiogram, blood tests (cardiac markers), cardiac stress testing or a coronary angiogram. Depending on the symptoms and risk, treatment may be medication, percutaneous coronary intervention (angioplasty) or coronary artery bypass (CABG) surgery.

Risk factors for coronary heart disease include:

• Age (45 years or older for men; 55 years or older for women)
• Family history of early heart disease
• High total blood cholesterol
• Smoking
• Hypertension
• Diabetes
• Obesity
• Physical inactivity

Charts in this section focus on acute myocardial infarction (AMI) or heart attack, the most significant type of coronary heart disease in terms of mortality and morbidity.

Acute Myocardial Infarction

An acute myocardial infarction (AMI), or heart attack, occurs when the blood supply to part of the heart is interrupted, resulting in the death of heart cells. This interruption is most commonly due to blockage of a coronary artery following the rupture of an atherosclerotic plaque, which is an unstable collection of lipids (such as cholesterol) and white blood cells in the arterial wall. If the blood supply is not restored quickly, the heart muscle suffers permanent damage. The restoration of blood supply via thrombolysis (clot-busting) or revascularisation (the use of surgical procedures) has been proven to be an effective treatment for AMI.

A recently published paper (Atzema et al. 2009) states that fewer than one-half of AMI patients meet benchmark times for restoring blood flow (30 minute door-to-needle time). A cardiac arrest is the abrupt cessation of normal circulation of the blood due to failure of the heart to contract effectively. A cardiac arrest is different from, but may be caused by, a myocardial infarction where the heart usually continues to beat but blood flow to the heart is blocked. About 40,000 Canadians experience a cardiac arrest every year. Fewer than 5% of those who have a cardiac arrest outside of a hospital survive. Ultimately, survival from cardiac arrest is dependent on the strength of individual links in the care chain, including early access, early cardiopulmonary resuscitation (CPR), early defibrillation, and early advanced cardiac life support (ACLS), with each link representing a specific community response to the emergency situation of cardiac arrest.

Cardiac arrest incidence rates per 100,000 vary between 53 and 59 across Canada. Most victims are men in their late 60s or early 70s. Their collapse is witnessed 35% to 55% of the time. For every one-minute delay in defibrillation, the survival rate of a cardiac arrest victim decreases by 7-10%. Defibrillation, when used with CPR, can improve cardiac arrest survival rates to more than 50% if delivered in the first few minutes (Heart and Stroke Foundation, online).
Mortality rates from AMI have been falling in most developed countries in recent years. The chart shows that, between 1992 and 2004, Canada recorded a 45.7% decrease in mortality rates. Viewed alongside the provincial data on AMI mortality (see Chart 1.19), it is apparent that, in 2004-2005, the level of variation within Canada was almost as marked as the level of variation among the countries shown in the chart.

% change 1992-2005

<table>
<thead>
<tr>
<th>Country</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>-56.1%</td>
</tr>
<tr>
<td>Canada</td>
<td>-45.7%</td>
</tr>
<tr>
<td>France</td>
<td>-43.5%</td>
</tr>
<tr>
<td>Germany</td>
<td>-40.0%</td>
</tr>
<tr>
<td>Sweden</td>
<td>-48.1%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>-61.8%</td>
</tr>
<tr>
<td>United States</td>
<td>-50.5%</td>
</tr>
</tbody>
</table>

Note: Australia data, 2003; Canada and Sweden data, 2004.
Rates of premature mortality due to AMI have fallen dramatically across most developed countries. The chart shows that the number of years lost to AMI per 100,000 population decreased by 50.4% in Canada between 1992 and 2004.

<table>
<thead>
<tr>
<th>Country</th>
<th>% change 1992-2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>-64.3%</td>
</tr>
<tr>
<td>Canada</td>
<td>-50.4%</td>
</tr>
<tr>
<td>France</td>
<td>-36.4%</td>
</tr>
<tr>
<td>Germany</td>
<td>-45.7%</td>
</tr>
<tr>
<td>Sweden</td>
<td>-52.0%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>-65.5%</td>
</tr>
<tr>
<td>United States</td>
<td>-47.1%</td>
</tr>
</tbody>
</table>

Note: Australia data, 2003; Canada and Sweden data, 2004.
AMI mortality data from across Canada show considerable variation. Across the provinces, rates in 2005 ranged from 36.1 deaths per 100,000 population (age standardized) in Alberta to 49.0 deaths per 100,000 population in Newfoundland and Labrador.
Comparatively high rates of unplanned re-admission can indicate problems with early discharge from hospital or with post-hospital care. The risk of re-admission following an AMI may be related to the type of drugs prescribed at discharge, patient compliance with post-discharge therapy, the quality of follow-up care in the community, or the availability of appropriate diagnostic or therapeutic technologies during the initial hospital stay. The chart illustrates that re-admission rates across Canada ranged from 4.2% in Alberta to 8.5% in Prince Edward Island.

<table>
<thead>
<tr>
<th>Province</th>
<th>Re-admission Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Columbia</td>
<td>5.6</td>
</tr>
<tr>
<td>Newfoundland and Labrador</td>
<td>7.1</td>
</tr>
<tr>
<td>Prince Edward Island</td>
<td>8.5</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>7.2</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>7.0</td>
</tr>
<tr>
<td>Quebec</td>
<td>6.6</td>
</tr>
<tr>
<td>Ontario</td>
<td>6.5</td>
</tr>
<tr>
<td>Manitoba</td>
<td>5.8</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>6.6</td>
</tr>
<tr>
<td>Alberta</td>
<td>4.2</td>
</tr>
<tr>
<td>Newfoundland and Labrador</td>
<td>7.1</td>
</tr>
<tr>
<td>Prince Edward Island</td>
<td>8.5</td>
</tr>
</tbody>
</table>

Source: Health Indicators, CIHI, 2008
Note: Canada rate does not include Quebec due to differences in data collection. Rates are based on three years of pooled data.
After a patient has had a heart attack, there are several drugs that have been shown in large clinical trials to reduce the risk of another attack (National Institute for Health and Clinical Excellence, 2007). These drugs, whose administration is called secondary prevention, include:

- aspirin, which helps prevent the blood from clotting;
- beta-blockers, which slow the heart rate and lower blood pressure;
- angiotensin-converting enzyme inhibitors (ACE inhibitors) and angiotensin II receptor blockers (ARBs), which block an enzyme in the blood that causes blood vessels to tighten, thereby relaxing blood vessels and lowering blood pressure (for patients who are intolerant of ACE inhibitors, angiotensin receptor blockers); and
- statins, which reduce both total cholesterol and low-density lipoprotein (LDL or “bad”) cholesterol levels in the blood, reducing the relative risk of coronary events.

National data for secondary prevention of AMI are not available. Saskatchewan provides an example of comprehensive data collection and reporting on AMI care processes. The chart illustrates the proportion of hospitalized AMI patients aged 20+ years who had secondary-prevention medications dispensed 90 days post-discharge. Saskatchewan data are also available for the proportion of patients on secondary prevention medication at three days post-discharge in 2005-2006. The data indicate that 73.5% of AMI patients were prescribed beta-blockers, 73.8% ACE inhibitors or ARBs, and 69.3% statins. To put these data in international context, a national audit conducted annually by the Royal College of Physicians (U.K.) found that, in 2008, the proportion of heart attack patients in England prescribed secondary-prevention medication on discharge from hospital was 98% for aspirin, 92% for beta-blockers and 96% for statins. Similarly, in the U.S., the National Committee for Quality Assurance (NCQA) reported that in 2006, of health plan members aged 35+ who were hospitalized after an AMI, 98% received a prescription for a beta-blocker within seven days of hospital discharge. These international comparisons should be interpreted with care, as the methodologies differ, particularly in terms of whether patients with contraindications are included in the analyses.

![Chart 1.21 Secondary prevention of AMI: Saskatchewan](chart)

AMI secondary prevention among residents of Saskatchewan aged 20+, 90th day post-discharge, 2001-2002 to 2005-2006

- Statin
- Beta-blocker
- ACE inhibitor/ARB

Source: Discharge Abstract Database, Prescription Drug Plan Historical Claims. Analysis by Health Quality Council, Saskatchewan (2008)
A stroke, also known as a cerebrovascular accident, occurs when a blood vessel that carries oxygen and nutrients to the brain either gets blocked by a clot (an ischemic stroke) or ruptures and bleeds (a hemorrhagic stroke). As a result, the area of the brain supplied by the blood vessel is damaged or dies. The severity and consequences of stroke vary dramatically, from a limited episode known as a transient ischemic attack (TIA) or “mini-stroke”, with no persistent consequences, to a severe incident that causes death or disability.

Risk factors for stroke fall into two main groups: those that can be controlled and those that cannot. Factors that are not amenable to control or change include:
- Age
- Family history
- Race
- Gender
- Prior stroke, TIA or heart attack

Risk factors that can be controlled include:
- High blood pressure
- Smoking
- Blood cholesterol levels
- Physical inactivity
- Obesity

According to the Heart and Stroke Foundation (online b), of the approximately 50,000 people who suffer a stroke each year:
- 15% will die
- 10% will recover completely
- 25% will recover with a minor impairment or disability
- 40% will be left with a moderate-to-severe impairment
- 10% will be so severely disabled they require long-term care

In 2005, there were more than 14,000 deaths attributed to cerebrovascular disease (the causal disease for stroke).

It has been estimated that widespread access to organized stroke care could prevent more than 160,000 strokes, prevent disability in 60,000 Canadians, and save $8 billion net in healthcare costs over the next 20 years in Canada (Heart and Stroke Foundation, online b).

The Canadian Stroke Strategy (online) is a comprehensive program designed to provide all Canadians with the best stroke care possible, regardless of where they live, by 2010. The strategy aims to support provinces and territories in preventing and treating strokes and rehabilitating and re-integrating survivors into their communities. The strategy also seeks to build public awareness of stroke, develop guidelines and standards of care, provide training for health professionals, and co-ordinate research efforts. It also sets out an agreed-upon set of quality indicators. However, there appear to be no national data sets that use those quality indicators or report on performance across Canada. Ontario does have a comprehensive set of quality data related to stroke; in the absence of national information, this section presents a subset of the Ontario data.
Chart 1.22 Cerebrovascular disease mortality: International

Cerebrovascular disease (CVD) makes it more likely that a stroke will occur, through either a sudden blockage or a rupture of a blood vessel within the brain. A blockage can be caused by a blood clot forming (a thrombosis) or by a fragment of material (blood clot, piece of tissue, cholesterol or various other substances) travelling in the bloodstream (an embolism). The chart shows that, internationally, mortality rates from cerebrovascular disease have been falling steadily. In Canada, mortality rates between 1992 and 2004 fell by 30.5%. Compared to many other developed countries, Canada has a low CVD mortality rate.

<table>
<thead>
<tr>
<th>% change 1992-2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
</tr>
<tr>
<td>Canada</td>
</tr>
<tr>
<td>France</td>
</tr>
<tr>
<td>Germany</td>
</tr>
<tr>
<td>Sweden</td>
</tr>
<tr>
<td>United Kingdom</td>
</tr>
<tr>
<td>United States</td>
</tr>
</tbody>
</table>

Note: Australia data, 2003; Canada and Sweden data, 2004.
Chart 1.23 Potential years of life lost to cerebrovascular disease: International

Of the countries shown in the chart, Canada has the fewest years of life lost to cerebrovascular disease. Over the period 1992-2004, Canada recorded a 38.7% fall in the potential years of life lost per 100,000 population.

% change 1992-2005

<table>
<thead>
<tr>
<th>Country</th>
<th>Change 1992-2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>-39.3%</td>
</tr>
<tr>
<td>Canada</td>
<td>-38.7%</td>
</tr>
<tr>
<td>France</td>
<td>-36.5%</td>
</tr>
<tr>
<td>Germany</td>
<td>-42.0%</td>
</tr>
<tr>
<td>Sweden</td>
<td>-31.6%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>-32.7%</td>
</tr>
<tr>
<td>United States</td>
<td>-20.9%</td>
</tr>
</tbody>
</table>

Note: Australia data, 2003; Canada and Sweden data, 2004.

Source: OECD, 2008
Cerebrovascular disease mortality data from across Canada show considerable variation. Among provinces, rates in 2005 ranged from 26.1 deaths per 100,000 population (age standardized) in Quebec to 49.5 deaths per 100,000 population in Newfoundland and Labrador. This means that in Newfoundland and Labrador, the rate was 90% higher than that in Quebec.
After a stroke, it is critically important that patients seek medical care quickly, as the window of opportunity within which to optimally treat most strokes is very small – no greater than three hours. Many charities, foundations and clinical groups around the world emphasize that, after stroke, “Time is Brain.” In 2007, the Heart and Stroke Foundation conducted a national survey that asked respondents: “Would you call 9-1-1 or local EMS if you or someone you know experienced a stroke warning sign?” The results are illustrated in the chart. In Newfoundland and Labrador, fewer than one-quarter of respondents indicated that they would call for emergency assistance. Overall, fewer than half of Canadians would do so.
It is critically important that patients quickly receive medical care for appropriate diagnosis and clinical intervention to minimize permanent damage from stroke (Lindsay et al., 2008). Recognizing stroke warning signs and getting immediate medical attention within three hours of stroke onset have a major impact on survival and recovery. However, according to the Heart and Stroke Foundation of Canada (online b), only 20-25% of people who have a stroke actually get emergency care within this critical window. Emergency transport is a major contributor to delays in accessing stroke care within this time frame. A stroke audit conducted in Ontario found that, in 2004-2005, fewer than one-third of stroke patients were treated medically within 2.5 hours of stroke onset.

**Chart 1.26 Emergency transport for stroke: Ontario**

Patients with stroke or TIA arriving in the emergency department within 2.5 hours of stroke onset, 2002-2003 and 2004-2005

Source: Institute for Clinical Evaluative Sciences (ICES), 2009
Thrombolysis, or “clot busting” with recombinant tissue plasminogen activator (rTPA), has been shown in clinical trials to improve outcomes after ischemic stroke, if administered within 4.5 hours of symptom onset (Lindsay et al., 2008). Neuroimaging is required prior to thrombolysis in order to ascertain whether the stroke is ischemic, as thrombolytic treatment would exacerbate the symptoms of hemorrhagic strokes. The chart shows that, in 2004-2005, only 3.9% of Ontario patients with acute ischemic stroke received thrombolytic treatment. In the subgroup of patients presenting within 2.5 hours of stroke onset, 14.1% received thrombolysis. Current Canadian guidelines (Lindsay et al., 2008) state that all eligible patients should receive thrombolysis within one hour of hospital arrival (i.e. door-to-needle, or DTN, time <60mins). Median door-to-needle time for those receiving thrombolysis in Ontario in 2004-2005 was 84.2 minutes. The lowest median DTN was recorded in regional stroke centres, where a result of 73.1 minutes was recorded (data not shown).
National guidelines recommend dysphagia screening (screening for swallowing problems) before patients are given anything to eat or drink (Lindsay, et al., 2008). This is to prevent development of inhalation pneumonia. Pneumonia is an important complication of ischemic stroke and increases mortality threefold. The latest available data for Ontario (2004-2005) show that slightly more than one-half of hospitalized stroke patients were screened for dysphagia. For details about the different hospital types shown, see Technical Appendix.
The recommended treatment for secondary prevention of ischemic stroke includes the use of antithrombotics, warfarin for atrial fibrillation, antihypertensives, and lipid-lowering agents. The chart on this page illustrates utilization rates for these treatments across Ontario. Secondary prevention clinics can help patients adhere to medication regimes and support them to make lifestyle changes in order to prevent subsequent cerebrovascular episodes. The chart on the next page shows that, in 2004-2005, 29% of patients were referred to a secondary prevention clinic after discharge from hospital.

Chart 1.29 Secondary prevention for stroke: Ontario

Drug therapy at discharge among stroke/TIA patients, 2002-2003 and 2004-2005

Source: ICES, 2009

Effectiveness
Referral to a secondary prevention clinic among stroke/TIA patients, by hospital type, 2002-2003 and 2004-2005

<table>
<thead>
<tr>
<th>Hospital Type</th>
<th>2002-2003</th>
<th>2004-2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontario</td>
<td>14.1</td>
<td>29.1</td>
</tr>
<tr>
<td>Non-designated</td>
<td>7.1</td>
<td>20.9</td>
</tr>
<tr>
<td>District Stroke Centre</td>
<td>16.7</td>
<td>27.4</td>
</tr>
<tr>
<td>Regional Stroke Centre</td>
<td>39.9</td>
<td>67</td>
</tr>
</tbody>
</table>

Source: ICES, 2009
Respiratory Disease

Respiratory disease, which includes asthma, chronic obstructive pulmonary disease (COPD), influenza and pneumonia, bronchiolitis, cystic fibrosis and respiratory distress syndrome, affects more than 3.5 million Canadians\(^1\) (Public Health Agency of Canada, 2007). In 2005, there were 20,485 deaths attributed to respiratory disease (CANSIM Table 102-0530, excludes lung cancer).

Approximately 6.5% of Canada’s total healthcare spending is allocated to respiratory diseases (not including lung cancer). In 2000, almost $5.7 billion was invested in direct costs of caring for patients with respiratory disease, including covering hospitalization, physician visits, research, and drugs, while a further $6.7 billion was spent on indirect expenses associated with disability and mortality (PHAC, 2007).

The two most important risk factors for respiratory diseases are tobacco smoke (through personal smoking and exposure to second-hand smoke) and air quality.

\(^1\) There is some variation in the way respiratory disease is defined: some reports include lung cancer within respiratory disease (e.g. PHAC, 2007) while others, notably those based on the International Classification of Disease (ICD-10), consider lung cancer under neoplasms and exclude it from respiratory disease.
Respiratory disease affects the lung, pleural cavity, bronchial tubes, trachea and upper respiratory tract, as well as the nerves and muscles involved in breathing. It ranges from mild and self-limiting illnesses such as the common cold, to life-threatening conditions such as bacterial pneumonia and to syndromes that can significantly compromise quality of life such as chronic obstructive pulmonary disease (COPD). According to the Public Health Agency of Canada (2007), respiratory disease is responsible for more than 10% of hospitalizations and more than 16% of deaths in Canada. The charts show that, between 1992 and 2004, Canada recorded a 17% reduction in respiratory disease mortality and a 31.2% decrease in the potential years of life lost to the disease.

Source: OECD, 2008
According to the Public Health Agency of Canada (2007), Canada is facing a wave of chronic respiratory diseases as a consequence of an aging population. The latest available data show that there is considerable variation in mortality rates across the country, with provincial rates ranging from 40.6 deaths per 100,000 population in Quebec to 55.0 deaths per 100,000 population in Nova Scotia.

**Chart 1.31 Respiratory disease mortality: Canada**

<table>
<thead>
<tr>
<th>Region</th>
<th>Mortality Rate per 100,000 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Brunswick</td>
<td>48</td>
</tr>
<tr>
<td>Newfoundland and Labrador</td>
<td>53.6</td>
</tr>
<tr>
<td>Prince Edward Island</td>
<td>43.6</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>55</td>
</tr>
<tr>
<td>British Columbia</td>
<td>49.8</td>
</tr>
<tr>
<td>Quebec</td>
<td>49.8</td>
</tr>
<tr>
<td>Ontario</td>
<td>55.0</td>
</tr>
<tr>
<td>Manitoba</td>
<td>46.7</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>47.8</td>
</tr>
<tr>
<td>Alberta</td>
<td>48.8</td>
</tr>
<tr>
<td>Yukon</td>
<td>55.0</td>
</tr>
<tr>
<td>Northwest Territories</td>
<td>129</td>
</tr>
<tr>
<td>Nunavut</td>
<td>118.2</td>
</tr>
</tbody>
</table>

Source: Statistics Canada, Canadian Vital Statistics

Note: Rates for Yukon, the Northwest Territories and Nunavut should be interpreted with caution due to small underlying counts.
Chronic obstructive pulmonary disease (COPD), which includes chronic bronchitis and emphysema, is characterized by shortness of breath, cough and sputum production. COPD is a result of a narrowing of the airway limiting the flow of air to and from the lungs. Symptoms do not usually appear before age 55; however, changes to the lung begin many years earlier. In general, COPD progresses slowly over a period of years. As the disease advances, shortness of breath limits the activity levels of individuals and reduces their quality of life. Current guidelines recommend that patients suspected to have COPD should be diagnosed by spirometry (O’Donnell et al., 2007). Early diagnosis can help to improve outcomes. The chart illustrates data from a Lung Association survey of Canadians deemed “at risk” for COPD (that is, aged 18+ years and current smokers) and patients with diagnosed COPD. More than one-third of patients diagnosed with COPD and more than two-thirds of those deemed “at risk” reported that they had never undergone a spirometry test.
Diabetes mellitus is a disease in which the body either does not produce, or does not properly use, insulin. A hormone produced by the pancreas, insulin is needed to convert sugar, starches and other food into energy. The result of insulin deficiency is the high blood sugar levels characteristic of the disease. There are two main forms of diabetes: type 1 diabetes results from the body’s failure to produce insulin, and type 2 diabetes results from insulin resistance (suboptimal use of insulin). Ten percent of cases in Canada are type 1 and 90% type 2. Obesity is closely linked with type 2 diabetes.

Diabetes is the seventh-leading cause of death in Canada and accounts for 25,000 years of life lost before age 75. Internationally, there is significant under-recording of diabetes as an underlying cause of death, as deaths in diabetic people are often coded to secondary complications associated with the disease. The extent of under-recording may vary geographically and over time. Therefore, mortality rates from the disease are not reported here.

In 2005, 1.8 million Canadians – 5.5% of the population – had diagnosed diabetes. However, more than 2.25 million Canadians are estimated to have diabetes, with many adults with diabetes unaware that they have the condition. The cost of diabetes in Canada is estimated to be up to $9 billion annually (PHAC, online).

In 1999, the Government of Canada allocated $115 million to the Canadian Diabetes Strategy (CDS), aimed at preventing type 2 diabetes and addressing complications associated with the disease. A policy review (PHAC, online) in 2007 revisited the strategy and noted that progress in achieving priorities has been slow.

Diabetes is associated with serious chronic ill health, disability and premature mortality. Long-term complications include heart disease, stroke, blindness, kidney disease and amputations (PHAC, online). Many of the long-term effects of diabetes can be avoided with effective control of blood pressure, cholesterol and blood sugar levels (Diabetes Control and Complications Trial, 1993).

Two population groups are at highest risk of diabetes:

- Seniors – 10% of those aged 65+ have the disease, compared to 3% of those aged 35–64
- Aboriginal people – type 2 diabetes rates are 3 to 5 times higher in aboriginal communities than in the general population
The Canadian Diabetes Association (CDA) Clinical Practice Guidelines (2008) state that glycated hemoglobin (HbA1c) is a valuable indicator of treatment effectiveness, and should be measured every three months when glycemic targets are not being met and when diabetes therapy is being adjusted. HbA1C testing at six-month intervals may be considered in adults during periods of treatment and lifestyle stability, when glycemic targets have been consistently achieved. The chart illustrates findings from diabetic respondents to a Commonwealth Fund International Health Policy Survey question about whether their HbA1c had been checked in the past year. The data indicate that the majority of diabetic patients are having their HbA1c levels checked, but the data provide no insight into how effectively glycemic control is being maintained.
Screening for possible complications and sequelae of diabetes is important, as early detection means that disease processes can be treated and arrested. International data from the Commonwealth Fund survey, 2008, include responses from adults with diabetes. Almost one-half of Canadian respondents indicated that they had not received a foot exam in the preceding year, and almost one-third indicated that they had not undergone an eye examination. The strongest results were recorded in the U.K., which recently implemented the Quality Outcomes Framework, a national system for incentivizing primary-care physicians to provide evidence-based care.

Source: Commonwealth Fund, 2008

Note: Data should be interpreted with care due to small sample sizes.
In 2007, the Canadian Community Health Survey asked respondents with diabetes whether they had received four recommended care components in the preceding year (or preceding two years for eye exams). The charts below show that across Canada, fewer than one-third of respondents indicated that they had received comprehensive diabetes care.
Effectiveness

Age-standardized proportion of adults with diabetes who received all four recommended care processes, 2007

Source: Statistics Canada, CCHS, 2007
Note: Data exclude gestational diabetes

% respondents

CANADA
Newfoundland and Labrador
Prince Edward Island
Nova Scotia
New Brunswick
Quebec
Ontario
Manitoba
Saskatchewan
Alberta
British Columbia

29
33
32
31
32
34
34
21
24
NA

Chronic hyperglycemia of diabetes is associated with significant long-term complications, particularly damage, dysfunction and failure of various organs. The 2008 Clinical Practice Guidelines of the Canadian Diabetes Association state that, for most individuals, HbA1c levels should be \( \leq 7.0\% \) in order to minimize risks of microvascular and macrovascular complications. The beneficial effects of lowering low-density lipoprotein cholesterol (LDL) with statin therapy apply equally well to people with diabetes as to those without. The primary target for high-risk persons with diabetes is an LDL-C of \( \leq 2.0 \) mmol/L, which is generally achievable with statins. The chart illustrates the percentage of people with diabetes aged 20+ years in Saskatchewan with most recent HbA1c and LDL results within the recommended levels. To place these data in context, results from the Quality Outcomes Framework in England show that HbA1c levels of less than 7.5% (less strict than levels in Canada) were achieved in 66.8% patients in England in 2007-2008. Cholesterol levels of less than 5 mmol/litre (also less strict than Canadian levels) were achieved in 83.2% of diabetic patients.
Mental Health and Mental Illness

Healthcare organizations in Canada generally define mental health as “the capacity of each and all of us to feel, think, and act in ways that enhance our ability to enjoy life and deal with the challenges we face. It is a positive sense of emotional and spiritual well-being that respects the importance of culture, equity, social justice, interconnections and personal dignity.” Mental illness, on the other hand, is defined as “alterations in thinking, mood or behaviour due to distress and impaired function” (Government of Canada, 2006).

The most common mental illnesses are mood disorders (depression), schizophrenia, anxiety, personality disorders, and eating disorders. According to the International Classification of Diseases used by the World Health Organization, the wide-ranging category of mental disorders also includes sleep disorders, autism, substance abuse, mental retardation, dementia, paranoia, and mania.

Mental illness is classified as one of the five major chronic diseases in Canada and depression is one of the leading causes of disability in developed countries (CIHI 2008b; Conference Board of Canada, online b). The Canadian Community Health Survey on mental health and well-being found that 4.5% of Canadians reported having major depression, similar to rates found for diabetes and heart disease. An estimated 20% of Canadians will experience mental illness at some time in their lives; two-thirds of these people will never receive treatment. The economic burden attributed to mental disorders in Canada is significant. In 1998, the costs associated with mental illness in Canada were estimated to be about $7.9 billion, or 5% of total healthcare costs. Mental illness is the second-leading cause of hospital admission among Canadians between 20 and 44 years of age (Health Canada, 1998).

Mortality rates are an imprecise measure of the impact of mental health disorders because deaths directly attributable to mental illnesses are uncommon, with the exception of suicides among the young. Every year in Canada, some 3,400 people end their life through suicide. Approximately 90% of suicides are related to depression, other mental health disorders and/or substance abuse. Most notably, youth suicide is an urgent issue for First Nations and Inuit youth in Canada. While there is much variation among communities, overall rates are high. Suicide rates are five to seven times higher for First Nations youth than for non-aboriginal youth. Suicide rates among Inuit youth are among the highest in the world, at 11 times the Canadian average (Health Canada, online).

The federal government established the Mental Health Commission of Canada in 2007 to increase understanding of mental health and mental illness in Canada.
Suicide can represent a failure of the health system, and society, to help an individual in need of medical and psychosocial care and community support. The chart illustrates OECD data and shows that Canadian rates of suicide fell by 18% between 1992 and 2004. The potential years of life lost over the same time period fell by 20%.

Source: OECD, 2008
In 2004, across Canadian provinces, the potential years of life lost to suicide per 100,000 population ranged from 182.4 in Prince Edward Island to 499.3 in Quebec. This is a considerable difference, with the Quebec figure being some 146% higher than the PEI statistic. The scale of this difference is, however, dwarfed by the comparison between the provinces as a group and the territories, particularly the Northwest Territories and Nunavut. Care should be taken in making such comparisons because of small underlying population counts in the territories. Nonetheless, there are grounds for serious concerns about this aspect of health.
Suicide is one of the leading causes of death in both males and females from adolescence to middle age, accounting for 24% of all deaths among those aged 15 to 24 and 16% among those aged 25 to 44. The mortality rate from suicide in males is four times that for females (data not shown). There is marked variation across Canada, with the territories recording hospitalizations due to attempted suicide at a rate two-and-a-half times that seen in Canada as a whole. The relative roles of primary care and mental health services – as well as behavioural, cultural, economic or educational issues – in such high levels of attempted suicide in the territories are unknown.
Although re-admission to hospital within 30 days of discharge for mental illness may be unavoidable, a CIHI study showed that shorter initial hospital stays are related to higher re-admission rates for schizophrenia and psychotic disorders (CIHI, 2008c). The highly debilitating and hard-to-treat nature of such disorders means long hospital stays are often necessary to stabilize patients. In some cases, a high level of re-admissions suggests that patients were discharged prematurely or that the level of mental health support provided in the community was inadequate, or both.

The chart shows data released by CIHI’s Hospital Mental Health Database on 30-day re-admissions. Rates ranged from 6.5% in Manitoba to 11.7% in Prince Edward Island.
Prevention and Health Promotion

Assessments of the quality of healthcare in any country or jurisdiction often focus on how the system deals with patients and their ailments. In developed countries, however, a significant proportion of illnesses that afflict the population are associated with, and exacerbated by, lifestyle choices. The extent to which we can hold a healthcare system to account for the behaviour choices of the public it serves is debatable. However, it is undeniable that public health, health promotion and health prevention are an increasingly important facet of healthcare delivery.

Table 1.2 contains data from the Canadian Community Health Survey (2003-2007) and provides insight into the health status of Canadians.

Table 1.2 Modifiable health risk factors, Canadian Community Health Survey (2003-2007)

<table>
<thead>
<tr>
<th>Modifiable health risk factors</th>
<th>Year</th>
<th>% respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current smoking (daily or occasional)</td>
<td>2003</td>
<td>22.9%</td>
</tr>
<tr>
<td></td>
<td>2005</td>
<td>21.7%</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>21.9%</td>
</tr>
<tr>
<td>Overweight/Obese</td>
<td>2003</td>
<td>48.1%</td>
</tr>
<tr>
<td></td>
<td>2005</td>
<td>48.9%</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>48.5%</td>
</tr>
<tr>
<td>Five or more drinks, on one occasion, at least once per month in preceding year</td>
<td>2003</td>
<td>20.7%</td>
</tr>
<tr>
<td></td>
<td>2005</td>
<td>21.8%</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>21.8%</td>
</tr>
<tr>
<td>Leisure time, physically inactive</td>
<td>2003</td>
<td>46.4%</td>
</tr>
<tr>
<td></td>
<td>2005</td>
<td>46.2%</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>47.6%</td>
</tr>
<tr>
<td>Vegetable and fruit consumption, fewer than five or more per day</td>
<td>2003</td>
<td>38.9%</td>
</tr>
<tr>
<td></td>
<td>2005</td>
<td>41.2%</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>41.3%</td>
</tr>
</tbody>
</table>

Source: Health Care in Canada Survey, 2007

There are a number of processes and services that healthcare systems should provide in order to prevent ill health or to facilitate early detection of disease, thus improving outcomes. This section presents data on such processes, including:

- immunization
- management of risk factors such as hypertension and hyperlipidaemia
- cancer screening.
Vaccinations are one of the most cost-effective disease prevention strategies in public health. The World Health Organization recommends immunity levels of around 95% to prevent outbreaks of disease (Health Protection Agency, 2001). The chart shows coverage rates for diphtheria, tetanus and pertussis (DTP) vaccination. The results from Canada are substantially lower than those of comparator countries.

Effectiveness

Chart 1.41 Childhood immunization: International

Childhood immunization coverage: Diphtheria, tetanus and pertussis, 2006

Note: Canada data are from 2004.

Source OECD, 2008
An estimated 10–25% of Canadians may get influenza each year. For the majority of people, it is an unpleasant but self-limiting illness. However, for those in high-risk groups (those aged 65+ or with underlying respiratory or cardiovascular disease, diabetes or impaired immunity), influenza is much more serious. An estimated 4,000 to 8,000 Canadians, mostly seniors, die every year from pneumonia related to influenza, and many others may die from other serious complications of the disease (Health Canada, online b). The charts illustrate data from the Canadian Community Health Survey and show the proportion of respondents aged 65+ years who indicated that they had a flu shot in the preceding year. There is considerable variation in rates of immunization among provinces. To set these data in context, in 2007–2008, the percentage of the population in England aged 65+ years immunized against influenza was 74% (NHS Information Centre, online).
Hypertension (high blood pressure) and hyperlipidaemia (high cholesterol) are important risk factors in the development of heart disease and stroke. Evidence-based guidelines recommend that patients with diabetes, heart disease and hypertension should undergo regular checks. In 2008, the Commonwealth Fund survey of sicker adults asked all respondents whether, in the previous year, they had their blood pressure checked, and asked respondents with heart disease, diabetes or hypertension whether they had their cholesterol level checked in the same period. The chart illustrates the proportion who answered “yes” to these questions. For Canada, 91% of respondents had their blood pressure checked and 82% of respondents indicated that they had their cholesterol checked.
The Canadian Survey of Experiences with Primary Health Care (CSE-PHC), 2008, asked respondents who reported having diabetes, heart disease, stroke, high blood pressure or hypertension: “In the past 12 months, did you get blood pressure and cholesterol measurements to monitor your condition?” The proportion of respondents who indicated that they had their blood pressure measured ranged from 82.1% in Nova Scotia to 96.4% in Manitoba. The data for a routine cholesterol test in the preceding year ranged from 74.6% in Nova Scotia to 82.9% in New Brunswick.
Regular screening can detect breast cancer in its early stages, increasing the number of treatment options available to the patient and improving treatment outcomes and survival rates. The Canadian Task Force on Preventive Health Care recommends biennial breast screening by mammography for women aged 50 to 69. The chart illustrates survey data on mammogram coverage across Canada. To set this in context, in England in 2007, 76% of women aged 50-64 (the original screening population) and 67.7% of women aged 65-70 years (an expanded screening population) were screened in the preceding three years.
Regular screening can reduce death from colorectal cancer. Patients whose cancer is detected early have an estimated 90% chance of being cured, compared with only 10% if the cancer is detected at an advanced stage. Studies have demonstrated that colorectal cancer death rates can be reduced by 15-18% with regular screening using the fecal occult blood test (FOBT) (Mandel et al, 1993; 1999; Hardcastle et al, 1996). The chart contains survey data drawn from the Canadian Community Health Survey, 2003, and illustrates the number of respondents aged 50+ years who indicated that they received guideline-compliant care. Internationally, other countries that have implemented FOBT screening programs have achieved significantly higher participation rates. Australia and Finland achieved 45% and 70% participation respectively among the invited population in their programs’ initial rounds of screening. In the United States, the Veterans’ Administration screened about 75% of its plan members for colorectal cancer in 2003; 90% of them were screened with FOBT.

Source: Statistics Canada, CCHS, analysis by Scritch et al., 2008
Note: Data are drawn from all health regions in Newfoundland and Labrador and British Columbia, 14/37 regions in Ontario and 7/11 regions in Saskatchewan.
Cervical cancer is preventable. Despite this, in 2009 there will be an estimated 1,300 new cases of cervical cancer in Canada and some 380 women will die from the disease (Canadian Cancer Society, 2009). Regular screening via Pap smear is an essential defence against cervical cancer. Cervical screening can detect early cell changes on the cervix caused by persistent human papillomavirus (HPV) infection, which can progress to cancer if not found and treated. Although there is now a vaccine that can block HPV infections before they occur, it does not protect against all cancer-causing HPV strains. As a result, vaccination is not a substitute for cervical cancer screening; women continue to need regular (every three years) cervical screening tests. The chart illustrates survey data from women across Canada. The proportion of respondents who indicated they had undergone cervical screening in the preceding three years ranged from 69.8% in Quebec to 82.2% in Nova Scotia. To set this in an international context, in 2008 in England, 78.6% of eligible women had been screened at least once in the previous five years.
Appropriateness

An appropriate procedure is defined as one in which “the expected health benefit (e.g., increased life expectancy, relief of pain, reduction in anxiety, improved functional capacity) exceeds the expected negative consequences (e.g., mortality, morbidity, anxiety, pain, time lost from work) by a sufficiently wide margin that the procedure is worth doing, exclusive of cost” (Brook et al., 1986; Park et al., 1986).

The concept of appropriateness has been used to examine both overuse and underuse of healthcare services (Fitch et al, 2001). This report adopts a broad interpretation of the concept to examine three issues:

- Appropriateness of primary care services (measured via hospitalizations for ambulatory care sensitive conditions, as an indicator of underuse)
- Appropriateness of hospital discharge (measured via re-admission rates, with high re-admissions indicating underuse)
- Caesarean section rates (often cited as an example of an overused procedure in developed countries)
Ambulatory care sensitive conditions (ACSCs) encompass chronic diseases – such as angina, asthma, chronic obstructive pulmonary disease, diabetes, heart failure and hypertension – that can be managed in the community. While not all hospital admissions for ACSCs are avoidable, appropriate ambulatory care in the community can prevent acute exacerbations or arrest disease progression. Well-functioning and accessible primary healthcare services are essential to the management of ACSCs. Hospitalization rates can serve as a proxy indicator for quality of care, although rates are also affected by factors such as patients’ socioeconomic status, co-morbidities, and others. Between 2001 and 2006, there was a 22% fall in hospitalizations for ACSCs across Canada as a whole (data exclude Quebec). The greatest decrease was recorded in Nova Scotia (-28.2%). Higher ACSC hospitalization rates are associated with low physician supply. Chart 3.7 shows that Nunavut has low rates of family physicians per capita.
<table>
<thead>
<tr>
<th>Province</th>
<th>Change 2001-06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>-22.2%</td>
</tr>
<tr>
<td>Newfoundland and Labrador</td>
<td>-21.9%</td>
</tr>
<tr>
<td>Prince Edward Island</td>
<td>-22.2%</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>-28.2%</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>-20.9%</td>
</tr>
<tr>
<td>Quebec</td>
<td>-21.5%</td>
</tr>
<tr>
<td>Ontario</td>
<td>-25.6%</td>
</tr>
<tr>
<td>Manitoba</td>
<td>-17.6%</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>-9.0%</td>
</tr>
<tr>
<td>Alberta</td>
<td>-19.1%</td>
</tr>
<tr>
<td>British Columbia</td>
<td>-16.7%</td>
</tr>
<tr>
<td>Yukon</td>
<td>-14.5%</td>
</tr>
<tr>
<td>Northwest Territories</td>
<td>-18.3%</td>
</tr>
<tr>
<td>Nunavut</td>
<td>16.2%</td>
</tr>
</tbody>
</table>

Source: Health Indicators, CIHI, 2008
Notes: Canada rates exclude Quebec. Data from Quebec for 2006-2007 were not available at the time of publication; rates for 2001-2002 and 2005-2006 are presented for Quebec. Rates for Yukon, the Northwest Territories and Nunavut should be interpreted with caution due to small underlying count.
High re-admission rates can be an indicator of premature discharge or poor quality of care (CIHI, 2002). The Commonwealth Fund International Health Policy Survey, 2008, asked respondents who had been hospitalized in the preceding two years: “After you were discharged, were you readmitted to a hospital or did you have to go to a hospital emergency department as a result of complications that occurred during your recovery?” The proportion of respondents answering “yes” in each country is depicted in the chart. Canada recorded the second-highest proportion of re-admissions, with only the U.S. respondents indicating a higher proportion of re-admissions.
The proportion of women in Canada who delivered by Caesarean section increased from approximately 5% in the late 1960s to about 20% in the early 1980s. A persistent increase has occurred since then, both in Canada and many other industrialized countries (PHAC, 2008). Explanations for the increase include changing maternal characteristics such as increases in maternal age, increases in pre-pregnancy body mass index, obstetric practice, and social factors. Caesarean sections increase maternal morbidity/mortality and are associated with higher costs. Rates can be used to monitor practice with the assumption that lower rates indicate more appropriate, as well as more efficient, care. Across provinces, Caesarean section rates in 2006-2007 ranged from 19.8% in Manitoba to 31.4% in Prince Edward Island. To set these data in an international context, OECD figures for 2005 show that Caesarean sections accounted for 30.0% of live births in Australia and 23.3% of live births in the U.K. (equivalent OECD Canada data for 2005 was 26.2%).
ACCESS

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Introduction

Access to healthcare is a prominent concern of patients and the public around the world. Access encompasses a range of issues: the timeliness of services received; whether services are provided within an appropriate setting; and whether they are delivered by skilled providers (Grol et al., 1999; Davis et al., 2007; inter alia).

Barriers to access are many and varied. They include long waits for service, charges for services, costs for insurance coverage, lack of personal or public transport, and cultural or language differences between patients and health professionals. Poor access has potentially serious consequences, including deterioration in individuals’ health status and subsequent extra costs for healthcare systems.

In countries with no public health insurance, costs and affordability are the primary barriers to access. In countries with public health insurance, wait times tend to be problematic; consequently wait times, along with availability of healthcare professionals, remain overriding concerns in Canada. In Canada, a 2007 survey found that wait times was the most commonly cited concern (20% of respondents) among a range of healthcare issues facing the country (Health Care in Canada, 2007).

This chapter focuses on these issues. It is organized around two key areas of service provision:

• Waits for primary and emergency care
• Waits for secondary care and specialist services
Access

Waits for Primary and Emergency Care

Primary care is the cornerstone of healthcare in Canada. Primary healthcare offers a sustainable way to improve quality through: health promotion activities and improved health status of Canadians; early management of chronic diseases and prevention of complications; co-ordination of care, eliminating waste and duplication; and continuity of care and appropriate follow-up to hospitalization, reducing readmission rates and relapses.

There is almost universal agreement that primary health care offers tremendous potential benefits to Canadians and to the health care system ... no other initiative holds as much potential for improving health and sustaining our health care system.

(Romanow Commission, 2002: 150).

Governments across Canada have been engaged in significant primary care reform:

- In September 2000, First Ministers agreed that improvements to primary healthcare were crucial to the renewal of Canada’s health system.
- In February 2003, First Ministers agreed to a Health Care Accord that set a target of 50% of Canadians having 24/7 access to an appropriate primary healthcare provider by 2011.
- In September 2004, First Ministers reiterated the target in the 10-Year Plan to Strengthen Health Care, and First Ministers further agreed to establish a best practices network for information-sharing and collaboration.

(Health Canada, online c)
An ongoing relationship with a doctor plays an important role in maintaining health and ensuring appropriate access to wider health services (Saultz and Lochner, 2005). The annual Commonwealth Fund International Health Surveys asks respondents: “Is there one doctor you usually go to for your medical care?” In 2005 and 2008, the survey focused on adults with health problems and in 2007 it surveyed the general public. In 2008, a supplementary question asked respondents who indicated they did not have a regular doctor whether they had a “usual place of care,” such as a clinic or health centre. For Canada, 4% of all respondents indicated they had neither a regular doctor nor a usual place of care.

![Chart 2.1 Access to a regular doctor: International](image-url)

**Source:** Commonwealth Fund, 2005, 2007, 2008
The Canadian Community Health Survey (CCHS) consistently asks whether respondents (Canadians 15 years and over) have a “regular family physician;” that is, a general physician seen for most routine care such as annual check-ups, blood tests and flu shots. The chart shows that, in 2007, 85% of Canadians reported having a regular medical doctor. Based on CCHS data, it has been estimated that, in 2007, around 1.7 million Canadians had looked for a regular doctor but could not find one (CIHI, 2008b). Across provinces, access to a regular family physician was variable, with Quebec residents indicating the lowest level of access. Supplementary data for the 12+ age-range shows generally poorer access to a regular doctor in the three territories. In the 10 largest communities of Nunavut, only 13.4% of respondents indicated that they had access to a regular doctor, compared to 40.8% of respondents in the Northwest Territories and 77.9% in Yukon (see CANSIM 105-0501).
Chart 2.3 Reported difficulties gaining access to routine or ongoing care: Canada

The Canadian Community Health Survey regularly asks respondents if they have experienced difficulties in gaining access to routine or ongoing care, either during or outside regular office hours. The chart illustrates that, in 2007, respondents from Prince Edward Island reported the most difficulties gaining access to routine care and Nova Scotia respondents the fewest. Types of barriers to accessing routine or ongoing care were analyzed by the Health Services Access Survey in 2001. It found that the most frequently cited barriers included: difficulties getting an appointment; waiting too long for an appointment; waiting too long to see a physician (in-office wait); and difficulty contacting a physician (see CANSIM Table 105-3019).

Reported difficulties accessing routine or ongoing care, aged 15+ years, 2007

Source: Statistics Canada, CCHS, 2007
Note: Data for “during evenings and weekends” for NL, NS, NB, MB, SK and BC should be interpreted with caution.
Chart 2.4 Unmet healthcare needs: Canada

The Canadian Survey of Experiences with Primary Health Care, 2008, asked respondents: “During the past 12 months, was there ever a time when you felt that you needed health care but you didn’t receive it?” The chart illustrates that respondents from Quebec were most likely to report unmet healthcare needs (13.5%) while those from Nova Scotia recorded the lowest levels of unmet needs (7.0%).

Source: CSE-PHC, 2008
Data from PEI should be interpreted with caution.
Chart 2.5 Waits for primary care: International

The Commonwealth Fund International Health Policy Survey generally asks respondents: “Last time you needed medical attention, how quickly could you get an appointment to see a doctor (not including a visit to Emergency Department)?” In 2008, the survey focused on sicker adults. Of the countries surveyed, Canada and the United States had the lowest proportion of respondents (25%) indicating that they could get an appointment on the same day.

Waits for primary care, survey of sicker adults, 2008

Source: Commonwealth Fund, 2008
The Canadian Survey of Experiences with Primary Health Care, 2008, asked respondents: "Thinking about the last time you received routine or ongoing care, how long did you have to wait between when you needed care and when you received care?" The chart illustrates that overall, about one-third of patients wait less than one day for a routine appointment. The proportion of patients who reported waiting longer than three weeks for routine or ongoing care ranged from 6.8% in Newfoundland and Labrador to 28.8% in Quebec.
In 2008, the Canadian Survey of Experiences with Primary Health Care asked respondents: “Thinking of the last time you received immediate care for a minor health problem, how long did you have to wait to receive care?” The chart shows that overall, more than three-quarters of patients reported that they were seen in less than one day. The largest proportion of respondents seen quickly was from Quebec (85.0%) and the smallest proportion was from Prince Edward Island (73.7%).

Source: Statistics Canada, CSE-PHC, 2008
In 2008, the Commonwealth Fund survey focused on adults with health problems. It asked those respondents who indicated that they had used the emergency department in the preceding two years: “The last time you went to the hospital emergency department, was it for a condition that you thought could have been treated by your regular doctor if he/she had been available?” A high proportion of positive responses suggests that access to primary care is problematic. Of the countries included in the survey, Canada had the highest proportion of respondents indicating that they had used the emergency department for primary care. Canadian respondents to the Commonwealth Fund surveys have consistently reported problems with access to primary care, as shown in the chart on the next page.

Chart 2.8 Emergency department used for primary care: International

Use of ED for primary care, survey of sicker adults, 2008

<table>
<thead>
<tr>
<th>Country</th>
<th>% respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>35</td>
</tr>
<tr>
<td>Canada</td>
<td>39</td>
</tr>
<tr>
<td>France</td>
<td>24</td>
</tr>
<tr>
<td>Germany</td>
<td>18</td>
</tr>
<tr>
<td>Netherlands</td>
<td>29</td>
</tr>
<tr>
<td>New Zealand</td>
<td>21</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>24</td>
</tr>
<tr>
<td>United States</td>
<td>36</td>
</tr>
</tbody>
</table>

Source: Commonwealth Fund, 2008
The Commonwealth Fund’s International Health Policy Survey has consistently asked respondents whether they had used the emergency department in the preceding two years. In 2008, of the full samples, 64% of Canadians, 41% of British and 58% of American respondents indicated that they had used the emergency department. This subset was then asked: “The last time you went to the hospital emergency department, was it for a condition that you thought could have been treated by your regular doctor if he/she had been available?” The chart illustrates the responses from Canadian surveys between 2004 and 2008. The surveys vary from year to year in terms of sampling frames, sometimes focusing on adults with health problems, sometimes on the general public. Between one-third and one-half of Canadian respondents who reported using the emergency department indicated that they did so for primary care. Despite similarities in terms of substantial public funding between the United Kingdom and Canada, responses from Canadian respondents are more closely aligned with those from the U.S. than the U.K.
Chart 2.10 Emergency department used for primary care: Canada

The Canadian Survey of Experiences with Primary Health Care, 2008, asked respondents whether they had visited the emergency department in the preceding 12 months. Of those who answered yes, it asked: “The last time you went to the hospital emergency department, was it for a condition that you thought could have been treated by your primary care provider if he/she had been available?” The chart illustrates that the proportion of respondents that did use the emergency department for primary care ranged from 28.4% in British Columbia to 55.2% in Newfoundland and Labrador.
Respondents to the 2007 Commonwealth Fund International Health Policy survey were asked whether they had used the emergency department in the preceding two years. Respondents who indicated that they had done so were then asked: “The last time you went to the hospital emergency department, how long did you wait before being treated?” Compared to other countries, Canadian respondents in 2007 had the longest waits in the emergency department. In 2008, the same question was asked of Canadian respondents only.

Chart 2.11 Waits in the emergency department: International

Waits in emergency department, public and patient surveys, 2007 and 2008

Source: Commonwealth Fund, 2007, 2008
The Canadian Association of Emergency Physicians has outlined medically acceptable wait times in emergency departments, in terms of the Canadian Triage and Acuity Scale (CTAS). The five CTAS triage levels are shown in Table 2.1, below.

### Chart 2.12 Waits in the emergency department: Canada

The Canadian Survey of Experiences with Primary Health Care, 2008, asked respondents who indicated that they had visited the emergency department in the preceding 12 months: “The last time you went to the hospital emergency department, how long did you wait from the time you entered the ER to the time you were treated?” The chart illustrates responses from around the country. Of respondents who visited the emergency department in the preceding 12 months, the proportion that waited longer than four hours ranged from 14% in Saskatchewan to 44.6% in Quebec. The survey provides no information about the severity of the problem for which patients visited the emergency department. Across Canada, 29.5% of respondents indicated that they waited longer than four hours to be seen: twice the maximum recommended response time. These data should be interpreted in light of the fact that many Canadians in rural locations use the emergency department for primary care (see Chart 2.9), rather than for emergencies per se. Such differences in patient population and utilization patterns may contribute to the long waits reported.

### Table 2.1:  
**Canadian Triage and Acuity Scale**

<table>
<thead>
<tr>
<th>CTAS level</th>
<th>Level of illness/acuity</th>
<th>Nursing response time</th>
<th>Physician response time</th>
<th>Sentinel diagnosis</th>
<th>ED Targets*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Resuscitation</td>
<td>Immediate</td>
<td>Immediate</td>
<td>Cardiac arrest</td>
<td>98%</td>
</tr>
<tr>
<td>Level 2</td>
<td>Emergent</td>
<td>Immediate</td>
<td>&lt;15 minutes</td>
<td>Chest pain</td>
<td>95%</td>
</tr>
<tr>
<td>Level 3</td>
<td>Urgent</td>
<td>&lt;30 minutes</td>
<td>&lt;30 minutes</td>
<td>Moderate asthma</td>
<td>90%</td>
</tr>
<tr>
<td>Level 4</td>
<td>Less urgent</td>
<td>&lt;60 minutes</td>
<td>&lt;60 minutes</td>
<td>Minor trauma</td>
<td>85%</td>
</tr>
<tr>
<td>Level 5</td>
<td>Non urgent</td>
<td>&lt;120 minutes</td>
<td>&lt;120 minutes</td>
<td>Common cold</td>
<td>80%</td>
</tr>
</tbody>
</table>

* ED targets refer to the proportion of patients triaged to each level who should be seen within the stated response times.

Source: CAEP, 2005
Waits in the emergency department, patient survey, 2008

- <1 hour
- 1 to <4 hours
- 4+ hours

Source: Statistics Canada, CSE-PHC, 2008
Waits for secondary and specialist care

In response to sustained levels of concern, First Ministers in 2004 made a collective commitment to achieve meaningful reductions in wait times for secondary care in the 10-Year Plan to Strengthen Health Care (Health Canada, online d). The 10-Year Plan identified five priority areas:
- cancer
- heart
- diagnostic imaging
- joint replacements
- sight restoration

Poor access and delays can have serious consequences, resulting in emotional distress and physical suffering or harm to patients, as well as higher treatment costs (Leddy et al., 2003; Boudreau et al., 2004). In terms of the economic cost of waits in Canada, the Centre for Spatial Economics (CSE, 2008) analyzed data for four procedures: total joint replacement surgery; cataract surgery; coronary artery bypass graft (CABG); and MRI scans. Costs of waits for these procedures were found to range from an average of $2,900 per patient for cataract surgery to $26,400 per patient for joint replacement surgery. The economic cost of waiting for treatment across all four priority areas in 2007 was an estimated $14.8 billion.

In 2008, CIHI reviewed available data on wait times across Canadian provinces. The study revealed marked variation in both targets and data definitions across key disease areas. The lack of robust, standardized and validated data on a country-wide basis has hampered those seeking to investigate issues of access to quality healthcare in Canada. However, this shortcoming is beginning to be addressed; a 2009 CIHI report documents progress made, although some variations in data definitions and collection persist (CIHI 2008; 2009).
The 2008 Commonwealth Fund survey focused on sicker adults, asking them: “After learning you needed to see a specialist doctor, how long did you have to wait for an appointment?” Compared to other countries, Canada had the most respondents indicating that they were not seen by a specialist in under a month. Twenty percent indicated they waited longer than three months – the highest proportion among the countries surveyed (data not shown). The same question was asked in the 2005 survey of sicker adults. In that survey, 10% of Canadian respondents indicated that they waited less than one week to see a specialist, 26% indicated that they waited one-to-four weeks, and 57% waited more than four weeks.
The Canadian Community Health Survey routinely asks Canadians how long they waited to be seen by a specialist. The data refer to a visit with a medical specialist to obtain a diagnosis for a new illness or condition; they do not include visits to specialists for ongoing care for a previously diagnosed condition. In 2007 there were approximately three million specialist visits for a new illness or condition across Canada. More than 420,000 patients waited longer than three months for their appointment. Across Canada, the median wait for specialist visits for new illnesses and conditions was 4.3 weeks. At a provincial level, more than one-fifth of respondents from Newfoundland and Labrador indicated that they waited longer than three months for an appointment, which was the highest proportion of all the provinces.

### Chart 2.14 Wait times for specialist appointment: Canada

<table>
<thead>
<tr>
<th>Province</th>
<th>&lt; 1 month</th>
<th>1-3 months</th>
<th>&gt; 3 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>14%</td>
<td>21%</td>
<td>65%</td>
</tr>
<tr>
<td>Newfoundland and Labrador</td>
<td>14%</td>
<td>21%</td>
<td>65%</td>
</tr>
<tr>
<td>Prince Edward Island</td>
<td>11%</td>
<td>15%</td>
<td>74%</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>15%</td>
<td>18%</td>
<td>67%</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>12%</td>
<td>15%</td>
<td>73%</td>
</tr>
<tr>
<td>Quebec</td>
<td>12%</td>
<td>15%</td>
<td>73%</td>
</tr>
<tr>
<td>Ontario</td>
<td>12%</td>
<td>15%</td>
<td>73%</td>
</tr>
<tr>
<td>Manitoba</td>
<td>14%</td>
<td>15%</td>
<td>71%</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>15%</td>
<td>15%</td>
<td>70%</td>
</tr>
<tr>
<td>Alberta</td>
<td>12%</td>
<td>15%</td>
<td>73%</td>
</tr>
<tr>
<td>British Columbia</td>
<td>11%</td>
<td>15%</td>
<td>74%</td>
</tr>
</tbody>
</table>

Source: Statistics Canada, CCHS, 2007

Note: For PEI, NS, NB, MB and AB - estimates suppressed because of extreme sampling variability.
Excessive waits for priority procedures

Following the publication of the *10-Year Plan to Strengthen Health Care* (2004), there has been a concerted effort to provide timely access to care. Efforts to reduce wait times focused initially on five areas: cancer, heart, diagnostic imaging, joint replacement and sight restoration. Provincial benchmarks for acceptable wait times for key procedures in these priority areas are shown in Table 2.2, below.

The charts on the following pages illustrate data from analyses undertaken by CIHI (2009) showing available data on the proportion of patients in each province who were seen within the benchmark period. Of the four procedures analyzed, joint replacement had the highest proportion of patients exceeding recommended wait times.

### Table 2.2: Benchmarks for priority procedures

<table>
<thead>
<tr>
<th>Priority area</th>
<th>Provincial benchmarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint replacement (hip and knee)</td>
<td>Within 26 weeks</td>
</tr>
<tr>
<td>Cataract removal (ophthalmology)</td>
<td>Within 16 weeks for patients deemed “at high risk”</td>
</tr>
<tr>
<td>Radiation oncology (cancer care)</td>
<td>Within 4 weeks</td>
</tr>
<tr>
<td>Coronary artery bypass graft (heart disease)</td>
<td>Within 2 weeks for level I cases (non-emergency)</td>
</tr>
<tr>
<td></td>
<td>Within 6 weeks for level II cases</td>
</tr>
<tr>
<td></td>
<td>Within 26 weeks for level III cases</td>
</tr>
</tbody>
</table>
The pan-Canadian benchmark for joint replacement surgery states that patients should wait no longer than 26 weeks (182 days) between the date a surgeon makes a decision to treat and the date the patient is operated on. The chart illustrates that, for hip replacements, the proportion of patients operated on within the benchmark ranged from 45% in Nova Scotia to 90% in Quebec and Ontario. For knees, the proportions ranged from 37% in Saskatchewan to 86% in Quebec. Nova Scotia reported particularly long waits for joint replacement surgeries, with 90th percentile waits (that is, the time within which 90% of patients are treated) of 642 days for hips and 647 days for knees (data not shown).
Chart 2.16 Waits for cataract removal surgery: Canada

In the case of cataract surgery, the pan-Canadian benchmark specifies that patients should undergo surgery within 16 weeks (112 days) of the surgeon’s decision to treat. The chart illustrates that the proportion of patients operated on within the benchmark ranged from 60% in Prince Edward Island to 88% in Ontario.
Chart 2.17 Waits for radiation therapy: Canada

The pan-Canadian benchmark for radiation therapy wait time is four weeks (28 days) from the date an oncologist decides the patient is ready to begin radiotherapy to the date of the first radiotherapy treatment. The chart illustrates that the proportion of patients receiving treatment within the benchmark ranged from 81% in Saskatchewan to 100% in Prince Edward Island.
Chart 2.18 Waits for coronary artery bypass grafts: Canada

The pan-Canadian benchmark for coronary artery bypass graft surgery states that patients should wait no longer than 26 weeks (182 days) between the date of the decision to treat and the date the patient is operated on. The benchmark states that more urgent cases need to be seen more quickly (within two weeks for level I cases and within six weeks for level II cases). There is, however, no consensus on definitions for urgency levels, so data shown refer to all cases. The chart illustrates that the proportion of patients operated on within the benchmark ranged from 91% in British Columbia to 100% in Ontario.
Chart 2.19 Waits for selected diagnostic tests: Canada

Waits for diagnostic tests can be a significant bottleneck in patient pathways. This chart illustrates data from the Canadian Community Health Survey. It includes tests such as non-emergency MRI, CT scans and angiography, but not x-rays or blood tests. In 2007 there were 2.46 million tests performed nationwide. The median wait for tests was two weeks, but approximately 258,000 patients (about one in 10) waited longer than three months.

Source: Statistics Canada, CCHS, 2007
Capacity
CAPACITY

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Introduction

The provision of high-quality healthcare relies upon a complex network of critically important elements, including efficiency of operations, compliance with scientific evidence, adequacy and optimal distribution of resources, and compassionate and responsive interactions between staff and patients. The delivery of these elements depends upon the predictable capacity of the system to provide healthcare that meets both individual and population needs.

The 10-Year Plan to Strengthen Health Care (Health Canada, 2004) recognized this and highlighted, in particular, the need for investment in capacity in order to ensure access to health services:

First Ministers agree that access to timely care across Canada is our biggest concern and a national priority.... [and] recognize that improving access to care and reducing wait times will require... strategic investments in areas such as: increasing the supply of health professionals (e.g. doctors, nurses and pharmacists); effective community based services, including home care; a pharmaceuticals strategy; effective health promotion and disease prevention, and adequate financial resources.

This section focuses on investment and resources, comparing levels of investment both across Canada and internationally in terms of:

- Spending
- Staffing
- Equipment
- Information technology
- Pharmaceuticals
Spending

In 2008, spending on healthcare in Canada was an estimated $172 billion, or $5,170 per capita. After adjusting for inflation and population growth, spending growth has been estimated to be 3.4% in 2008. Real healthcare spending has been rising steadily in recent years: in 2008, Canada’s healthcare spending outpaced inflation and population growth for the 12th consecutive year. As a share of Canada’s gross domestic product (GDP), expenditures on health continued the pattern of gradual increases, rising slightly from 10.5% in 2006 to an estimated 10.7% in 2008 (National Health Expenditure Trends, 1975-2008. CIHI, 2008e).

In an international context, Canada is in the top 20% of OECD countries in terms of per capita spending on healthcare. As a proportion of its national wealth, or GDP, Canada spent one in every 10 dollars on healthcare in 2006.

At the provincial level, total health expenditures were lowest in Quebec and British Columbia, at approximately $4,653 and $5,093 per capita respectively. Total health expenditures among the provinces were highest in Alberta and Manitoba at $5,730 and $5,555 per person respectively; however, per capita healthcare spending is highest in the territories. In 2008, total health expenditures, per capita, were estimated to be $7,837 in Yukon, $9,652 in the Northwest Territories and $11,379 in Nunavut. Many factors contribute to such variation in spending patterns, including demographic differences, health status, patterns of health-service delivery, geography and population density, and the costs of providing care in diverse environments (CIHI, 2008e).

The major categories of spending in 2008 were:
- hospitals, 28.0% of total healthcare spending ($48.1 billion);
- drugs (prescription and non-prescription), 17.4% ($29.8 billion); and
- physicians, 13.4% ($23.1 billion).

In 2008, public-sector healthcare spending was expected to account for 70% of the total, or $120.3 billion, compared to $51.6 billion spent by the private sector.
Internationally, there has been a steady increase in the proportion of developed countries’ GDP dedicated to healthcare. However, Canada’s ratio of health expenditure to GDP in 2006 was almost the same as the level recorded in 1992. In 1992, of the 30 OECD member countries, Canada ranked as the second-highest spender on health, after the U.S. In 2006, Canada ranked eighth-highest spender on health as a percentage of GDP among OECD countries. The early 1990s saw a decrease in the proportion of Canada’s GDP spent on health, probably as a result of the economic recession in 1990-1992 (CIHI, 2008e).

% change, 1992-2006

<table>
<thead>
<tr>
<th>Country</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>1.4</td>
</tr>
<tr>
<td>Canada</td>
<td>0.2</td>
</tr>
<tr>
<td>France</td>
<td>2.1</td>
</tr>
<tr>
<td>Sweden</td>
<td>1.0</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1.5</td>
</tr>
<tr>
<td>United States</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Note: Data should be interpreted with care due to methodological differences across countries.
Across most developed economies, per capita spending on healthcare has grown steadily in the past decade or so. This has resulted from a range of factors, including medical and technological advances, aging populations, higher public expectations, and increases in national wealth. The chart illustrates expenditure at purchase price parity (PPP). The PPP rate is the rate at which the domestic purchasing power of currencies is equivalent. For example, if identical items cost $10 in Canada and $12 in the U.S., the PPP exchange rate is C$1=US$1.20. Relative to most other countries, Canada had a less-steep rise in health expenditures over the period 1992–2006, with an increase of 86.8% in per person spending (38.9% when inflation is taken into account). The steepest increase was seen in the U.K., with a 139.4% increase (73.0% when corrected for inflation).

Chart 3.2 Expenditure on health per capita, $US purchase price parity: International

Source: OECD, 2008
Note: Data should be interpreted with care due to methodological differences across countries.
The total health expenditure per person forecast for 2008 ranged from $4,653 in Quebec to $11,379 in Nunavut. Across jurisdictions, total health expenditure per capita is influenced by different age distributions, population density and geography across the provinces/territories. The territories, in particular, are characterized by large geographical areas and low population densities, which contribute to their higher cost base.

Source: National Health Expenditure Database (CIHI, 2008e)
Staffing

Front-line staff are a key element in the delivery of quality healthcare. This section focuses on staffing levels for various staff groupings. Simple counts are not the sole determinant of quality in terms of staffing. The specific skills, individual experience, attitudes and compassion of staff towards the public and patients, as well as the context and environment within which human resources are deployed, are equally important.

In 2008, CIHI published a reference guide to Canada’s healthcare professionals that provides data on the numbers, characteristics and distribution of healthcare providers across Canada. Table 3.1 below, arrays the 24 health personnel groups included in the guide.

<table>
<thead>
<tr>
<th>Audiologists</th>
<th>Environmental public health professionals</th>
<th>Medical radiation technologists</th>
<th>Pharmacists</th>
<th>Registered psychiatric nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiropractors</td>
<td>Health information management professionals</td>
<td>Midwives</td>
<td>Physicians</td>
<td>Respiratory therapists</td>
</tr>
<tr>
<td>Dental hygienists</td>
<td>Licensed practical nurses</td>
<td>Nurse practitioners</td>
<td>Physiotherapists</td>
<td>Speech-language pathologists</td>
</tr>
<tr>
<td>Dentists</td>
<td>Medical laboratory technologists</td>
<td>Occupational therapists</td>
<td>Psychologists</td>
<td>Social workers</td>
</tr>
<tr>
<td>Dieticians</td>
<td>Medical physicists</td>
<td>Optometrists</td>
<td>Registered nurses</td>
<td></td>
</tr>
</tbody>
</table>

Source: *Health Personnel Database (CIHI, 2008f)*
Physicians are highly trained and skilled professionals who play a central role in healthcare delivery, preventing, diagnosing, treating and ameliorating disease and injury. The number of practising physicians has remained stable in Canada over the past 10 years, at 2.1 physicians per 1,000 population. Canada has fewer practising physicians than other developed countries. In 1996, of the countries shown in the chart, the U.K. was the only country that had fewer physicians, with 1.8 per 1,000 population. In the intervening years, however, the U.K. increased its medical workforce considerably. The latest data now show that Canada has the fewest physicians per 1,000 population of the countries shown.
Chart 3.5 Physicians per capita: Provinces and territories

Across Canada as a whole, physician services is the third-largest category of total health expenditure and in 2008 was forecast to account for $23.1 billion, or 13.4% of total expenditure. Public-sector expenditure on physicians has remained above 98% of total physician expenditure since 1975 (CIHI, 2008e). Canada has, in recent years, substantially increased the number of doctors in training. In the decade from 1997-98 to 2007-08, first-year enrolment has risen by 59%, from 1,577 to 2,506, although the effects of this expansion are yet to be fully reflected in the workforce data (Evans and McGrail, 2008). The chart shows that the number of physicians per 1,000 population in 2006 ranged from 0.4 in Nunavut to 2.6 in Nova Scotia.
In most developed countries, family physicians and general practitioners are the linchpins and gatekeepers in healthcare delivery. Communities with access to comprehensive services provided by family physicians/general practitioners, working with other primary healthcare professionals, have been shown to have better patient outcomes (Starfield and Shi, 2002). In 2006, Canada had 1.0 active family physicians/general practitioners for every 1,000 people; this level has been unchanged for more than a decade.
Chart 3.7 Family physicians: Canada

As noted on the previous page, the number of family physicians per capita across Canada has remained constant at 1.0 physicians per 1,000 population for more than a decade. However, the actual number of family physicians increased by 14% between 1997 and 2006, from 29,723 to 34,038, while the population increased from 29.9 million to 32.9 million. The chart illustrates the number of family physicians per 1,000 population across Canadian jurisdictions. The lowest density of family physicians was recorded in Nunavut (0.3 physicians per 1,000 population) and the highest in Yukon (2.0 physicians per 1,000 population).
Specialist physicians provide a diverse range of services ranging from obstetrics and paediatrics to care of the elderly and palliative care. Over time, there has been a tendency for these highly trained professionals to focus on sub-specialties as knowledge and technology become increasingly complex and intricate. The number of specialist physicians in Canada has remained steady at 1.1 specialists per 1,000 population over the past decade. Canada has the lowest density of specialists of all the countries shown.

**Chart 3.8 Specialist physicians: International**

Practising specialists per 1,000 population, 1997-2006

Source: OECD, 2008
Chart 3.9 Specialist physicians: Canada

Although the number of practising specialists per capita in Canada has remained unchanged over the past decade (see Chart 3.8), the actual number of specialists increased between 1997 and 2006, from 32,248 to 36,832 (14%). The chart illustrates the number of specialist physicians per 1,000 population across Canadian jurisdictions. The lowest density of specialists was recorded in Nunavut (where there was only one specialist recorded in official data, or effectively 0 per 1,000 population) and the highest was recorded in Newfoundland and Labrador, Nova Scotia and Quebec (1.3 physicians per 1,000 population).
Chart 3.10 Dentists: Canada

Total expenditures on dental services in Canada were estimated at $12.1 billion in 2008 (CIHI, 2008e). Of this, $11.6 billion (95.6%) were private-sector expenditures. Expenditures on dental services were approximately 7% of total health expenditures in Canada. In 2006, there were 18,925 licensed dentists in Canada.

There is a marked difference in availability of dentists between urban and rural areas. The resident:dentist ratio for Canada as a whole in 2004 was 1,734:1, but in rural areas the ratio was 5,096:1 (Canadian Dental Association, online). The chart illustrates the distribution of dentists across Canada, ranging from 0.3 dentists per 1,000 population in Newfoundland and Labrador to 1.6 per 1,000 population in Nunavut.

To place these data in context, OECD data show that, in 2006, there were 0.5 dentists per 1,000 population in Australia and the U.K., 0.7 per 1,000 in France and 0.8 per 1,000 in Germany.
Chart 3.11 Registered nurses per capita: International

Registered nurses are employed in a variety of settings including hospitals, nursing homes, rehabilitation centres, clinics, community health centres, home care agencies, education and research facilities, private companies, nursing agencies, government, and physicians' offices. Canada has seen a slight increase in nurses per capita in the last few years, increasing from 8.5 registered nurses per 1,000 population in 2003 to 8.8 per 1,000 in 2006. The chart shows that many developed healthcare systems have a higher density of registered nurses than that seen in Canada.

Practising nurses per 1,000 population, 2005-2006

Source: OECD, 2008
Note: Data should be interpreted with caution due to differences in data definition and collection across countries.
Chart 3.12 Registered nursing workforce: Canada

In 2007, there were 257,961 active registered nurses in Canada (CIHI, 2008). The chart illustrates the number of employed active registered nurses per 1,000 population across the jurisdictions of Canada. The lowest density of registered nurses was recorded in British Columbia, with 6.9 registered nurses per 1,000 population and the highest density in Northwest Territories and Nunavut, with 14.2 registered nurses per 1,000 population.

Source: Nursing Database, CIHI; Statistics Canada
CT (computerized tomography) scanners provide images of hard tissues such as bones and soft tissues such as muscles, organs, the brain, large blood vessels and nerves. Most commonly used to determine the cause of strokes, CT scanners are also used to investigate and diagnose tumours, abscesses, head injuries and abnormal blood vessels. CT is the method of choice for rapidly screening trauma victims to detect internal bleeding or other life-threatening conditions.

Canada appears to have a relatively low number of scanners compared to other countries. However, analyses conducted by CIHI in 2006–2007 found that scanners were more intensively used in Canada than in other countries, with 8,735 exams per scanner, compared to 2,448 exams per scanner in Denmark, 5,000 exams per scanner in Sweden and 6,108 exams per scanner in the U.S. (CIHI, 2007).

Source: OECD, 2008
Note: Data should be interpreted with caution due to differences in data definition and collection across countries.
Chart 3.14 CT scanners: Canada

The number of CT scanners across Canadian jurisdictions varies considerably, from 10.2 per million population in Ontario to 32.3 per million population in Yukon. However, the data should be interpreted with care. Further analysis undertaken by CIHI revealed a weak inverse relationship between the number of scanners per million population and the intensity of utilization (when the territories are excluded). Average number of hours of operation per week in 2006-07 ranged from 38 in Yukon and Northwest Territories to 69 in Ontario [data not shown].
Chart 3.15 MRI scanners: International

Magnetic resonance imaging (MRI) is a medical imaging technique used to visualize the internal structure and function of the body. MRI provides much greater contrast between the different soft tissues of the body than does computed tomography (CT), making it especially useful in neurological (brain), musculoskeletal, cardiovascular and oncological (cancer) imaging. In 2006, Canada had 6.2 MRI scanners per million population. Further analysis found that Canada has relatively high utilization rates for each scanner (CIHI, 2007). In 2006-2007, 5,123 MRI exams were performed on average by each scanner in Canada, compared to 3,460 in the U.S. (CIHI, 2007).
Chart 3.16 MRI scanners: Canada

The number of MRI scanners in Canadian provinces ranges from 4.0 per million population in Saskatchewan to 8.7 per million population in Quebec. The territories have no MRI units and patients have to travel to neighbouring provinces for scans. Further analysis undertaken by CIHI found a weak inverse relationship between the number of scanners per million population and the intensity of utilization. The number of MRI scans per scanner in 2006-07 ranged from 2,839 in Prince Edward Island to 6,979 in Ontario [data not shown].

Source: National Survey of Selected Medical Imaging Equipment, CIHI, 2007
Health information technology (HIT) can have a profound effect on quality. It has the potential to enable dramatic transformations in the delivery of healthcare, making it safer, more effective and more efficient (Chaudhry et al., 2006; Shekelle et al., 2006). In a country with regions of sparse population and huge geographical areas, health information technology offers particular benefits through telehealth (or telemedicine), remote consultations, digital imaging, and other ways of providing care from a distance.

Some of the most significant potential gains from HIT are gleaned from multifunctional, interoperable HIT systems built around an electronic health record (EHR) (Shekelle et al., 2006). In 2004, First Ministers pledged that 50% of Canadians would have an interoperable electronic health record by 2010. As of March 2008, only 7% of the population had an interoperable EHR despite investments of $1.457 billion via the Infoway program (Canada Health Infoway, 2008). Table 3.2, below, shows the estimated timelines for implementing EHRs across Canada.

The data in this section focus primarily on the use of HIT in primary care. There were few datasets available on the use of HIT in acute care. The exception was in Ontario, where the Hospital Report series provides information on HIT use across the province’s hospitals (Hospital Report Research Collaborative, 2008).

### Table 3.2: Timelines for implementing EHRs across Canada

<table>
<thead>
<tr>
<th>Complete by 2010</th>
<th>Complete late in 2010</th>
<th>Partial completion by 2010; need more time or resources</th>
<th>Need more time and resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberta</td>
<td>British Columbia</td>
<td>Saskatchewan</td>
<td>New Brunswick</td>
</tr>
<tr>
<td>Prince Edward Island</td>
<td>Quebec</td>
<td>Manitoba</td>
<td>Nova Scotia</td>
</tr>
<tr>
<td>Northwest Territories</td>
<td>Ontario</td>
<td>Nunavut</td>
<td>Yukon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Newfoundland and Labrador</td>
<td></td>
</tr>
</tbody>
</table>

Source: *Health Council of Canada, 2008*
The 2006 Commonwealth Fund Health Policy Survey sought the views of primary care physicians in seven countries. The survey included a series of 14 questions on the use of information technology (IT) and clinical record systems in the respondents’ practices. Across the countries surveyed, Canadian physicians reported the lowest level of advanced information capacity, with fewer than one in 10 respondents indicating that their practice had advanced IT capacity.

Chart 3.17 Advanced IT capacity in primary care: International

The chart provides a composite picture of IT use, showing the proportion of respondents who indicated that their practice had seven or more out of the following 14 functions in routine use:

<table>
<thead>
<tr>
<th>Function</th>
<th>% respondents indicating yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current use of electronic medical records</td>
<td>23</td>
</tr>
<tr>
<td>Ability to share patient records electronically with clinicians outside the practice</td>
<td>24</td>
</tr>
<tr>
<td>Ability to access patient records when away from the surgery/office</td>
<td>50</td>
</tr>
<tr>
<td>Ability to provide patients with easy access to their medical records</td>
<td>25</td>
</tr>
<tr>
<td>Routine electronic ordering of tests</td>
<td>8</td>
</tr>
<tr>
<td>Routine use of electronic prescribing</td>
<td>11</td>
</tr>
<tr>
<td>Routine electronic access to patients’ test results</td>
<td>27</td>
</tr>
<tr>
<td>Routine electronic access to patient hospital records (e.g. discharge summary)</td>
<td>15</td>
</tr>
<tr>
<td>Patients sent reminder notices for preventive or follow-up care using computerized system</td>
<td>8</td>
</tr>
<tr>
<td>Physicians receive an alert or prompt about a potential problem with drug dosage or interaction via computerized system</td>
<td>10</td>
</tr>
<tr>
<td>Physicians receive a computerized alert or prompt to provide patients with test results</td>
<td>6</td>
</tr>
<tr>
<td>Easily able to generate a list of patients by diagnosis or health risk</td>
<td>26</td>
</tr>
<tr>
<td>Easily able to generate a list of patients who are overdue for tests or preventive care</td>
<td>13</td>
</tr>
<tr>
<td>Easily able to generate a list of all medications taken by individual patients, including those prescribed by other doctors</td>
<td>25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% respondents indicating yes</th>
<th>CAN</th>
<th>U.K.</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>89</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>15</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>22</td>
<td>76</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>51</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>20</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>55</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>84</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>19</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>83</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>91</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>53</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>92</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>77</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>88</td>
<td>37</td>
<td></td>
</tr>
</tbody>
</table>
Primary care practices with advanced information capacity, physician survey, 2006

Source: Commonwealth Fund, 2006
Notes: Since the survey was conducted, there has been significant and sustained investment in information technology across Canada. The Canadian data are based on a low sample size of 578 physicians and should be interpreted with care.
Canada’s National Physician Survey, 2007, asked respondents in primary care whether they used a range of information technology aids in patient care. The chart shows functions ranked in order of most-to-least utilized, as indicated by survey respondents across Canada. Electronic billing systems were the most widely used. Overall, 5.2% respondents indicated that they neither had nor used any of the listed IT aids, and 21.5% indicated that they chose not to use any of the aids. The proportion of respondents who said they did not use any IT aids ranged from 16.5% in New Brunswick to 26.7% in Quebec.
In 2006, the Commonwealth Fund surveyed primary care physicians across seven countries and asked respondents: “Do you currently use electronic patient medical records in your practice?” It is important to distinguish between electronic patient records (EPRs), which can be based on stand-alone systems in individual family-practice offices, and the national initiative for electronic health records (EHRs), Infoway. Currently there are some concerns about the mismatch between EPR and EHR (Canadian EMR online). The chart refers to the use of stand-alone EPRs and shows that respondents in the Netherlands, New Zealand and the U.K. had a high utilization rate compared to North American respondents.

**Chart 3.19 Electronic patient records in primary care: International**

<table>
<thead>
<tr>
<th>Country</th>
<th>% Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>79</td>
</tr>
<tr>
<td>Canada</td>
<td>23</td>
</tr>
<tr>
<td>Germany</td>
<td>42</td>
</tr>
<tr>
<td>Netherlands</td>
<td>98</td>
</tr>
<tr>
<td>New Zealand</td>
<td>92</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>89</td>
</tr>
<tr>
<td>United States</td>
<td>28</td>
</tr>
</tbody>
</table>

Source: Commonwealth Fund, 2006
In 2007, the Canadian National Physician Survey asked primary care physicians whether they used electronic patient records to enter and retrieve clinical patient notes. Utilization ranged from 8.8% of respondents in Prince Edward Island to 40.2% of respondents in Alberta.

Chart 3.20 Electronic patient records in primary care: Canada
Pharmaceuticals

Retail sales of prescription and non-prescription drugs together represent the second-largest category of health expenditure in Canada, estimated at $29.8 billion in 2008 (Drug Expenditure in Canada, 1985-2008. CIHI).

Survey data suggest that more than one-half of Canadian adults are taking one or more prescription drug (Statistics Canada, 2007 Primary Care Survey; Commonwealth Fund, 2007). In 1975, the private sector accounted for more than 79.5% of expenditures for prescription drugs. This share decreased to 52.3% by 1992 and, in 2008 it was estimated to be 55.5% (Drug Expenditure in Canada, 1985-2008. CIHI).

Canadians spent $578 per person on retail purchases of prescription drugs in 2007, almost $19 billion in total (Rx Atlas). One-quarter of all spending on prescription drugs in Canada in 2007 was for cardiovascular treatment: antihypertensives (14.5% of total spending), statins (10%) and antithrombotics (1.7%). Neurological treatments also accounted for a large share of spending on prescription drugs in 2007, led by antidepressants (6.1% of total spending) and antipsychotics (3.3%). Canadians spent $1.4 billion (7.4% of total spending) on prescription drugs to reduce stomach acid in 2007 and $888 million (4.7%) on inhaled prescription drugs for respiratory conditions (Rx Atlas).

The National Pharmaceuticals Strategy was established in 2004 to develop nation-wide solutions to some of the concerns about the safety and affordability of prescription medications in Canada. The strategy was part of the 2004 10-Year Plan to Strengthen Health Care, in which participating governments (except Quebec) agreed to make a variety of improvements to their healthcare sectors, accompanied by additional annual payments from the federal government.


### Main features of the National Pharmaceutical Strategy

<table>
<thead>
<tr>
<th>Feature</th>
<th>Focus Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explore options for “catastrophic” pharmaceutical coverage</td>
<td>Pursue value for money in drug purchasing strategies</td>
</tr>
<tr>
<td>(e.g. for illnesses with high drug costs such as cancer, HIV)</td>
<td></td>
</tr>
<tr>
<td>Establish a common national drug formulary</td>
<td>Encourage appropriate prescribing practices by health professionals</td>
</tr>
<tr>
<td>Accelerate access to breakthrough drugs for unmet health needs</td>
<td>Encourage e-prescribing and use of electronic health records</td>
</tr>
<tr>
<td>Strengthen evaluation of drug safety and effectiveness</td>
<td>Accelerate access and value for money on non-patented drugs</td>
</tr>
<tr>
<td></td>
<td>Analyze cost-effectiveness in drug-plan policies</td>
</tr>
</tbody>
</table>
Almost three-quarters of all Canadians fill at least one prescription per year, at a total cost of some $20 billion. Researchers at the University of British Columbia analyzed variation in spending on prescription drugs across provinces (Morgan et al., 2008). The chart illustrates their findings: the annual per capita spending ranged from $432 in British Columbia to $681 in Quebec.
Some of the inter-provincial variation seen in spending on prescription drugs is explained by differences in age structure. Provinces such as those to the east of Ontario, as well as British Columbia and Saskatchewan, have older populations than the national average and would be expected to have higher spending per capita. This chart illustrates the variation in spending on drugs, after age has been taken into account. It shows that age-standardized spending was significantly higher than the national average in Quebec, New Brunswick and Nova Scotia, and significantly lower than the national average in British Columbia, Saskatchewan and Manitoba.
# SAFETY

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Introduction

Safety, the elimination of unnecessary risk of harm to patients, is a fundamental attribute of quality in healthcare. In recent years, safety has come to the fore as a pressing concern of health policy makers, patients, managers, and healthcare professionals.

Underlining the critical importance now afforded safety issues, the World Health Organization in 2004 established a World Alliance for Patient Safety. The Alliance provides a forum to coordinate the many efforts of different countries to improve safety as well as to standardize and/or promulgate common terminology, methods of measurement and compatible reporting of adverse events. Similarly, the OECD and the United States’ Agency for Healthcare Research and Quality (AHRQ) have published comprehensive indicator sets for patient safety, drawing on available evidence and on consensus recommendations of international expert panels.

In Canada, the 2003 First Ministers’ Accord on Health Care Renewal stated that “the implementation of a national strategy for improving patient safety is critical.” As a result of this imperative, the Canadian Patient Safety Institute (CPSI) was established, with a national mandate to build and advance a safer health system for Canadians. Health Canada allocated $50 million to patient safety initiatives (to include the work of the CPSI) over a five-year period (CPSI, online).

For Canada as a whole, there is a paucity of publicly reported safety data. Safer Healthcare Now!, an initiative partly funded by CPSI, has recently released data on a number of safety indicators, including surgical site infection rates, central line infection rates, venous thromboembolism rates, patient falls, adverse drug events, and ventilator-associated pneumonia rates (Safer Healthcare Now!, 2009). However, these datasets are generated by self-selecting teams that participate in targeted safety improvement initiatives. While the Safer Healthcare Now! data show significant improvements in the safety of care delivered by the participating teams, they do not provide a picture of quality of care more generally. Until there is a mandated requirement for collecting these types of data, it will be difficult to assess properly the domain of safety within quality of healthcare.

This chapter presents available data on three aspects of safety and quality:
- Adverse events
- Healthcare-associated infections (HAIs)
- Systems and processes for ensuring patient safety

For many of the indicators, national data were unavailable. Therefore, this chapter includes data drawn from provincial reports, as well as from studies conducted in discrete geographical areas within Canada and published in the peer-reviewed literature.
Adverse events in healthcare

A number of studies have been conducted around the world seeking to quantify the number of adverse events in different healthcare systems (Brennan et al., 1991; Wilson et al., 1995; Vincent et al., 2001). In Canada, Baker et al. (2004) estimated that 7.5% of all hospital patients experienced an adverse event. This corresponds to 185,000 admissions per year associated with an adverse event. Further analysis suggested that of these, 70,000 are potentially avoidable.

Data on adverse events can be difficult to interpret. There is a perennial question of whether a measured increase in adverse events reflects a negative situation of worsening safety of care or actually reflects a positive situation of better reporting of safety problems, exposing them to analysis and mitigation.

Juxtaposing staff-reported adverse event rates with patient reports can help to unravel what is actually happening in healthcare settings. There is a growing recognition that patients can play a vital role in helping to identify and quantify risks and provide options to devise solutions. Although patients are a valuable source of information about quality in healthcare, data from patient surveys should be interpreted with care. Patients are not necessarily in possession of the information required to ascertain whether an error has occurred in their care. They may either be unaware of an error that has occurred or may assume an error in a situation that has a poor outcome, when in fact no error has occurred.
In 2007, CIHI, drawing on a variety of data sources, conducted a review of patient safety in Canada (CIHI, 2007b). The analysis estimated the frequency of a range of adverse events. Its findings are summarized in the chart below. Of the events examined, nosocomial (or health-care-acquired) infections were most common, occurring in around 10% of patients. At the other end of the scale, the least-common incident in the analysis was a fatal event due to blood transfusions, which occurred in 0.001% of patients.

### Chart 4.1 Types of adverse events and estimated exposure

<table>
<thead>
<tr>
<th>Event</th>
<th>Number exposed per event</th>
<th>Reported year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults contracting a nosocomial infection while in an acute care hospital</td>
<td>1 in 10</td>
<td>2002</td>
</tr>
<tr>
<td>Children contracting a nosocomial infection while in an acute care hospital</td>
<td>1 in 12</td>
<td>2002</td>
</tr>
<tr>
<td>Obstetrical traumas during childbirth (vaginal delivery)</td>
<td>1 in 21</td>
<td>2003-2006</td>
</tr>
<tr>
<td>Birth trauma – injury to neonate</td>
<td>1 in 141</td>
<td>2003-2006</td>
</tr>
<tr>
<td>Post-admission pulmonary embolism or deep vein thrombosis</td>
<td>1 in 279</td>
<td>2003-2006</td>
</tr>
<tr>
<td>In-hospital hip fracture for adults aged 65+</td>
<td>1 in 1,263</td>
<td>2003-2006</td>
</tr>
<tr>
<td>Foreign object left in after procedure</td>
<td>1 in 2,998</td>
<td>2003-2006</td>
</tr>
<tr>
<td>Adverse blood transfusion events</td>
<td>1 in 4,091</td>
<td>2003</td>
</tr>
<tr>
<td>Fatal events definitely, probably and possibly related to transfusion of blood components</td>
<td>1 in 87,863</td>
<td>2002</td>
</tr>
</tbody>
</table>

Source: Adapted from CIHI, 2007b.
In collaboration with CIHI, the Health System Performance Research Network (HSPRN, formerly known as Hospital Report Research Collaborative) compiles annual performance results for hospitals in Ontario. The HSPRN reports collate data on nurse-sensitive adverse events, distinguishing between medical and surgical settings. The medical indicator refers to patients with acute myocardial infarction, heart failure, asthma, GI bleed or stroke, and aggregates the incidence of post-admission pressure ulcers and post-admission fractures from falls. The surgical indicator refers to patients admitted for cholecystectomy, hysterectomy or prostatectomy, and aggregates the incidence of post-admission pressure ulcers and post-admission fractures from falls, as well as post-admission urinary tract infections (UTIs).

Post-admission pneumonia was added to the list of nurse-sensitive conditions for both patient groups starting in 2004-2005. While the rate for adverse events in surgical patients fell between 2002-2003 and 2004-2005 and remained relatively stable up to 2006-2007, the corresponding figure for medical patients saw a marked increase. This may be due to the addition of post-admission pneumonia to the list of adverse events. The increase may also reflect improved hospital reporting resulting from a system-wide focus on patient safety. Note that, as methodological refinements were made from year to year, caution must be used when comparing results across years.

Medication errors (MEs) are a relatively common, and potentially life-threatening, occurrence in Canada. It has been estimated that adverse drug events account for 24% of total adverse events (Baker et al., 2004). Their full impact is difficult to quantify, due to significant under-reporting of these errors (CIHI, 2005; Wilkins and Shields, 2008). The main causes of medication errors have been shown to be inappropriate prescribing by professionals, skipped doses or incorrect use by patients, and the lack of systems for continuous and adequate tracking of problems (Health Council of Canada, 2009). The chart illustrates findings from a CIHI report (2007c) on inappropriate prescribing for seniors (aged 65+ years). It focuses on the continued prescription of drugs from “Beers List,” an internationally recognized list of drugs considered to be inappropriate for seniors due to an elevated risk of adverse effects. In provinces with available data, the proportion of seniors on public drug programs who were chronically prescribed “Beers List” drugs ranged from 12.9% in Alberta to 18.8% in New Brunswick.
The Commonwealth Fund International Health Policy Surveys in 2002, 2005 and 2008 focused on adult patients with health problems. Respondents were asked whether in the past two years they thought that either a medication error or a medical mistake had been made in their treatment or care. In 2008, among Canadian respondents who indicated that an error or mistake (or lab error) was made, 12% said that it led to a serious health problem (n = 82 out of 669 respondents who reported error; total sample was 2,635). These data should be interpreted with caution. As previously noted, although patients are a valuable source of information about quality in healthcare, they are not necessarily in possession of the necessary information to ascertain whether an error has occurred in their care. They may either be unaware of an error that has occurred or may assume an error in a situation that has a poor outcome when, in fact, no error has occurred.
The Health Care in Canada Survey was established in 1997. The most recent survey, conducted in November 2007, asked respondents: “Within the past two years, have either yourself or a member of your family experienced any adverse effects or events as a result of care received in Canada’s health care system?” The chart shows the proportion of respondents who answered positively. Of those respondents who indicated that they had experienced adverse effects or events, 20% experienced medical complications, 17% were affected by excessive wait times, 14% indicated a general poor quality of care, 13% were misdiagnosed, and 6% experienced a medication error (data not shown).
Chart 4.6 In-hospital hip fractures: Canada

In-hospital hip fractures are preventable complications that have serious consequences for patients and for the cost of care. The charts provide two views of in-hospital hip fracture rates for patients aged 65+. The first shows a time series of fracture rates across Canada and illustrates that rates have remained largely unchanged in recent years. The second chart delves into the Canada-wide data for 2004-2005 to 2006-2007 and shows that Manitoba, Alberta and British Columbia had in-hospital hip fracture rates that were significantly higher than those in Canada as a whole. Variation in rates may be attributed to numerous factors, including hospital processes, environmental safety and availability of nursing care.

Source: Health Indicators e-publication, CIHI/Statistics Canada
Notes: Rates are based on three years of pooled data. The reference year reflects the mid-point of the three-year period. Canada rate includes only jurisdictions for which comparable data were available.

Source: Health Indicators e-publication, CIHI/Statistics Canada
Notes: Rates are based on three years of pooled data. The reference year reflects the mid-point of the three-year period. Canada rate includes only jurisdictions for which comparable data were available.
A national survey conducted by Jhawar et al. (2007) asked neurosurgeons across Canada about their experiences with incorrect-site surgery. Incorrect-site surgery for neurosurgeons includes both wrong-sided cranial surgery and wrong-level spinal surgery (i.e. wrong disc). The chart illustrates the estimated rate of incorrect-site surgeries both in the previous year and throughout the neurosurgeons’ careers for three procedures:

- **Craniotomy**: surgery in which an opening is made in the skull, most commonly performed for brain tumour removal. Also performed to remove blood clots, to control hemorrhage, to repair abnormal connections of blood vessels, to drain a brain abscess, to relieve pressure inside the skull, to perform a biopsy or to inspect the brain.

- **Lumbar discectomy**: surgery to remove part of an intervertebral disc from the lower back.

- **Cervical discectomy**: surgery to remove the disc between two (or more) neck vertebrae. Generally, a cervical spine fusion procedure is performed at the same time.

Notably, patients were not informed about the errors in 15% of wrong-sided cranial surgeries and 19% of wrong-level spinal surgeries.
Ventilator-associated pneumonia (VAP), also known as hospital-acquired pneumonia, is a common nosocomial infection (the second most prevalent after urinary tract infections). Ventilator-associated pneumonia (VAP) accounts for up to 60% of deaths associated with nosocomial infection. Hospitalized patients who are ventilated in the intensive care unit (ICU) have the highest risk of developing nosocomial pneumonia. It should be noted that, even in units providing exemplary standards of care, some cases of VAP are unavoidable. Total costs for VAP are $11,450 per case. Based on 4,000 cases of VAP each year, the total cost of VAP per year is approximately $46 million.
Perineal trauma can be a serious consequence of childbirth. Up to 50% of women with third- or fourth-degree perineal tears during childbirth suffer from fecal incontinence. Historically, episiotomies have been performed in the belief that the procedure benefited both mother and child: the mother by reducing injury to the perineum and the newborn through shortened second stage of labour. However, there is now strong evidence that liberal or routine use of episiotomy provides no benefit compared to selective or restrictive use, such as in cases of fetal distress or imminent severe perineal laceration. The chart illustrates the incidence of four types of perineal trauma:

- **First degree**: superficial laceration involving skin
- **Second degree**: laceration involving the perineal muscles
- **Third degree**: injury to the perineum involving the anal sphincter complex
- **Fourth degree**: involves anal sphincter & rectal mucosa

Episiotomy: A surgical procedure for widening the outlet of the birth canal to facilitate delivery of the baby and to avoid a jagged rip of the perineum

Between 1995-1996 and 2004-2005, the rate of third-degree tears increased by 10%, while the rate of fourth-degree tears remained relatively steady at 0.6 per 100 hospital vaginal deliveries. The number of episiotomies has fallen considerably, from 31.1 per 100 vaginal births to 20.4 per 100 vaginal births over the same period (PHAC, 2008).
Nosocomial infections are infections that are a result of treatment in a hospital or a healthcare service unit. Infections are considered nosocomial if they first appear 48 hours or more after hospital admission or within 30 days after discharge. They are an important cause of morbidity and mortality in hospitalized patients and lead to increases in individual suffering, length of stay in hospital, and healthcare costs.

Each year in Canada, there are an estimated 220,000 cases of nosocomial infections, resulting in more than 8,000 deaths (Zoutman et al., 2003). Ongoing problems with methicillin-resistant Staphylococcus aureus (MRSA) and Clostridium difficile-associated diarrhoea affect healthcare organizations throughout the country. The costs associated with MRSA alone in Canadian hospitals have been estimated at between $42 million and $59 million annually (Kim et al., 2001).
Methicillin-resistant *Staphylococcus aureus* (MRSA) is a strain of bacteria that is resistant to a wide range of antibiotics. MRSA was first discovered in 1961 and is now widespread, particularly in hospitals, where it is commonly called a “superbug.” The Canadian Nosocomial Infection Surveillance Program (CNISP) was established in 1994 to examine trends in healthcare-associated infections across Canada. At present, 49 sentinel hospitals from nine provinces participate in the CNISP network. The CNISP publishes annual reports on MRSA surveillance and the chart illustrates time series data on MRSA isolates. Healthcare-associated MRSA infections increased more than nine-fold between 1995 and 2007 (from 0.2 to 1.8 isolates per 10,000 days). For context, the European Antimicrobial Resistance Surveillance System (EARSS), in 2007, reported MRSA bacteremia rates (blood infections only) of 0.02 isolates per 10,000 patient days in Sweden, 0.09 isolates per 10,000 patient days in Germany, 0.71 isolates per 10,000 patient days in France and 1.34 per 10,000 patient days in the U.K.
Chart 4.11 Healthcare-associated MRSA infections: Regional incidence

NCISP publishes data on MRSA incidence from 47 sentinel hospitals in nine provinces. The chart illustrates regional data on healthcare-associated MRSA infections and shows that, in both 2006 and 2007, the western region of Canada reported much higher MRSA incidence than the rest of the country. While the central region saw a decrease in healthcare-associated MRSA incidence between 2006 and 2007, the other two regions saw increases over the two-year period.
**Chart 4.12 Hospital-associated *Clostridium difficile* infections: Canada**

*Clostridium difficile* is a bacterium that causes diarrhoea and can lead to serious illness and death. People aged 65+ and patients with serious underlying disease are particularly susceptible to infection. Under certain conditions, *Clostridium difficile*, which is found in feces, can produce spores. These spores are resistant to heat, alcohol and acids in the stomach, and can survive in patients and in the environment for long periods of time. A hospital can become contaminated with spores, placing patients at risk. The chart illustrates data on the incidence of *Clostridium difficile* in sentinel hospitals across Canada in 2005. Rates ranged from 3.8 per 10,000 patient days in Saskatchewan/Manitoba to 11.9 per 10,000 patient days in Quebec. CNISP also reported fatality rates (deaths directly or indirectly related to *Clostridium difficile* within 30 days of infection). The overall fatality rate was 5.6 per 100 cases and ranged from 1.1 per 100 cases in Alberta to 5.6 per 100 cases in Quebec (data not shown).
Safety systems and processes

Current thinking on safety in healthcare recognizes the importance of system failures in creating conditions that allow adverse events to occur (Reason, 1997). Experience from other high-risk industries, such as aviation and nuclear power, has shown that highly reliable organizations do not depend on human perfection to achieve high levels of safety. Rather, these industries design “fault-tolerant” systems with attention to the human propensity for error. Accordingly, efforts for improvement in safety in healthcare have sought to bring about a shift away from blaming individuals and toward designing systems, organizations and operations that will better assure patient safety (WHO, 2004).

This section provides data on the use of various safety systems and processes.
Chart 4.13 Safety alerts in primary care: International

The Commonwealth Fund International Health Policy Survey, 2006, was conducted with primary care physicians across seven countries. Respondents were asked: “Do doctors in your practice routinely receive an alert or prompt about a potential problem with drug dose or drug interaction?” The chart illustrates the responses, distinguishing between the use of manual and computerized alert systems. In Canada, fewer than one-half of respondents indicated that such a system was in place. This was in contrast to the countries surveyed outside North America, where drug-alert safety systems were in widespread use.
Chart 4.14 Processes for improving patient safety: Ontario

In Ontario, the system for reporting hospital performance draws on data from the System Integration and Change (SIC) survey, which is sent annually to hospital management staff in acute care facilities across the province, as part of the Hospital Report: Acute Care project. The survey asks about a number of initiatives designed to support a strong safety culture. In 2008, more than 90% of participating hospitals reported having a hospital-wide non-punitive reporting policy (data not shown). The chart illustrates that, over the three-year period 2006–2008, substantial efforts went into implementing safety strategies in Ontario.
Chart 4.15 Patient safety strategies: Ontario

The System Integration and Change survey in Ontario asks hospital executives about specific initiatives to reduce nosocomial infection rates. The chart illustrates the proportion of respondents indicating that their facility had implemented these initiatives.


- Reuse of single-use medical devices permitted (with sterilization) - 13%
- Reporting surgical infection rates after specific procedures - 57%
- Reporting on all surgical infection rates - 33%
- Surveillance method reporting daily - 67%
- Fully implemented formal mechanism for auditing hand-hygiene practices - 38%

Note: A different colour is used for re-use of single-use devices, as this is not a desirable practice, in contrast to the other strategies reported.
Patients often have more than one condition that requires management and treatment. Failure to appreciate the potential consequences of treatment of one condition upon another comorbid condition may have significant safety consequences. The 2008 Commonwealth Fund survey asked of respondents with multiple conditions: “Was there ever a time when:

- a doctor gave you instructions for one of your chronic conditions that conflicted with what you have been told to do for another condition?
- the specialists you see did not seem aware of the different chronic conditions that you have?”

The responses are depicted in the chart. On both questions, Canadian responses were higher than average rates of conflicting instructions and specialists unaware of co-morbidities, suggesting deficiencies in the management of comorbid conditions.
Post-surgical complications, or exacerbations of chronic conditions that occur following discharge from hospital, can be extremely serious. Patients’ awareness about which symptoms might comprise a clinically significant deterioration in their condition is vital if those symptoms are to be managed quickly and effectively. The 2008 Commonwealth Fund survey asked patients who had been hospitalized in the previous two years: “When you left the hospital did you receive clear instructions about symptoms to watch for and when to seek further care?” The chart shows that 80% of Canadian respondents were well briefed on danger signs to watch out for once they had returned home, the second-highest proportion of the countries shown (after the U.S.).
PATIENT CENTREDNESS

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Introduction

Providing high-quality healthcare requires the use of the best available scientific evidence, diagnostic acumen, and technical proficiency, all applied in safe and managerially efficient environments. An equally important component is patient centeredness: a concern for – and responsiveness to – patient preferences, attitudes and experiences.

According to the International Alliance of Patients’ Organizations (IAPO), “a patient-centred approach aims to better align national healthcare systems with the needs and expectations of patients, notably by improving their access to treatment and information, ensuring participation in healthcare decision-making and involvement in policy-making” (IAPO, 2006).

Health systems can be seen as networks of interconnected and disparate stakeholders. At the centre of the network is the patient/citizen: the primary beneficiary and, in Canada, the principal funder of the healthcare system. Internationally, there is a growing recognition that patients’ views should be taken into account in decision-making, both at the level of individual care and in issues of management and policy. Patients and their families can provide an important perspective on the quality of health services, one that complements other assessment methods such as inspections, audits and routine data collection. Patient and public perspectives can provide insight into the convenience, compassion, cleanliness and availability of healthcare services, and can also give insights into clinical outcomes through the use of patient-reported outcome measures (or PROMs). PROMs are currently used in Canada in the context of discrete clinical trials, but they have also been used to report on quality of healthcare more broadly in a number of countries, including the Netherlands (Quality of Care through the Patients’ Eyes), the U.S. (Consumer Assessment of Health Plans Study; Improving Chronic Illness Care Evaluation; Patient Assessment of Chronic Illness Care) and England (Department of Health, online). PROMs may be an area for development in Canada.

There are a number of sets of survey data of public and patient perceptions about quality of healthcare in Canada, including:

- Statistics Canada/Health Council of Canada: Canadian Survey of Experiences with Health Care Services
- Statistics Canada: Canadian Community Health Survey
- Commonwealth Fund International Health Policy Survey
- Health Council of Canada: Canadian Perceptions of the Health Care System
- Canadian Medical Association: National Report Card on Health Care
- Pollara Research: Health Care in Canada Survey

According to the Health Care in Canada Survey (2007), Canadians have, over the past decade, changed their perspective on the key health issues facing the country. In 1998, they regarded lack of funding as the most important issue. In 1998, they regarded lack of funding as the most important issue. In 2007, they deemed waiting times and the shortage of doctors to be the most pressing issue.
The 2008 Commonwealth Fund International Health Policy Survey asked respondents: “Which of these statements comes closest to expressing your overall view of the health care system in this country?” Respondents in the Netherlands were the most satisfied, with only 7% indicating that their healthcare system required a complete rebuild. In Canada, around one in seven respondents (14%) indicated that a complete rebuild of the system was required.
In 2005 and 2008, the Commonwealth Fund surveys focused on adults with health problems. Over the time period shown, Canadians became significantly more positive about their healthcare system. In 2005, 21% indicated that only minor changes were needed, compared to 34% in 2008.
In 2008, the Commonwealth Fund survey asked respondents: “Overall, how do you rate the quality of medical care that you have received in the past 12 months?” Canadian respondents were relatively positive about their experiences, with 61% rating care received in the preceding 12 months as excellent or very good. Only the United Kingdom and New Zealand respondents indicated greater satisfaction, while respondents from Australia were tied with those from Canada.
In 2008, the Canadian Survey of Experiences with Primary Health Care (CSE-PHC) asked respondents: “Overall, how do you rate the quality of health care that you have received in the past 12 months?” The results in the chart show that Manitoba had the lowest proportion of respondents that rated care as excellent (27.3%) while Prince Edward Island had the highest proportion that judged care to be excellent (42.4%). Ontario had the highest proportion of respondents that rated care fair or poor (11.7%).

Chart 5.4 Public ratings of overall quality: Canada

Overall ratings of healthcare quality in preceding 12 months, 2008

Source: Statistics Canada, CSE-PHC, 2008
In 2007, a survey conducted by Statistics Canada on behalf of the Health Council of Canada asked adults about their experiences of primary healthcare. The survey asked two questions about respondents’ confidence in the healthcare system: “How confident are you that you will get quality/safe care when you need it?” and “Is your confidence in the health care system rising, falling or about the same?” More than three-quarters of respondents indicated they were very or somewhat confident they would get quality/safe care, while two-thirds of respondents indicated either increasing or static levels of confidence.

Chart 5.5: Confidence in healthcare system: Canada

Confidence in healthcare system, 2007

- Very confident
- Somewhat confident
- Not very confident/not at all confident
Trajectory of confidence in healthcare system, 2007

% of respondents

Falling
About the same
Rising

In 2008, the Commonwealth Fund survey asked sicker adults in eight countries about their perceptions and experiences of their healthcare system. The chart illustrates the proportion of respondents answering yes to the question: “In the past two years, when getting care for a medical problem, was there ever a time when test results, medical records, or reasons for referrals were not available at the time of your scheduled doctor’s appointment?” Almost one in five Canadian respondents indicated that they had experienced such coordination problems.

Source: Commonwealth Fund, 2008
Chart 5.7 Coordination-of-care problems: Canada

The 2008 Canadian Survey of Experiences with Primary Health Care (CSE-PHC) asked respondents: “In the past 12 months, how often have test results or medical record not been available to your family physician at the time of your scheduled appointment?” The chart illustrates the proportion of respondents who said that such coordination problems occurred either always or usually. Overall, 7.4% of respondents across Canada indicated that they had experienced problems with availability of medical records and test results. The proportion ranged from 3.8% in New Brunswick to 11.8% in Manitoba.

Test results or medical record always/usually not available to family physician at appointment, 2008

Source: Statistics Canada, CSE-PHC, 2008
Note: Canadian results on this page differ from those shown in Chart 5.6. The discrepancy is probably due to differences in time scales (12 months vs. two years), sampling frame (primary care patients vs. sicker adults), and nature of the question (how often vs. ever occurred).
Recent developments in primary care provision and, in particular, chronic disease management, have focused on increasing patient engagement and collaboration in the healthcare process. A recent systematic review found encouraging evidence that increasing patient engagement can have a positive impact on a variety of patient and provider outcomes (National Centre for Health Outcomes Development, 2005). The 2008 Commonwealth Fund survey asked adults with chronic conditions: “Has any health care professional you see for your condition(s):
- Given you a written plan or instructions to help you manage your own care at home?
- Discussed with you your main goals or priorities in caring for your condition?”

The chart shows that almost one-half of Canadian respondents had a written plan to help them manage their own care and almost two-thirds indicated that they had discussed main goals or priorities for care with their primary care provider.

<table>
<thead>
<tr>
<th>Country</th>
<th>Given written plan or instructions to help manage own care</th>
<th>Discussed main goals or priorities for care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>42%</td>
<td>34%</td>
</tr>
<tr>
<td>Canada</td>
<td>60%</td>
<td>51%</td>
</tr>
<tr>
<td>France</td>
<td>65%</td>
<td>51%</td>
</tr>
<tr>
<td>Germany</td>
<td>64%</td>
<td>31%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>58%</td>
<td>35%</td>
</tr>
<tr>
<td>New Zealand</td>
<td>43%</td>
<td>43%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>50%</td>
<td>35%</td>
</tr>
<tr>
<td>United States</td>
<td>66%</td>
<td>74%</td>
</tr>
</tbody>
</table>

Source: Commonwealth Fund, 2008
Collaborative care has been defined as: “interaction between a patient and the health care system in which the patient is active in providing information to aid diagnosis and problem-solving; sharing his or her preferences and priorities for treatment or management; asking questions; and/or identifying management approaches that best meet his or her needs preferences and priorities” (National Centre for Health Outcomes Development, 2005). In 2008, the Commonwealth Fund survey gauged the extent of patient involvement in decision-making across eight countries, asking adults with health problems who had a regular doctor: “When you visit your doctor, does he or she always tell you about treatment options and involve you in decisions about best treatment?”

The chart shows that more than one-half of Canadian respondents indicated that this was the case.
Chart 5.10 Patient involvement in decision-making: Canada

In 2008, Statistics Canada surveyed primary care patients and asked: “In the past 12 months, how often did your family physician (or general practitioner) involve you in clinical decisions about your health care?” The chart shows that respondents indicated a considerable variation in the extent of their involvement in clinical decisions. The proportion of people indicating that they were usually or always involved ranged from 64.0% in Quebec to 78.1% in Nova Scotia.

Source: Statistics Canada, CSE-PHC, 2008
Most healthcare, perhaps as much as 85%, is self-care (Coulter and Ellins, 2006). Average individuals, in looking after themselves and their families, provide a far greater quantity of healthcare than do health professionals. For people with complex health problems, it is important that self-care is rooted in evidence. Written care plans are one way to provide appropriate support for self-care following discharge from hospital. In 2008, the Commonwealth Fund survey asked patients hospitalized in the preceding two years: “When you left the hospital did the hospital staff provide you with a written plan for your care after discharge?” Two-thirds of Canadian respondents indicated that they received this support, the second-highest proportion among the countries shown, behind the U.S.
In 2008, the Canadian Survey of Experiences with Primary Health Care (CSE-PHC) asked respondents: “Overall, how often does your family physician (or general practitioner) allow you enough time to discuss your feelings, fears and concerns about your health?” The chart illustrates the proportion of respondents that answered always or usually. Across Canada, results ranged from 76.1% of respondents in British Columbia to 91.4% of respondents in Nova Scotia.

Source: Statistics Canada, CSE-PHC, 2008
EQUITY

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Introduction

It is unacceptable for a privileged country like Canada to continue to tolerate such disparities in health. Our challenge is to find ways to improve the health of all Canadians to equal that of those who experience the best regardless of their ethnicity, social or economic position. (Fourth Report of the Subcommittee on Population Health of the Standing Senate Committee on Social Affairs, Science and Technology, April 2008)

Equity is an underlying value and much cherished tenet of healthcare across Canada. Quantifying and monitoring equity is generally done in two ways:

1. Measures of disparities (i.e. inequity) in health status and outcomes. These measures document variation in “healthiness” of different groups or sub-populations, variations that are often attributed to socio-economic status and influenced by a wide range of contributory factors, such as education, employment and housing. The social and economic differences are often compounded by differences in health-related behaviours such as smoking, diet and exercise, as well as health-services utilization. Often referred to as health inequalities, these measures include differences in life expectancy and incidence of disease, when comparing groups across different socio-economic levels.

2. Measures of disparities in delivery of services. These measures document variation in the provision of healthcare services, due either to physical constraints, such as geographical location and distribution of healthcare providers, or to inconsistent and inequitable clinical decision-making; for example, on the basis of age, gender or social class.

This section depicts data for disparities on the basis of:
- Socio-economic status and income
- Aboriginal status (see box for definitions)
- Geography
- Gender
- Age

Definitions of Registered Indian, First Nations and Aboriginal People

Registered Indian (or Status Indian) refers to an Indian person who is registered (or is entitled to be registered) under the Indian Act. The Act sets out the requirements for determining who is a Status Indian.

First Nations is a term that came into common usage in the 1970s to replace the word “Indian,” which some people found offensive. Although the term “First Nations” is widely used, no legal definition of it exists. Among its uses, the term “First Nations peoples” refers to the Indian peoples in Canada, both Status and Non-Status. Some Indian peoples have also adopted the term “First Nation” to replace the word “band” in the name of their community.

Aboriginal People is a collective term for the original peoples of North America and their descendants. The Canadian Constitution (the Constitution Act, 1982) recognizes three groups of aboriginal peoples: Indians, Métis and Inuit. These are three separate peoples with unique heritages, languages, cultural practices and spiritual beliefs. (from Lemstra and Neudorf, 2008)
Authors’ note on data availability for equity and disparities

A number of the charts in this section contain data that are more than five years old. In normal circumstances, we exclude data more than five years old on the basis that emerging scientific evidence, available technology, formulations of public policy and improvements in performance can all change significantly in a five-year period. Thus, out-of-date data can give a misleading picture of performance. In the case of the equity charts contained in this section, we have relaxed our timeliness inclusion criteria for the following reasons:

1. Inequality is a serious concern when assessing the quality of care in health systems (Chief Public Health Officer, 2008). Excluding key indicators on the basis of the age of the available analyses would mean that we had little data to present on this issue, which could be interpreted to mean that we do not consider equity to be an important aspect of quality in healthcare.

2. The controversial nature of inequality can mean that performance in this area is not exposed to careful analysis, public attention and policy development. This can lead to increasing disparities and inequalities, often affecting groups that struggle to navigate complex social and healthcare systems, further exacerbating the problem.

As well as experiencing difficulties in accessing timely equity data, we also struggled to find meaningful information on a national basis. While our goal has been to present a Canada-wide picture throughout this chartbook, where this has not been possible we have highlighted province-specific data.

In this chapter, we present a number of indicators that have been produced by the Manitoba Centre for Health Policy and the Health Quality Council Saskatchewan (Fransoo et al., 2005). Their work provides excellent case studies of the type of analyses possible in this domain.
Life expectancy in Canada has increased dramatically over the past century. A Canadian born today can expect to live for about 80 years (see Chart 1.3), a statistic that places Canada among the longest-lived nations in the world. Within Canada, however, there is considerable variation. The chart shows differences in life expectancy by income. It highlights that, for males aged 25 in 2001, there was a 6.9 year difference in life expectancy; that is, males in the richest quintile could expect to live 14% longer than those in the poorest. For females, there was a 4.3 year difference (8%). To place the scale of these differences in context, it has been estimated that eliminating all cancers would increase U.S. life expectancy by 2.8 years (Manton, 1991).
First Nations peoples are more likely to experience poor outcomes in almost all areas of health. The following are some of the key findings from Health Canada’s *A Statistical Profile on the Health of First Nations in Canada* (2000; update due in late 2009):

- In First Nations populations, the potential years of life lost from injury was almost 3.5 times the national average.
- Compared with the overall Canadian population, First Nations had elevated rates of pertussis (2.2 times higher), rubella (7 times higher), tuberculosis (6 times higher), shigellosis (2.1 times higher), and chlamydia (7 times higher).
- First Nations hospitalization rates were higher than Canadian rates for all causes except cancers. Where the principal hospital discharge diagnosis was respiratory disease, digestive disease, or injuries and poisonings, the rates were approximately 2 to 3 times higher than the national averages (Lemstra and Neudorf, 2008).

This chart illustrates the latest available data comparing life expectancy of Canadians overall with that of Registered Indians. In 1980, the absolute gap for males was 10.8 years and for females 10.9 years. In 2001 the absolute gap was 6.6 years for males and 6.6 for females.
The most recent data on mortality emanate from a follow-up study to the 1991 census (Wilkins et al., 2008). The study calculated age-standardized mortality rates (ASMRs) per 100,000 person years at risk for Canadians, by race. People with any aboriginal origins (First Nations, Métis, Inuit) had higher ASMRs than persons with no aboriginal ancestry. Mortality rates were highest among Registered Indians (a subset of First Nations).
Mortality rates, females, aboriginal vs. non-aboriginal, Canada 1991-2001

Deaths per 100,000 person years at risk (age standardized)

- No aboriginal origins: 319
- Aboriginal origins: 560
- Not registered Indian: 321
- Registered Indian: 624

Source: Census mortality follow-up study 1991-2001 (Wilkins et al., 2008)
Premature mortality rate (PMR) is a standardized (age- and sex-adjusted) rate of “premature” death; in this case, death before the age of 75. Many researchers consider PMR to be the best single indicator of the overall health status of a region’s population and need for healthcare (Carstairs and Morris, 1991; Eyles et al., 1991; Eyles and Birch, 1993). PMR is highly correlated with morbidity and with self-rated health, as well as with socio-economic risk factors (Martens et al., 2002). The chart illustrates a clear relationship between premature mortality and low income, in both rural and urban settings and for both males and females. The greatest relative difference was in urban areas, where males in the lowest-income group had premature mortality rates nearly two times greater than those in the highest-income group.

Source: Manitoba Centre for Health Policy (Fransoo et al., 2005)
Chart 6.5 Cost concerns as a barrier to medical care: International

Internationally, cost is a frequent factor in inhibiting equitable access to medical care when needed. These charts present data from the patients’ perspective regarding cost-related barriers to care. Data are drawn from the 2008 Commonwealth Fund survey of adults with health problems, which asked: “Was there a time in the past year when you:
• **Had a specific medical problem but did not visit the doctor because of cost?**
• **Skipped or did not get a medical test that was recommended by a doctor because of cost?”**

The chart illustrates the proportion of all respondents in each country who answered yes. For Canadian respondents, around one in ten respondents in each group indicated that they had not accessed medical care because of cost concerns.
The 2008 Commonwealth Fund survey asked respondents: “Was there a time in the past year when you:
• Did not fill a prescription for medicine or skipped doses because of cost?
• Needed dental care but did not see dentist because of cost?”
More than one-quarter of Canadian respondents indicated that they had not sought needed dental care because of cost and one in six had not taken recommended pharamaceuticals because of financial concerns.
Infant mortality refers to the number of deaths under the age of one year per 1,000 live births. In 2005, Canada’s infant mortality rate was 5.4 per 1,000 live births. Income levels are known to affect infant mortality rates. The chart shows that infant mortality rates in urban Canada fell between 1986 and 2001 and that the gap between richest and poorest communities decreased from a difference of 4.7 deaths per 1,000 live births in 1986 to 2.1 deaths per 1,000 live births in 2001. Further insight is gained from estimates of infant mortality rates among aboriginal peoples and those living in Canada’s northern communities. The infant mortality rate among First Nations people living on reserves is estimated at 7 deaths per 1,000 live births, although this may be an underestimate, due to limitations associated with data and reporting. Recent research related to First Nations in British Columbia puts the estimate as high as 7.5 deaths per 1,000 live births for First Nations living in rural areas. The estimated rate in Nunavut (where approximately 85% of the population is Inuit) is more than three times the national rate, at 16 deaths per 1,000 live births (Public Health Agency of Canada, 2008).
Chart 6.8 Incidence of AMI and stroke by income and place of residence: Manitoba

The Manitoba Centre for Health Policy analyzed administrative data on deaths and hospitalizations for acute myocardial infarction (AMI) and stroke by sex and income (stratified into urban and rural areas). The chart shows the data for lowest- and highest-income groups in both rural and urban areas. There is a strong relationship between AMI/stroke rates and income/place of residence.
On the previous page, Chart 6.8 illustrates that, in Manitoba, patients in lower income brackets suffered more heart attacks and strokes than those in higher income brackets. These charts examine the rate at which two types of treatment for cardiovascular diseases are given, by income and urban or rural residence. In the case of angioplasty, the rate for lower-income males in rural areas is lower than that for rural high-income males, despite the fact that incidence is higher in the lower-income group. For statins, urban males in the higher income bracket have a higher rate of prescription despite recording lower relative levels of AMI/stroke incidence when compared to lower-income urban males.
Statin prescriptions, by income, Manitoba, 2003-2004

Source: Manitoba Centre for Health Policy (Fransoo et al., 2005)
Evidence-based care for diabetes involves good glycemic control (as measured by HbA1c testing) and regular foot and eye exams to check for early signs of disease complications. In 2008, Sanmartin and Gilmore published an analysis of data from the 2005 Canadian Community Health Survey (which surveyed people with diabetes from six provinces and territories), examining whether there was any relationship between income and the provision of these evidence-based processes. None of the tests showed a statistically significant difference between the income groups (at 95% CI – see Technical Appendix for details), suggesting that care to diabetics is provided equitably.
Chart 6.11 Diabetes and lower-limb amputations by income: Manitoba

People with diabetes are at risk of developing neuropathy (nerve damage). This is most frequently manifested in ulceration of patients’ feet and, in extreme cases may lead to lower-limb amputation. The chart shows data on the rate of lower-limb amputations among diabetics from those in the highest- and lowest-income groups in rural and urban Manitoba. It illustrates a strong relationship between amputation rates and income/place of residence. In both urban and rural areas, lower-limb amputation rates for both males and females are higher among residents of lower-income areas. The extent to which the amputations reflect suboptimal primary care and disease management, poor patient compliance or both, is unknown.

Lower limb amputations in diabetics by income, Manitoba, 1999-2000 to 2003-2004

Rate per 1,000 residents aged 20-79 years (age standardized)

- **Lowest rural**
- **Highest rural**
- **Lowest urban**
- **Highest urban**

Source: Manitoba Centre for Health Policy (Fransoo et al., 2005)
A study conducted by the Canadian Population Health Initiative (CPHI) focusing on 15 Canadian census metropolitan areas analyzed data from the Canadian Community Health Survey and found that 63% of seniors with low socio-economic status (SES) reported receiving an influenza immunization, compared with 65% of those seniors with an average SES and 68% of seniors with a high SES.
The chart illustrates the proportion of children in highest- and lowest-income quintiles in both rural and urban Manitoba, born between April 1, 2000 and March 30, 2001, who had complete immunization schedules as of their second birthday. A complete immunization schedule at that time included:

- four diphtheria, acellular pertussis, tetanus and polio (DaPTP)
- four haemophilus influenzae B (HIB)
- one measles, mumps and rubella (MMR).

There is a strong relationship between area-level income and immunization rates for two-year-olds: children from families living in higher-income areas had higher immunization rates. The rates are considerably lower than the target of 95% or higher for most childhood immunizations identified by the Public Health Agency of Canada.

**Proportion of children with complete immunizations at two years old, by income, Manitoba, 2002-2003**

Source: Manitoba Centre for Health Policy (Fransoo et al., 2005)
Benzodiazepines are a commonly prescribed drug, especially for older adults suffering from anxiety or sleep problems. Intended for short-term use (<3 weeks), benzodiazepines can be relatively effective and safe when prescribed and taken in an appropriate manner. However, some older adults are prescribed the drug for much longer than therapeutically recommended and at levels that may be unsafe for them. The use of high daily doses of benzodiazepines by seniors, in particular, is associated with increased risk of hip fractures, motor vehicle accidents, accidental falls, accidental poisonings, hospitalization for depression and other psychiatric problems, and with attempted and completed suicides. The chart illustrates that females in Manitoba were prescribed benzodiazepines twice or more, or were prescribed more than a 30-day supply much more frequently than were men. Lowest-income quintiles had higher prescription rates than the highest quintiles.
A research study conducted by Goa et al. (2008) examined whether access to care differed between status Indians and non-aboriginal people with chronic kidney disease. Good primary care should keep admission rates low. The chart on the left illustrates disparities in admission rates, disparities that remain in evidence after controlling for other variables known to increase admission rates. The chart on the right illustrates the likelihood of visiting the nephrologist, adjusting for various confounders. It shows that aboriginal people were much less likely to visit a nephrologist. Increased rates of hospital admissions for ambulatory care-sensitive conditions and a reduced likelihood of nephrology visits point to inequities in care. The extent to which this contributes to a higher rate of kidney failure among aboriginal people is unknown.
Likelihood of an outpatient nephrologist visit, aboriginal vs. non-aboriginal, Alberta 2003-2004

Adjusted for age, sex, diabetes, baseline GFR, median household income quintile, admission for non-ambulatory care condition and rural location of residence

Source: Goa et al., 2008
Secondary prevention medications are prescribed to prevent people from having another heart attack. There is good evidence to show that heart attack patients who take the recommended medications live longer. This chart illustrates that age-related disparities are in evidence and suggests that older adults may not be receiving adequate cardioprotective medications following a heart attack.

Chart 6.16 AMI secondary prevention by age: Saskatchewan

Secondary prevention AMI, drugs dispensed three days post-discharge, Saskatchewan, 2005-2006

Source: Saskatchewan Health Council, 2005
TECHNICAL APPENDIX

Chart 1.1
Age-standardized death rates per 100,000 people aged 0-74 years using direct standardization to the European standard population. Mortality and population data were extracted for 1997-2003 from World Health Organization (WHO) mortality database. Data include deaths coded according to the 9th and 10th revisions of the International Classification of Diseases (ICD). The causes of death considered amenable to healthcare were based on a systematic review (see Nolte and McKee, 2004 for details and ICD codes). Included were:

- **For ages 0-14**: intestinal infections, whooping cough, measles (1-14), all respiratory diseases except pneumonia and influenza (1-14).
- **For ages 0-44**: malignant neoplasm of the cervix uteri and body of cervix, leukemia and diabetes (0-49).
- **For ages 0-74**: tuberculosis, other infections (diphtheria, tetanus, septicemia and poliomyelitis), malignant neoplasm of the rectum and colon, skin, breast, cervix uteri, testis, Hodgkin’s disease, diseases of the thyroid, epilepsy, chronic rheumatic heart disease, hypertensive disease, ischemic heart disease (as per growing international consensus, only one-half of IHD deaths were counted as “amenable”), cerebrovascular disease, influenza, pneumonia, peptic ulcer, appendicitis, abdominal hernia, cholelithiasis and cholecystitis, nephritis and nephrosis, benign prostatic hyperplasia, misadventures to patients, maternal death, congenital cardiovascular anomalies, perinatal deaths (all causes except stillbirths). Note that age limits other than 75 years were set for: diabetes (<50 years because the preventability of deaths at older ages—and in particular the effectiveness of good diabetic control in reducing vascular complications—is controversial), intestinal infectious diseases, whooping cough, measles and childhood respiratory diseases (<15 years because death from these diseases other than in childhood is likely to reflect the presence of other disease processes); leukemia (<44 years because recent evidence demonstrates improvement in mortality from leukemia in the European Union up to age 44 since 1960, largely attributed to advances in treatment).

Chart 1.2
From OECD Health Data 2008, sourced from Australian Bureau of Statistics (Farr’s method used; from 1995 onwards, data represent three-year rolling averages); Statistics Canada (estimates for 1986—a census year—based on three-year mortality data; estimates for 2005 calculated via Greville’s method using three-year average of age-specific mortality rates; non-residents of Canada are excluded from the deaths and population estimates used); Eurostat NewCronos database for European data; U.S. National Center for Health Statistics (note change in methodology in 1997 to one that constructs complete life tables by single years of age that extend to 100 using a methodology similar to that of the U.S. decennial tables).

Chart 1.3
Calculation based on Greville’s method for abridged life tables. For 1991, annual mortality rates and five-year age groupings of population and mortality rates were used. For the 2006 data, life expectancy was calculated using a three-year average of age-specific mortality rates. Chart is based on data tabulated by place of residence. Data exclude births to mothers not resident in Canada; births to mothers resident in Canada whose province or territory of residence was unknown; deaths of non-residents of Canada; deaths of residents of Canada whose province or territory of residence was unknown; deaths for which age or sex of decedent was unknown. The territories include Yukon, the Northwest Territories and Nunavut. For 95% confidence intervals and further details, see CANSIM table 102-0511.
Chart 1.4
Number of deaths extracted from WHO Mortality Database. Age-standardized death rates per 100,000 population, using the OECD population for 1980 as the reference population. ICD-10 codes C00-C97.

Chart 1.5
Potential years of life lost (PYLL) is a measure that sums deaths (in this case from cancer: ICD-10 C00-C97) occurring at each age and multiplying this by the number of remaining years to reach 70 years. PYLL per 100,000 is based on age-specific death statistics provided by WHO and uses the OECD population for 1980 as the reference population.

Chart 1.6
Data from CANSIM table 102-0552. Rates are: based on usual place of residence, age-standardized using the direct method and the 1991 Canadian Census of Population structure. ICD-10 codes C00-C97. Data exclude deaths of non-residents of Canada; deaths of residents of Canada whose province or territory of residence was unknown; and deaths for which age of decedent was unknown.

Charts 1.7-1.10 (a and b)
a. Number of deaths extracted from WHO Mortality Database. Age-standardized death rates per 100,000 population, using the OECD population for 1980 as the reference population. ICD-10 codes: C33-C34 for lung cancer; C18 – C21 for colorectal cancer; C50 for breast cancer; C61 for prostate cancer.
b. Sums of deaths (for each type of cancer) occurring at each age and multiplying this by the number of remaining years to reach 70 years. PYLL per 100,000 is based on age-specific death statistics provided by WHO and uses the OECD population for 1980 as the reference population.

Chart 1.8 (a and b)
See Chart 1.6

Chart 1.9 (a and b)
See Chart 1.6

Chart 1.10 (a and b)
See Chart 1.6

Chart 1.11
Data exclude Quebec due to methodological differences in data collection; 1992 data also excludes PEI. Colorectal cancer does not include cancer of the anus (2002-04 data).

Chart 1.12
Newfoundland and Labrador data not shown as they were artefactually high. Quebec data excluded from analysis because of methodological differences (see Canadian Cancer Society, 2009: 60). Due to the relatively small number of cases from Prince Edward Island available for analysis, RSR estimates for this province are less precise than for other provinces.

Chart 1.13
Cancer System Quality Index (CSQI) of Ontario is a web-based public reporting tool. Further details available at: http://csqi.cancercare.on.ca/

Chart 1.14
Number of deaths extracted from WHO Mortality Database. Age-standardized death rates per 100,000 population, using the OECD population for 1980 as the reference population. ICD-10 codes 100-I99.
Chart 1.15
Sum of deaths from circulatory disease occurring at each age and multiplying this by the number of remaining years to reach 70 years. PYLL per 100,000 is based on age-specific death statistics provided by WHO and uses the OECD population for 1980 as the reference population.

Chart 1.16
Data from CANSIM table 102-0552. Rates are based on place of residence; data exclude deaths of non-residents of Canada. Data refer to underlying cause of death. ICD-10 codes I00-I798 and I80-I99.

Chart 1.17
Number of deaths extracted from WHO Mortality Database. Age-standardized death rates per 100,000 population, using the OECD population for 1980 as the reference population. ICD-10 codes I21, I22

Chart 1.18
Sum of deaths from AMI occurring at each age and multiplying this by the number of remaining years to reach 70 years. PYLL per 100,000 is based on age-specific death statistics provided by WHO and uses the OECD population for 1980 as the reference population.

Chart 1.19
Data from CANSIM table 102-0552. Rates are based on usual place of residence and age-standardized using the direct method and the 1991 Canadian Census of Population structure. ICD-10 code I21-I22. Data exclude deaths of non-residents of Canada; deaths of residents of Canada whose province or territory of residence was unknown; and deaths for which age of decedent was unknown.

Chart 1.20
Risk-adjusted rate of unplanned re-admission following discharge for AMI. A case is counted as a re-admission if it is for a relevant diagnosis and occurs within 28 days after the index AMI episode of care. An episode of care refers to all contiguous in-patient hospitalizations and same-day surgery visits.

Relevant diagnoses for assigning re-admission cases:
- Acute myocardial infarction
- Other acute and subacute forms of ischemic heart disease
- Old myocardial infarction
- Angina pectoris
- Other forms of chronic ischemic heart disease
- Conduction disorders
- Cardiac dysrhythmias
- Functional disturbances following cardiac surgery
- Pneumococcal pneumonia
- Other bacterial pneumonia
- Bronchopneumonia, organism unspecified
- Pneumonia, organism unspecified
- Urinary tract infection

Numerator: number of AMI episodes with a re-admission for a given year. Denominator: total number of AMI episodes in an 11-month period. Data collection period April 1-March 31. Data are labelled by CIHI as the mid-point of a three-year period. The Canada rate includes only those provinces for which comparable data were available.

Chart 1.21
Data refer to financial years April 1-March 31. Data were suppressed for dispensing rates where the denominator (number of AMI patients) was less than 15. Data were also suppressed in any instance where the numerator or denominator minus numerator was less than five. Patients who died in hospital, patients with Registered Indian status and patients with no drug use whatsoever were excluded from analysis. Patients who died between discharge and any of the three time points were also removed from the denominator when determining drug adherence at various time points.
Chart 1.22
Number of deaths extracted from WHO Mortality Database. Age-standardized death rates per 100,000 population, using the OECD population for 1980 as the reference population. ICD-10 codes I60 – I69

Chart 1.23
Sum of deaths from cerebrovascular disease occurring at each age and multiplying this by the number of remaining years to reach 70 years. PYLL per 100,000 is based on age-specific death statistics provided by WHO and uses the OECD population for 1980 as the reference population.

Chart 1.24
Data from CANSIM table 102-0126. Rates are based on place of residence and age-standardized using the direct method and the 1991 Canadian Census of Population structure. ICD-10 code I60-I69. Data exclude deaths of non-residents of Canada; deaths of residents of Canada whose province or territory of residence was unknown; and deaths for which age of decedent was unknown.

Chart 1.25
National survey conducted in the fall of 2007, for further details see Heart and Stroke Foundation http://www.heartandstroke.com/site/apps/nlnet/content2.aspx?c=ikIQLcMWJtE&b=4955951&tct=591565

Charts 1.26-1.29
All Ontario acute-care institutions (excluding children’s and mental healthcare hospitals and those with fewer than 10 stroke or TIA separations per year) participated in the stroke audit (n=153). All patients seen in the emergency department or admitted to hospital between April 1, 2004 and March 31, 2005 with a “most responsible” diagnosis of stroke or TIA were eligible for inclusion in the audit. Stroke/TIA separations were identified from the discharge abstract database (DAD) and the National Ambulatory Care Reporting System (NACRS). For individuals with more than one stroke/TIA in the sampling time frame, only the first stroke/TIA event was included. From all eligible cases, a simple random sample of 21% was selected, with over-sampling performed at low-volume institutions so that each institution contributed a minimum of 10 cases. The total sample size was 4,913 stroke/TIA events. Different hospital types are defined as:
- **Non-designated**: acute-care hospital that does not fit the definition of District or Regional Stroke Centre
- **District Stroke Centre**: facilities with written stroke protocols for emergency services, emergency department and acute care, including transport and triage protocols; ability to offer thrombolytic therapy to suitable ischemic stroke patients; timely CT scanning and expert interpretation; clinicians with stroke expertise; and linkages to rehabilitation and secondary prevention
- **Regional Stroke Centre**: all the requirements of a District Stroke Centre, plus neurosurgical facilities and interventional radiology.

Chart 1.27
See Chart 1.26

Chart 1.28
See Chart 1.26

Chart 1.29
See Chart 1.26

Chart 1.30
a. Number of deaths extracted from WHO Mortality Database. Age-standardized death rates per 100,000 population, using the OECD population for 1980 as the reference population. ICD-10 codes J00-J98.
b. Sum of deaths from respiratory disease occurring at each age and multiplying this by the number of remaining years to reach 70 years. PYLL per 100,000 is based on age-specific death statistics provided by WHO and uses the OECD population for 1980 as the reference population.

Chart 1.31
Data from CANSIM table 102-0552. Rates are based on usual place of residence and age-standardized using the direct method and the 1991 Canadian Census of Population structure. ICD-10 codes J10-J18; J20-J22; J40-J47; J60-J66.
J68; J69; J00-J06; J30-J39; J67; J70-J98. Data exclude deaths of non-residents of Canada; deaths of residents of Canada whose province or territory of residence was unknown; and deaths for which age of decedent was unknown.

Chart 1.32
Survey conducted by Leger Marketing. Random sample of 2,196 Canadians from British Columbia (207); Alberta (185); Manitoba/Saskatchewan (314); Ontario (569); Quebec (523); and Maritimes (398). COPD-diagnosed segment n=143; “at risk” segment n=425. Details available at: http://www.lung.ca/media-medias/news-nouvelles_e.php?id=98

Chart 1.33-1.34
The 2008 Commonwealth Fund International Health Policy Survey screened random samples of adults aged 18+ years to identify those who rated their health as fair or poor or who had a serious illness or disability, major surgery or had been hospitalized (for conditions other than childbirth) in the preceding two years. Full sample sizes: Australia (750), Canada (2,635), France (1,202), Germany (1,201), Netherlands (1,000), New Zealand (751), United Kingdom (1,200) and United States (1,205). Interviews were conducted by telephone between March and May 2008. The margin of sample error for country averages are approximately: +/-4% for Australia, New Zealand and the Netherlands; +/-3% for France, Germany and the U.S.; and +/-2% for Canada at the 95 percent confidence level.

This chart limited to respondents with diagnosed diabetes. This more limited sample was: Australia, 105; Canada, 452; France 151; Germany, 205; Netherlands, 143; New Zealand, 78; U.K. 144; U.S. 264.

Chart 1.34
See Chart 1.23

Chart 1.35
The CCHS is a cross-sectional survey that collects information related to health status, health care utilization and health determinants for the Canadian population. It relies upon a large sample of respondents and is designed to provide reliable estimates at the health region level. Further details available at: http://www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl? Function=getSurvey&tSDDS=3226&lang=en&db =imdb&tadm=8&dis=2#2

Chart 1.36
Denominator for indicators was number of persons who met the diabetes mellitus definition criteria who are in the Saskatchewan Diabetes Database (SDD) and who had at least one HbA1c test done (or one LDL cholesterol measurement) in the measurement year. Lab records with missing test data were excluded. For further details, see: http://www.hqc.sk.ca/download.jsp?2z6ed94Gr0iMC4qBWunaBDBIzBf0QfLQkUwK40BZaJukPeUN9CnxMA==

Chart 1.37 a and b
a. Number of deaths extracted from WHO Mortality Database. Age-standardized death rates per 100,000 population, using the OECD population for 1980 as the reference population. ICD-10 codes X60-X84
b. Sum of deaths from intentional self-harm occurring at each age and multiplying this by the number of remaining years to reach 70 years. PYLL per 100,000 is based on age-specific death statistics provided by WHO and uses the OECD population for 1980 as the reference population.

Chart 1.38
Data drawn from CANSIM Table 102-0110. PYLL is defined as the number of years of potential life not lived when a person dies “prematurely”; defined for this indicator as before age 75. Data exclude deaths of non-residents of Canada; deaths of residents of Canada whose province or territory of residence was unknown; and deaths for which age of decedent was unknown.
**Chart 1.39**

**Chart 1.40**
Health regions are based on patients’ residence. Re-admission rates included only individuals whose age at admission was between 15 and 65 years old, who were diagnosed with a mental illness in the index episode and who were re-admitted with mental disorders via the emergency department. Rates exclude patients with invalid health card numbers or postal codes. Data needed for the computation of Quebec re-admission rates were not available.

**Chart 1.41**
Percentage of children at one or two years of age who have been fully immunized against diphtheria, tetanus and pertussis (DTP). Different countries have different immunization schedules.

**Chart 1.42**
Data from CANSIM table 105-4045. Population aged 65 and over who reported when they had their last influenza immunization. Rates are age standardized using the direct method and the 1991 Canadian census population structure. Nunavut data is from 2005.

**Chart 1.43**
The 2008 Commonwealth Fund International Health Policy Survey screened random samples of adults aged 18+ years to identify those who rated their health as fair or poor or who had a serious illness or disability, major surgery or had been hospitalized (for conditions other than childbirth) in the preceding two years. Full sample sizes: Australia (750), Canada (2,635), France (1,202), Germany (1,201), Netherlands (1,000), New Zealand (751), United Kingdom (1,200) and United States (1,205). Interviews were conducted by telephone between March and May 2008. The margin of sample error for country averages are approximately: +/−4% for Australia, New Zealand and the Netherlands; +/−3% for France, Germany, and the U.S.; and +/−2% for Canada at the 95 percent confidence level. Sample size for cholesterol question was: Australia, 355; Canada, 1,196; France, 536; Germany, 681; Netherlands, 488; New Zealand, 292; U.K., 582; U.S., 717.

**Chart 1.44**
Canadian Survey of Experiences with Primary Health Care (CSE-PHC) was conducted with Canadians aged 18+ years living in private dwellings in the 10 provinces and the three territories. Persons living on Indian reserves or Crown lands, residents of institutions, full-time members of the Canadian Armed Forces and residents of certain remote regions were excluded. The sample for this survey was drawn from the Canadian Community Health Survey (CCHS, record number 3226), Cycle 4.1, and consisted of 16,482 respondents. The response rate was 71.0%. Further details at: [http://www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&tSDDS=5138&lang=en&db=imdb&adm=8&dis=2](http://www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&tSDDS=5138&lang=en&db=imdb&adm=8&dis=2)

**Chart 1.45**
Data from CANSIM table 105-0443. Females aged 50-69 years who reported when they had their last mammogram for routine screening or other reasons. Data from Nunavut suppressed due to extreme sampling variability.

**Chart 1.46**
Data drawn from CCHS 2003 and come from all health regions in Newfoundland and British Columbia, 14/37 regions in Ontario and 7/11 regions in Saskatchewan. Since 1996, Canadian and U.S. organizations have published guidelines for CRC screening in individuals who are 50 years of age and older and at average risk for developing the disease. Recommendations include performance of either annual or biannual FOBT, flexible sigmoidoscopy every five years, double contrast barium enema every five-to-ten years or colonoscopy every 10 years. National recommendations for the development of population-based CRC screening were published for Canada in 2002. Since then, several provinces have implemented small-scale pilot screening-program projects. In 2007, provinces
and territories began to formally announce their intentions to launch organized CRC screening programs and/or indicated CRC screening was an upcoming priority. Programs are currently at various stages of development, with some provinces still at the planning phase and others moving to expand their existing pilots. At the federal level, a pan-Canadian CRC screening network has been established to promote collaborative action aimed at facilitating the development of CRC screening programs across Canada.

**Chart 1.47**
Data from CANSIM table 105-4042. Includes females aged 18-69 who reported when they had their last Pap (Papanicolaou) smear test. Rates are age-standardized using the direct method and the 1991 Canadian Census population structure.

**Chart 1.48**
Ambulatory care sensitive conditions include:
- Grand mal status and other epileptic convulsions
- Chronic obstructive pulmonary diseases
- Asthma
- Heart failure and pulmonary edema
- Hypertension
- Angina
- Diabetes

Data exclude patients who died before discharge. Data age-standardized using direct method and 1991 Canadian census population structure.

**Chart 1.49**
The 2008 Commonwealth Fund International Health Policy Survey screened random samples of adults aged 18+ years to identify those who rated their health as fair or poor or who had a serious illness or disability, major surgery or had been hospitalized (for conditions other than childbirth) in the preceding two years. Full sample sizes: Australia (750), Canada (2,635), France (1,202), Germany (1,201), Netherlands (1,000), New Zealand (751), United Kingdom (1,200) and United States (1,205). Interviews were conducted by telephone between March and May 2008. The margin of sample error for country averages are approximately: +-4% for Australia, New Zealand and the Netherlands; +-3% for France, Germany, and the U.S.; and +-2% for Canada at the 95 percent confidence level.

This chart limited to respondents who had been hospitalized within the preceding two years; data include respondents who went to emergency department, were re-admitted to ward or both. This more limited sample was: Australia, 420; Canada, 1,265; France, 709; Germany, 697; Netherlands, 470; New Zealand, 436; U.K., 528; U.S., 554.

**Chart 1.50**
Calculated as number of caesarean sections per number of deliveries (live births and stillbirths), expressed as a percentage. Quebec data were unavailable for 2006-2007.

**Chart 2.1**

**Chart 2.5**

**Chart 2.6**

**Chart 2.8**

**Chart 2.9**

**Chart 2.11**

**Chart 2.13**
The 2008 Commonwealth Fund International Health Policy Survey screened random samples of adults aged 18+ years to identify those who rated their health as fair or poor or who had a serious illness or disability, major surgery or had been hospitalized (for conditions other than childbirth) in the preceding two years. Full sample sizes: Australia (750), Canada (2,635), France (1,202), Germany (1,201), Netherlands (1,000), New Zealand (751), United Kingdom (1,200) and United States (1,205). Interviews
were conducted by telephone between March and May 2008.

The 2007 Commonwealth Fund International Health Policy Survey was conducted by telephone in Australia (sample size 1,009), Canada (3,003), Germany (1,407), the Netherlands (1,557), New Zealand (1,000), United Kingdom (1,434) and United States (2,500). The survey consisted of interviews with representative samples of adults aged 18+ years.

The 2005 Commonwealth Fund International Health Policy Survey of Sicker Adults surveyed adults with health problems in six countries who met at least one of four criteria: rated their health as fair or poor; reported that they had a serious illness, injury, or disability that required intensive medical care in the past two years; reported that in the past two years they had major surgery; or had been hospitalized in the past two years. The sample size was 700-750 adults in Australia, Canada and New Zealand and 1,500 or more in the United Kingdom, United States and Germany. Interviews were conducted by telephone between March and May 2005.

The 2004 Commonwealth Fund International Health Policy Survey focused on primary-care and ambulatory-care experiences. It consisted of telephone interviews with random, representative samples of people age 18+ years: Australia (1,400), Canada (1,410), New Zealand (1,400), United Kingdom (3,061) and United States (1,401). Not all columns tally to 100 due to rounding errors and missing responses.

Chart 2.2
Data from CANSIM table 105-3024. Counts and percentages exclude non-responses. Data are not age standardized. Canada total does not include Yukon, the Northwest Territories and Nunavut.

Chart 2.3
Data from CANSIM table 105-3067. “Routine or ongoing care” refers to healthcare provided by a family or general physician, including annual check up, blood tests or routine care for an on-going illness. Regular office hours are 9:00 a.m. to 5:00 p.m. Monday to Friday; evenings are 5:00 p.m. to 9:00 p.m., Monday to Friday; and weekends are Saturday and Sunday from 9:00 a.m. to 9:00 p.m. Excludes non-responses.

Canadian Survey of Experiences with Primary Health Care (CSE-PHC) was conducted with Canadians aged 18+ years living in private dwellings in the 10 provinces and the three territories. Persons living on Indian reserves or Crown lands, residents of institutions, full-time members of the Canadian Armed Forces and residents of certain remote regions were excluded. The sample for this survey was drawn from the Canadian Community Health Survey (CCHS, record number 3226), Cycle 4.1, and consisted of 16,482 respondents. The response rate was 71.0%. Further details at: http://www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=5138&lang=en&db=imdb8&adm=8&dis=2

Chart 2.5
See Chart 2.1

Chart 2.6
See Chart 2.4

Chart 2.7
See Chart 2.4

Chart 2.8
See Chart 2.1

The percentage of respondents who indicated that they had used the emergency department in the preceding two years (that is, the denominator for this indicator) was: Australia, 52%; Canada, 64%; France, 39%; Germany, 38%; Netherlands, 28%; New Zealand, 46%; U.K. 41%; U.S. 58%.
Chart 2.9
See Chart 2.1

Chart 2.10
See Chart 2.4

Chart 2.11
See Chart 2.1

Chart 2.12
See Chart 2.4

Chart 2.13
See Chart 2.1

Chart 2.14
Data from CANSIM table 105-3002. Waiting times for specialist visits is defined as time between when individuals and their doctor decided that they should see a specialist and when they actually visited the specialist. Based on household population aged 15+ years reporting waiting times for services accessed in preceding 12 months. Data exclude non-responses.

Chart 2.15
Adults aged 18+ years. Excludes emergency cases and elective partial hip replacements and hip/knee resurfacing techniques. Includes all total hip and knee joint replacements (primary and revision); bilateral joints count as a single wait. See table for 50th and 90th percentile waits.

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For details on data definitions and differences in provincial datasets, see http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=PG_2010_E&cw_topic=2010&cw_rel=AR_1909_E
### Chart 2.16
Adults aged 18+ years. Excludes emergency cases. For first eye only; bilateral cataract removal counts as a single wait. See table for 50th and 90th percentile waits.

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<tr>
<td>SK</td>
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</tbody>
</table>


### Chart 2.17
Adults aged 18+ years. All new cases. Excludes emergency cases. Includes palliative care patients. See table for 50th and 90th percentile waits.

<table>
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<th>Radiation Therapy</th>
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</tbody>
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### Chart 2.18
Adults aged 18+ years. Excludes emergency cases. Includes CABG with and without valve replacement. See table for 50th and 90th percentile waits.

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<th>CABGs</th>
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Chart 2.19
Data from CANSIM Table 105-3004. Waiting times for selected diagnostic tests is defined as time between when individuals and their doctor decided to go ahead with the test and the day of the test. Based on household population aged 15+ years reporting waiting times for services accessed in preceding 12 months. Data exclude non-responses.

Chart 3.1

Chart 3.2
See Chart 3.1

Chart 3.3
The data are collected from diverse sources and include varying classes of financial information. The data are collected and classified according to methods established by a review committee. CIHI analysts and external experts continue to improve the comprehensiveness, accuracy and currency of the data, in order to provide the most complete and objective estimates possible. Further details available at: [http://secure.cihi.ca/cihiweb/products/nhex_2008_en.pdf](http://secure.cihi.ca/cihiweb/products/nhex_2008_en.pdf)

Chart 3.4
Head count. Included: persons who have completed studies in medicine at university level and who are licensed to practise; interns and resident physicians providing services under the supervision of other physicians; salaried and self-employed physicians; foreign physicians licensed to practise and actively practicing in the country. Data from Australia and Sweden 2005, other countries 2006.

Chart 3.5

Chart 3.7

Chart 3.9
Physician counts reflect the summation of data from two distinct sources: the total of “active” physicians from Scott’s Medical Database and resident counts from the Canadian Post-M.D. Education Registry (CAPER). Data as of December 31, 2006. Population estimates for 2006 from Statistics Canada.

Chart 3.6
Based on head count. A general practitioner is a physician who does not limit his/her practice to certain disease categories and assumes the responsibility for the provision of continuing and comprehensive care or referring to another health professional. Data from Australia and Sweden 2005, other countries 2006.

Chart 3.7
See Chart 3.5
Chart 3.8
Based on head count. A medical specialist is a physician who diagnoses and treats physical and mental disorders using specialist testing, diagnostic, medical and surgical techniques. He/she may limit his/her practice to certain disease categories or methods of treatment.

Chart 3.9
See Chart 3.5

Chart 3.10
“Active registered dentists” represents licensed general practice and certified specialist dentists as reported by the Canadian Dental Association. Population estimates for 2006 from Statistics Canada.

Chart 3.11
Based on head count. Included: persons who have completed studies in nursing and who are licensed to practice; salaried and self-employed nurses; foreign nurses licensed to practise and actively practicing in the country. Data from Australia and Sweden 2005, other countries 2006.

Chart 3.12
Employed, active registered nurses.

Chart 3.13
Australia figures are for 2005; U.K. figures are an estimate.

Chart 3.14

Chart 3.16
Includes medical imaging equipment in both hospitals and freestanding facilities. Includes CT scanners exclusively for cancer treatment and for research. Includes MRI scanners used exclusively for research. Number of scanners in Ontario and British Columbia is an estimate.

Chart 3.15
U.K. data are an estimate

Chart 3.17

Chart 3.19
See Chart 3.17

Chart 3.20
See Chart 3.18

Chart 3.21

Chart 3.22
Information from: retail sales of prescription-only drugs sold in Canada; IMS Health’s CompuScript Audit; IMS Health’s Anonymous Longitudinal Patient Database. Linking the data from these sources at the product level yielded province-specific estimates of number, size and cost of prescriptions. Population estimates from Statistics Canada.
Chart 4.1
The chart presents the number of people who receive care or are exposed to risk per patient safety event, with the exception of blood transfusion-related indicators, which present the number of blood transfusions per patient safety event. Sources: Gravel et al, 2007 Journal of Hospital Infection 66:243-48; Gravel et al (2007) American Journal of Infection Control 35:157-62; Discharge Abstract Database/Hospital Morbidity Database; Transfusion Transmitted Injuries Surveillance System Program Report, PHAC, 2005.

Chart 4.2
For further details, refer to the technical reports at http://hospitalreport.ca/downloads/year.html

Chart 4.3
The top five Beers drugs, by number of chronic users, were similar between the four provincial public drug programs. Overall, the top five were:
- Oral conjugated estrogens, used for hormone replacement
- Amitriptyline, an antidepressant
- Digoxin, used to treat congestive heart failure
- Oxybutynin, used to treat overactive bladders (incontinence)
- Temazepam, a benzodiazepine used to treat sleep disorders
Note that one-off prescriptions ranged from 25.2% in Manitoba to 31.3% in New Brunswick in 2005-2006. In all four provinces, the rate of chronic use of Beers drugs was highest among females and seniors aged 85 and older. Rates are age- and sex-standardized using a direct method of standardization based on the October 1, 2006 Canadian senior population. For further details, see CIHI, (2007c).

Chart 4.4
Chart 4.16
Chart 4.17
The 2008 Commonwealth Fund International Health Policy Survey screened random samples of adults aged 18+ years to identify those who rated their health as fair or poor or who had a serious illness or disability, major surgery or been hospitalized (for conditions other than childbirth) in the preceding two years. Full sample sizes: Australia (750), Canada (2,635), France (1,202), Germany (1,201), Netherlands (1,000), New Zealand (751), United Kingdom (1,200) and United States (1,205). Interviews were conducted by telephone between March and May 2008.

The 2005 Commonwealth Fund International Health Policy Survey of Sicker Adults surveyed adults with health problems in six countries who met at least one of four criteria: rated their health as fair or poor; reported that they had a serious illness, injury, or disability that required intensive medical care in the past two years; reported that in the past two years they had major surgery; or had been hospitalized in the past two years. The sample size was 700-750 adults in Australia, Canada and New Zealand and 1,500 or more in the United Kingdom, United States and Germany. Interviews were conducted by telephone between March and May 2005.

The 2002 Commonwealth Fund International Health Policy Survey of Adults with Health Problems conducted telephone interviews with adults who met at least one of the following criteria: Self-reported health status is fair or poor; serious illness in the past two years; hospitalized or had major surgery in the past two years. Sample size: Australia, 844; Canada, 750; New Zealand, 750; United Kingdom, 750; United States, 755. Survey conducted March 25-May 13, 2002.

Chart 4.5
Survey results are based on telephone interviews with nationally representative samples of the Canadian public, doctors, nurses, pharmacists and health administrators. Fielding of the questionnaire was conducted between October 3 and November 8, 2007. Sample Size 1,223.
Chart 4.6
Risk-adjusted rate of in-hospital hip fracture among acute-care inpatients age 65+ years, per 1,000 discharges. A logistic regression model is fitted with age, sex, whether a surgical procedure was provided and the following pre-admission comorbid conditions: cancer, seizure, syncope, stroke, coma, cardiac arrest, anoxic brain injury, poisoning, delirium and other psychosis, trauma and musculoskeletal/connective tissue disorder (MCC-8) as independent variables. Co-efficients derived from the logistic model are used to calculate the probability of in-hospital hip fracture for each case (episode). The expected number of in-hospital hip fractures of a region is the sum of these case probabilities for that region. The risk-adjusted in-hospital hip fracture rate (RAR) is calculated by dividing the observed number of in-hospital hip fractures of each region by the expected number of in-hospital hip fractures of the region and multiplying by the Canadian average rate. Further details at: http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=indicators_def_health_system_08_e#2_3

Chart 4.7
From the directory of the Canadian Neurosurgical Society and the Royal College of Physicians and Surgeon, 194 neurosurgeons were identified. Ten were ineligible because they were residents, fellows or not in active practice. Sample size 138 neurosurgeons (68% response rate).

Chart 4.8
Secondary analysis of pre-existing studies. For details see Muscedere et al, 2007.

Chart 4.9
Canada rates exclude Quebec.

Chart 4.10

Chart 4.11
Healthcare-associated MRSA case includes all newly identified MRSA isolates that were acquired in the participating CNISP hospitals. Note the CNISP Report also provides data on overall incidence rates (which are considerably higher than the healthcare-associated rates). Overall rates include community-associated infections. These were not reported in the charts, as they reflect factors outside the immediate control of safety system and healthcare organizations.

Chart 4.12
Prospective surveillance for *Clostridium difficile*-associated diarrhea (CDAD) was conducted among patients hospitalized in Canadian acute-care hospitals participating in CNISP between November 1, 2004 and April 30, 2005. A total of 34 hospitals participated in the surveillance activity including one non-CHEC hospital from Ontario. (This indicates hospitals affiliated with the CNISP.) Of these, 16 hospitals admitted pediatric patients under the age of 18 years. All hospitalized patients one year of age and older meeting the case definition for CDAD were eligible for enrollment. Both community-acquired (CA-CDAD) and healthcare-associated (HA-CDAD) cases were included. The following case definition was utilized for CDAD: 1) either diarrhea for more than two days; or fever, abdominal pain and/or ileuses with laboratory confirmation of a positive toxin assay for *C. difficile*; or 2) diagnosis of pseudomembranous colitis on colonoscopy or histological/pathological diagnosis of CDAD. The infection was considered healthcare-associated if the patient's symptoms occurred at least 72 hours after admission or symptoms resulted in re-admission of a patient who had been hospitalized within the previous two months of the current admission date, and who was not a resident in a chronic-care facility or nursing home. Patients who met the case definition for CDAD but did not meet the surveillance definition for healthcare-associated CDAD were considered to have acquired CDAD in the community. Incidence and rates of CDAD were calculated by province or region using patient admissions and patient-days for denominator. Further details available at: http://www.phac-aspc.gc.ca/nois-sinp/pdf/c-difficile_cnisp-pcsin-eng.pdf

Chart 4.13
The 2006 Commonwealth Fund International Health Policy Survey of Primary Care Physicians
was conducted by telephone and post between February and July 2006. The sample covered primary-care physicians and the sample sizes were as follows: Australia, 1,003; Canada, 578; Germany, 1,006; Netherlands, 931; New Zealand, 503; U.K., 1,063; U.S., 1,004.

Chart 4.14

Chart 4.15
The SIC survey is an online survey completed by hospital management staff as part of the Hospital Report: Acute Care project. The 2008 SIC was completed by 103 of 123 acute care hospitals in Ontario (84% participation rate). Questions regarding the provision of feedback to front-line staff and the presence of designated safety officers were included in the 2008 SIC survey but the results were not reported in the 2008 CIHI Patient Safety analysis in brief.

Chart 4.16
See Chart 4.4

Chart 4.17
See Chart 4.4

Chart 5.1
Chart 5.2
Chart 5.3
Chart 5.6
Chart 5.8
Chart 5.9
Chart 5.11
The 2008 Commonwealth Fund International Health Policy Survey screened random samples of adults aged 18+ years to identify those who rated their health as fair or poor; reported that they had a serious illness, injury, or disability that required intensive medical care in the past two years; reported that in the past two years they had major surgery; or had been hospitalized in the past two years. Full sample sizes: Australia (750), Canada (2,635), France (1,202), Germany (1,201), Netherlands (1,000), New Zealand (751), United Kingdom (1,200) and United States (1,205). Interviews were conducted by telephone between March and May 2008.

The 2005 Commonwealth Fund International Health Policy Survey of Sicker Adults surveyed adults with health problems in six countries who met at least one of four criteria: rated their health as fair or poor; reported that they had a serious illness, injury, or disability that required intensive medical care in the past two years; or reported that in the past two years they had major surgery or had been hospitalized. The sample size was 700-750 adults in Australia, Canada and New Zealand and 1,500 or more in the United Kingdom, United States and Germany.

Interviews were conducted by telephone between March and May 2005.

Chart 5.2
See Chart 5.1

Chart 5.3
See Chart 5.1

Chart 5.4
Chart 5.7
Chart 5.10
Chart 5.12
Canadian Survey of Experiences with Primary Health Care (CSE-PHC) was conducted with Canadians aged 18+ years living in private dwellings in the 10 provinces and the three territories. Persons living on Indian reserves or Crown lands, residents of institutions, full-time members of the Canadian Armed Forces and residents of certain remote regions were excluded. The sample for this survey was drawn from the Canadian Community Health Survey (CCHS, record number 3226), Cycle 4.1, and consisted of 16,482 respondents. The response rate was 71.0%. Further details at: http://www.statcan.gc.ca/cgi-bin/imdb/ p2SV.pl?Function=getSurvey&tSDDS=5138&lang=en&db=imdb&adm=8&dis=2
Mortality was tracked for more than a decade among a 15% sample of the adult population of Canada (approx 2.7 million) who completed the 1991 census long-form questionnaire. During the follow-up period (June 4, 1991 to December 31, 2001), there were more than 260,000 deaths in the sample. For further details see Wilkins et al., 2008.
Chart 6.9
See Chart 6.4

Chart 6.10

Chart 6.11
See Chart 6.4

Chart 6.12

Chart 6.13
See Chart 6.4

Chart 6.14
See Chart 6.4

Chart 6.15
Computerized laboratory data from six of the nine geographically defined health regions in Alberta covering more than 8% of the region’s population. Includes residents aged 20+ years who had 1 or more serum creatinine level made during July 1, 2003-June 30, 2004. Excluded kidney transplant recipients. For further details, see Gao et al., 2008.

Chart 6.16
Data drawn from the Saskatchewan Diabetes Database (SDD) and includes those who had at least one HbA1c test done (or one LDL cholesterol measurement) in the measurement year. Lab records with missing test data were excluded. For further details see: http://www.hqc.sk.ca/download.jsp?2z6ed94Gr0iMC4qBWunaBDBIzBf0QfLQkUwK4QBZaJukPeUN9CnxMA==
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<td>Ambulatory care sensitive conditions</td>
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<td>AHRQ</td>
<td>Agency for Healthcare Research and Quality</td>
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<td>Acute myocardial infarction</td>
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<td>Age-standardized mortality rate</td>
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<td>CABG</td>
<td>Coronary artery bypass graft</td>
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<td>CAEP</td>
<td>Canadian Association of Emergency Physicians</td>
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<td>CAPER</td>
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<td>Canadian Patient Safety Institute</td>
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<td>DTN</td>
<td>Door to needle</td>
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<td>European Antimicrobial Resistance Surveillance System</td>
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<td>Electronic health record</td>
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<td>Electronic patient record</td>
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<td>FOBT</td>
<td>Fecal occult blood test</td>
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<td>Gross domestic product</td>
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<td>Institute for Clinical Evaluative Sciences</td>
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<td>Medication error</td>
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<td>Manitoba Immunization Monitoring System</td>
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<td>MRSA</td>
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<tr>
<td>NACRS</td>
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<td>NPS</td>
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<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<td>PHAC</td>
<td>Public Health Agency of Canada</td>
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<td>PMR</td>
<td>Premature mortality rate</td>
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<td>PPP</td>
<td>Purchase price parity</td>
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<td>PROM</td>
<td>Patient-reported outcome measure</td>
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<td>PSA</td>
<td>Prostate-specific antigen</td>
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<td>PYLL</td>
<td>Potential years of life lost</td>
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<td>RAR</td>
<td>Risk-adjusted rate</td>
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<tr>
<td>RSR</td>
<td>Relative survival ratio</td>
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<tr>
<td>rTPA</td>
<td>Recombinant tissue plasminogen activator</td>
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<td>SES</td>
<td>Socio-economic status</td>
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<td>System of Health Accounts</td>
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<td>SIC</td>
<td>System Integration and Change survey (Ontario)</td>
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<td>TIA</td>
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<td>UK</td>
<td>United Kingdom</td>
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<td>US</td>
<td>United States</td>
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<tr>
<td>UTI</td>
<td>Urinary tract infection</td>
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<td>VAP</td>
<td>Ventilator-associated pneumonia</td>
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<td>WHO</td>
<td>World Health Organization</td>
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REFERENCES


Canadian EMR (online). Available online at: http://www.canadianemr.ca/


Conference Board of Canada (online b) Mortality Due Mental Disorders. Available online at: http://www.conferenceboard.ca/HCP/Details/Health/mortality-mental-disorders.aspx [last accessed May 22, 2009]

CPSI (online) Overview. Available online at: http://www.patientsafetyinstitute.ca/English/About/overview/Pages/default.aspx [last accessed May 22, 2009]


Statistics Canada (online b) *Five-year relative survival rate.* Available online at: http://www.statcan.gc.ca/pub/82-401-x/2006000/considerations/hlt/4064333-eng.htm [last accessed May 22, 2009]


