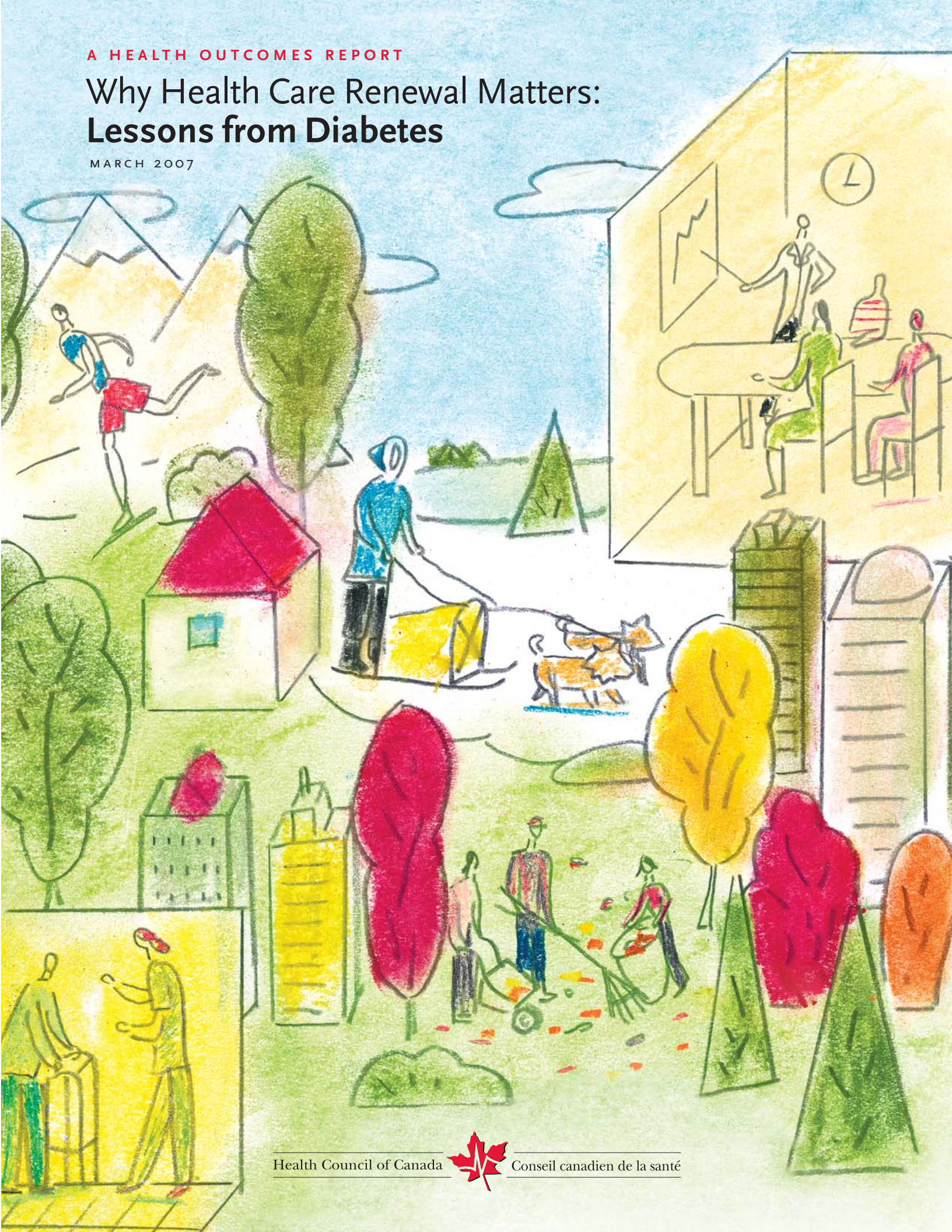
A HEALTH OUTCOMES REPORT

Why Health Care Renewal Matters: **Lessons from Diabetes**

MARCH 2007



Health Council of Canada | Conseil canadien de la santé

TABLE OF CONTENTS

Production of this report has been made possible through a financial contribution from Health Canada. The views expressed herein represent the views of the Health Council of Canada acting within its sole authority and not under the control or supervision of Health Canada. This publication does not necessarily represent the views of Health Canada or any provincial or territorial government.

To reach the Health Council of Canada:

Telephone: 416-481-7397
Facsimile: 416-481-1381
Suite 900, 90 Eglinton Avenue East
Toronto, ON M4P 2Y3
www.healthcouncilcanada.ca

Why Health Care Renewal Matters: Lessons from Diabetes

March 2007

ISBN 0-9780488-2-2

Cette publication est aussi disponible en français.

Our health care system is undergoing important changes – changes meant to improve the quality of care. The quality of health care can have profound effects on the quality of life of people with chronic health conditions. Learning from diabetes – one of many chronic conditions affecting Canadians – shows us in very human terms why this transformation matters and whether changes so far are on course. What have we learned?


CLINIC

LESSON ONE

The way we now provide primary health care leaves too many people with diabetes vulnerable to serious health complications that could be avoided. A redesign of the traditional family doctor's practice – to introduce teams, technology and other tools for change – will help achieve better care and help keep Canadians healthier.

Roughly one in 20 Canadians have type 2 diabetes, a disease that is largely preventable but increasing among children as well as adults. Three-quarters of people with diabetes also have other chronic health conditions such as heart disease and depression. Diabetes shortens life expectancy and the number of years people live in good health.

Research shows that when people with diabetes get better quality care, they are less likely to have serious complications. Health care in Canada needs to move from a "find it and fix it" approach to "prevent it, find it, manage it"– to better stem the rising tide of chronic health conditions.

LESSON TWO

Trends in the growth of diabetes include disturbing inequalities for some groups of Canadians. These inequalities could worsen unless we invest in greater preventive care for people at high risk of developing diabetes.

Canadians are much more likely to have diabetes if they have low income or belong to an Aboriginal community or certain ethnic groups.

Screening programs can identify people at high risk for diabetes and connect them with information, services and health care to prevent or delay the onset of disease. But those programs and services must be in place.

LESSON THREE

We have tremendous untapped potential to prevent chronic health conditions in Canada. To reduce smoking, it has taken over a generation for us to see real change. We can do the same for healthy eating and exercise, but it will take sustained action within and beyond the traditional boundaries of health care.

After 12 years of sustained effort, the Kahnawake Schools Diabetes Prevention Program has put the brakes to the persistent increase in new cases of diabetes in a First Nations community near Montreal. Successful programs provide models that should become the basis for widespread change in how we prevent and care for chronic health conditions like diabetes.

FOREWORD

In this report, the first in a series on health outcomes, we show how health care system renewal can have profound, practical and positive effects on the health and quality of life of Canadians with chronic health conditions such as type 2 diabetes. Measuring and monitoring health outcomes helps us understand where the country needs to act and how.

To help transform the health care system that Canadians rely on and pay for, the federal government committed more than $70 billion through agreements reached in 2003 and 2004 with the provinces and territories. The Health Council of Canada was mandated to monitor the progress of that transformation and to report on the individual and collective health of Canadians, as well as the sustainability of the system. In this report, the first in a series on health outcomes, we show how health care system renewal can have profound, practical – and positive – effects on the health and quality of life of Canadians with chronic health conditions such as type 2 diabetes. Health care analyses often focus heavily on financial costs. With this report, we begin to see in very human terms why health care renewal matters.

The projected surge in chronic health conditions could cost the health care system dearly and inhibit the quality of life of people with multiple health conditions and those with lower socio-economic backgrounds. These compelling realities helped the Council decide to focus first on type 2 diabetes as an example of how changes to the health care system and health policy can improve health outcomes. This report also notes that there are key influences outside of the traditional health care system – income and social and physical environments, for instance – that play a role in the complex challenge of preventing and curbing chronic health conditions.

The evidence this report presents on the extent of chronic health conditions in Canada and the current quality of care should give us pause. But, more importantly, it must compel us to act. Governments, health care managers and providers, and individual Canadians should use all available levers to do what can be done to curb chronic health conditions now. Above all, this means reorganizing and revitalizing primary health care so that responsibility for promoting health and preventing disease is part of our primary health care process. It also means providing appropriate tools like information systems and electronic health records. These are all commitments the First Ministers made in their 2003 and 2004 health care agreements.

The Health Council recently reported in its annual monitoring report that, while governments are introducing versions of team-based or collaborative care into their primary health care systems, few Canadians have experienced any concrete differences in how they receive their primary health care. Most still do not have access to truly interprofessional teams. Nor is there yet widespread use of electronic patient health records or electronic systems that help clinicians make evidence-based decisions in care. And that is particularly troubling for people with multiple chronic health conditions who need a wide range of services, from prevention to treatment to education to support for healthy living, if they are to prevent or delay avoidable complications. Reconfiguring our primary health care system can make it more likely that people with type 2 diabetes will maintain their vision, avoid amputations, or prevent a heart attack.

This report has cautionary words about the care that people with chronic health conditions in Canada receive, but it also shines a light on exemplary projects and services in quality diabetes care that are changing health outcomes – and the quality of people's lives. For example, in a Mohawk First Nation in Quebec and in collaboratives on the west and east coasts, communities of providers, individuals, health policy managers and planners have solid results to show for the changes to which they have committed.

Chronic disease prevention and management is a huge challenge for the health care system. Measuring and monitoring health outcomes helps us understand where we need to act and how. Our examination of an increasingly prevalent and problematic chronic health condition has revealed what happens when progress in health care renewal stalls, efforts dwindle, or commitment wanes. We also see what happens when commitments are kept, momentum is maintained, and connections between health and health care are understood and acted on.

Jeanne Besner, **RN PhD**
Chair, Health Council of Canada

Why are we reporting on health outcomes?

In defining the role of the Health Council of Canada, Canada's First Ministers gave the Council the task of reporting on health outcomes as one way to monitor the impact of changes underway in our health care system. This report launches a series of publications to meet this aspect of our mandate.

What are *health outcomes?* They are a measure of the effectiveness of our health care system and of the impact of public policies that influence health. A health outcome, for example, could be the number of Canadians with diabetes whose blood sugar levels and blood pressure improve after receiving services from a health care team. Or it could be the number of Canadians who quit smoking after laws about cigarette sales come into force. Health outcomes are the result of services, programs and policies that influence our health.

Health care in Canada is in the midst of major change. A series of accords by the federal, provincial and territorial governments has laid out the direction of that change: towards primary health care delivered by teams made up of a range of health care professionals; towards information technology to streamline the flow of vital information for patients and their care providers; towards preventing chronic health conditions; and towards helping patients with chronic disease have the best possible quality of life.

With this report, the Health Council hopes to illustrate why the changes envisioned in the accords matter to all Canadians. They matter because changing how the health care system works can change health outcomes. These changes matter because they have the potential to improve the health of Canadians and to support the sustainability of our health care system.

This report looks at the roles of four players in the health care system: public-policy makers; health care system managers; health care providers; and individual Canadians, their families and communities. These four groups affect:

- how much people know about their health and how to prevent illness;
- how and when people seek needed health care;
- how appropriately health care meets people's needs;
- how effectively people are empowered to manage their own health; and
- how healthy people are.

We've reviewed research evidence and conclude that Canada needs to take action on health outcomes from two perspectives: a *population health perspective,* to promote health and reduce risk of illness among Canadians generally and among our vulnerable populations; and a *health services perspective,* to ensure that health care reflects the best available knowledge and is appropriate and accessible to meet Canadians' needs. Given that the mandate of the Health Council is to monitor and report on health care renewal in Canada, this report uses primarily the lens of health services, although we stress that improving health outcomes for Canadians will also require a population health approach to influence some of the most important determinants of our nation's health.

Why focus on diabetes?

To help us understand whether health care renewal is improving health outcomes for Canadians, we chose to focus on what we can learn from the care and prevention of chronic health conditions – in particular type 2 diabetes.

Chronic health conditions affect nearly one in three Canadians, and diabetes, though largely preventable, is on the rise.

At least 1.3 million Canadians have diabetes, or almost five per cent of the population, up from three per cent a decade ago. Experts estimate that at least another five per cent of adults in Canada have either diabetes or pre-diabetes (a precursor condition) but don't know it, so the actual number of people with diabetes is likely even higher. Canadian children are increasingly developing type 2 diabetes, formerly considered a disease of adults and seniors. If trends continue – with our population inactive, overweight and aging, and an estimated 60,000 new cases of diabetes diagnosed each year – the number of Canadians diagnosed with diabetes is expected to nearly double by 2016, to 2.4 million, far outpacing population growth.

The World Health Organization estimates that 90 per cent of diabetes cases could be prevented through a healthy diet, regular physical activity, and not smoking. These same efforts could prevent other chronic health conditions, such as heart disease, that share the same risk factors. Not surprising then, more than one-third of Canadians with chronic health conditions have multiple long-term health problems.

Three-quarters of Canadians with diabetes also have other chronic health conditions, and many suffer serious but avoidable complications.
Diabetes, one of the leading causes of death in Canada, shortens life expectancy and the number of years people live in good health. It damages blood vessels and nerves which can lead to heart disease, kidney failure, blindness, and limb amputations. But these outcomes are not inevitable. The quality of health care that people with diabetes receive today matters a great deal in helping them avoid related health problems in the future.

Inequalities in health outcomes in Canada are evident when we look at chronic health conditions, diabetes in particular.
Aboriginal communities and lower-income people in Canada are at particularly high risk for developing a range of chronic health conditions including diabetes. Depending on the age group, First Nations adults are two to eight times more likely to have diabetes than Canadians generally, and they also have substantially higher rates of serious complications from diabetes, including kidney failure, foot amputations, heart disease and infectious disease. In this report, the Health Council profiles an initiative in northern Manitoba – the Island Lake Regional Renal Health Program – developed in response to the high rates of kidney failure in a remote First Nations region. And we take a look at the Kahnawake Schools Diabetes Prevention Program which, after 12 years of sustained effort, has put the brakes to the persistent increase in new cases of diabetes in that Mohawk First Nation community near Montreal.

The connection between health and wealth is also important in understanding how to influence health outcomes. The poorest Canadians are almost three times as likely to have multiple chronic health conditions, including diabetes, as the highest-income Canadians, and the ratio steps down steadily as family income goes up.

Certain ethnic groups that make up increasing proportions of the Canadian mosaic – people of South Asian, Asian, Latin American, and African descent – have high rates of diabetes. An innovative approach in Ontario, the Latin American Diabetes Program of London's InterCommunity Health Centre, is improving health outcomes for immigrants with diabetes by tackling the complex socio-economic factors (language, culture, and income) that can prevent them from accessing and benefiting from mainstream health care.

Diabetes represents a significant health and economic burden for Canada.
Overall, chronic health conditions cost the Canadian economy an estimated $80 billion each year. And the cost of caring for ever-larger numbers of Canadians with diabetes is expected to soar in the next decade – due to the mounting numbers of Canadians with diabetes and its complications. People with diabetes plus three or more other chronic health conditions use health care services at least three times more intensively than the national average. While it's positive that our health care system is serving people in need, the cost implications associated with the escalating demand for complex care are enormous.

But there is good news also: the evidence is clear that people with diabetes need less intensive care in the future if they receive the right care now.

How do we provide care now and how can we do it better?

The Health Council reviewed Canadian and international research on the quality of care for people with diabetes and other chronic health conditions. We learned that, despite the tremendous efforts and good intentions invested in delivering health care in Canada, the way that care is currently provided leaves too many people with chronic health conditions vulnerable to complications that could be avoided. Only half of family physicians in Canada feel their practices are well-prepared to handle patients with multiple chronic health conditions, the lowest proportion among seven countries surveyed. There is a breakdown between expert recommendations on lab tests and procedures and the actual number that are performed. And there is a breakdown between poor test results and action on that information.

The following results are consistent across international, national, provincial and regional studies in Canada:

> **Less than half of Canadians with diabetes…** get all the lab tests and procedures that experts recommend to monitor blood sugar, blood pressure, cholesterol, kidney health, vision, and foot health. Yet research suggests that when people with diabetes receive higher levels of preventive care, their health is better than those who don't. For example, when people with diabetes receive more of the recommended lab tests and procedures, they are less likely to need to be admitted to a hospital. Internationally, there are other publicly funded health care systems in which the vast majority of people with diabetes (up to 80 per cent) receive all the recommended lab tests and procedures. There is no reason Canada cannot achieve at least the same quality of care.

> **Getting the appropriate lab tests and procedures…** does not necessarily require that people simply see their doctor more often. Research into the care of 20,000 patients with diabetes in British Columbia found that, regardless of the number of times people saw their doctor, no more than 50 per cent on average received the recommended tests for blood sugar, kidney function and eye health, and that quality of care reached a plateau at about five visits a year. We may need more health care providers – or more of the right kind of providers – for a variety of reasons, but that alone will not improve health outcomes. It's what takes place during those health care visits that matters more. This evidence from BC underlines the importance of changing how we deliver care.

> **Canadians with diabetes appear to have poor control…** of key risk conditions that lead to complications. For example, more than half of Canadians with diabetes have poor cardiovascular health and half do not achieve recommended levels of blood sugar – conditions that have been shown to improve when health care providers deliver recommended care. Research evidence is clear that even modest improvements in blood pressure, cholesterol, and blood sugar can result in dramatic reductions in the risk of heart attack, kidney disease, eye damage, and death. There is no reason Canada cannot achieve at least moderate improvements in quality of care – and reap the benefits in terms of the health of Canadians.

> **Medical research has established two approaches…** both highly effective, either separately or in combination, that can help people with diabetes prevent complications. Medications can control blood sugar and cardiovascular health, and lifestyle changes to improve eating habits and physical activity can lead to weight loss and improvements in blood sugar, cholesterol, and blood pressure. Yet the use of effective drugs for diabetes care is low in Canada, particularly in the combinations recommended for people with diabetes who have also been diagnosed with heart or artery disease. Authors of a national evaluation of diabetes care in Canada concluded that "current treatment approaches are not intensive enough for a large proportion of patients, especially those with longer duration of disease."

> **While close to 80 per cent of family physicians…** advise patients with diabetes to eat better and be more active, only about half refer their patients for more active support such as nutrition or fitness counselling. Among the obstacles physicians note are lack of time, lack of information, and lack of access to appropriate services in the community. Health care providers and health care system managers can do more to help patients through the challenges of lifestyle changes to prevent complications from diabetes, but the influence of public policy (for example, to support healthy nutrition for low-income families and those living in remote parts of Canada) is also critical.

When people with diabetes receive higher levels of recommended care, it pays off in terms of health and the costs of care. So where should we invest our efforts to improve care and health outcomes for Canadians with chronic health conditions like diabetes?

Interprofessional teams and case management improve the quality of care.

There is strong evidence that delivering care through teams made up of providers such as nurses, pharmacists, nutritionists and physicians helps patients with diabetes improve their blood sugar levels. Interprofessional teams – those with a range of providers actively engaged in care – can produce better outcomes for their patients. Such teams are particularly effective at delivering quality care to people with chronic health conditions when the team designates a case manager, someone who helps coordinate care for individual patients. In the health care accords of 2003 and 2004, Canada's First Ministers set a goal that 50 per cent of Canadians will have access to primary health care teams by 2011. Yet, as the Health Council describes in our February 2007 report, *Health Care Renewal in Canada: Measuring Up?*, progress towards this modest goal is too slow: few Canadians have routine access to teams of health care professionals where they receive health care. Poor health for Canadians with diabetes is one result.

Information technology helps interprofessional health care teams do their best work – and helps health care system managers and policy makers know what's working to improve health outcomes.

Electronic health records and other health information systems are important tools to improve the quality of care. These tools make a difference in people's health – by reminding providers and patients about follow-up care, by reducing medical mistakes, and by providing data to evaluate whether changes in care are working to improve health outcomes. Yet only one in five family physicians in Canada have access to electronic systems for patient care, the lowest proportion among 11 countries recently compared on several aspects of care. As well, most of the systems that do exist in Canada produce only a partial electronic health record. We can book travel and pay our bills electronically, but most of our health care still relies on paper records.

Collaboratives are an effective process to stimulate changes in how care is delivered.

Several provinces have established a process called collaboratives to improve the quality of care for people with chronic health conditions. A collaborative brings together health care providers and health care system managers to collectively set goals aimed at bringing patient care closer to the standard set by expert guidelines (as measured by, for example, the percentage of people with diabetes who achieve recommended blood sugar levels and cardiovascular health). Health care providers are given access to learning sessions and quality improvement tools such as electronic systems that help to trigger appropriate steps in care and that also allow them to track how their patients are doing as a group. Financial incentives, to reward health care providers for changing the way they work, can be an effective part of this process. Yet only 44 per cent of Canadian

There is strong evidence that delivering care through teams made up of providers such as nurses, pharmacists, nutritionists and physicians helps patients with diabetes improve their blood sugar levels.

family physicians report that they have been trained in tools and methods to improve quality of care, and far fewer receive financial incentives to manage care for patients with chronic health conditions – a poor showing in an international comparison of primary health care.

In this report, the Health Council profiles collaboratives that have seen impressive results in Saskatchewan and British Columbia. We also describe how Newfoundland and Labrador has recently adopted this model. More patients are getting the appropriate tests and medications, more patients have reduced their blood sugar and blood pressure, and fewer are being admitted to hospital. Financially as well, collaboratives seem to pay dividends: BC has observed reductions in overall per-patient costs for diabetes care.

Prevention: what works?

If more and more Canadians continue to develop diabetes, the gains we can make in improving health outcomes for people with the disease will be overtaken by the sheer numbers of people who need care. So as much as we need to help those who have diabetes, we need to focus equally on preventing people from developing chronic diseases in the first place. We can improve health outcomes for Canadians who have diabetes, but we can also stop the march of this epidemic.

In our review of research and current initiatives on prevention of chronic health conditions, some key themes emerged.

> **While targeted screening can identify people…** with undiagnosed diabetes, it can also identify people with pre-diabetes, a precursor condition that indicates they have a high risk of developing the disease. Early identification provides important opportunities to stop or delay the onset of disease by connecting people with appropriate care. Screening of high-risk ethnic groups in Canada (Aboriginal people, South Asians, Latin Americans, among others) is one area where we need to make greater investments.

> **Lifestyle changes may be difficult to achieve…** but they work, and they have the added benefit of preventing a range of chronic health conditions, not just diabetes. Two major studies found that with just a modest weight loss (about 4 kg) over a period of three to six years, close to 60 per cent of people at high risk of diabetes were able to prevent or delay the onset of disease.

> **Helping people make these changes…** requires sustained, coordinated action on many fronts, both inside and outside the health care system and traditional health promotion activities. Action must go beyond the conventional boundaries of health care, into policy areas that affect the kinds of food available in communities and the levels of physical activity in people's daily lives. A great deal of effort is underway in Canada to encourage healthy lifestyles. Some initiatives – like the ActNow BC program profiled in this report – set clear targets, integrate activities across government departments, and harness the energy of community programs. Others are less comprehensive. The level of overall effort across Canada is encouraging but it should be considered just a beginning.

RECOMMENDATIONS

Our health care services have evolved to a "find it and fix it" orientation, which may work well for short-term health problems but does not match the complex, ongoing needs of people with chronic health conditions. This approach is piecemeal and out of date, and as a result, the care we provide is not satisfactory.

A major conversion – a "prevent it, find it, manage it" approach – is the vision behind current efforts to transform primary health care in Canada. This report helps to illustrate the value, in human terms, of this transformation. Health care renewal has the potential to stem the tide of Canadians with chronic health conditions and to keep our health care system sustainable for the future. First Ministers got it right in making commitments to transform health care in Canada, and the Romanow Commission on the Future of Health Care in Canada found that Canadians understand and support the value of making primary health care more coordinated, more interprofessional, and more focused on prevention. We cannot overstate the importance of not losing sight of these commitments and the necessity of accelerating the pace of change. We urge public-policy makers, health care system managers, and health care providers to work together with Canadians to make it happen. These are our recommendations:

1. Change the way we organize and deliver health care for people with chronic health conditions such as diabetes. In other words, speed up primary health care renewal. Essential elements of this transformation include rapid development and targeted deployment of:

> interprofessional teams, including case managers;
> electronic health records and other electronic information systems;
> support systems to help patients effectively care for themselves and reduce their risks for complications; and
> proven techniques to improve quality of care, such as collaborative goal-setting, financial incentives for providers, and regular feedback to providers and patients on their progress in making changes.

A redesign of the traditional family doctor's practice – to introduce teams, technology and other tools for change – will help achieve better care for patients with chronic health conditions and, ultimately, help promote better health outcomes.

2. Provide better care for high-risk populations. This includes employing services to identify people at risk, to help them prevent chronic health conditions, and to help patients manage their disease and prevent complications. Disturbing inequalities in the prevalence of diabetes and other chronic health conditions among Canada's Aboriginal populations, certain high-risk ethnic groups, and low-income families are not a fact of life that we must simply accept. The way public policy is designed and health care services are provided can make a difference. As a country, we must set specific targets to improve health and health care for both the general public and vulnerable populations, and report publicly on progress towards meeting them.

Programs that successfully reach high-risk people and break down barriers to care and prevention provide models that should be adopted widely. We describe three such programs: the Kahnawake Schools Diabetes Prevention Program in Quebec; the Latin American Diabetes Program in London, Ontario; and Manitoba's Island Lake Regional Renal Health Program.

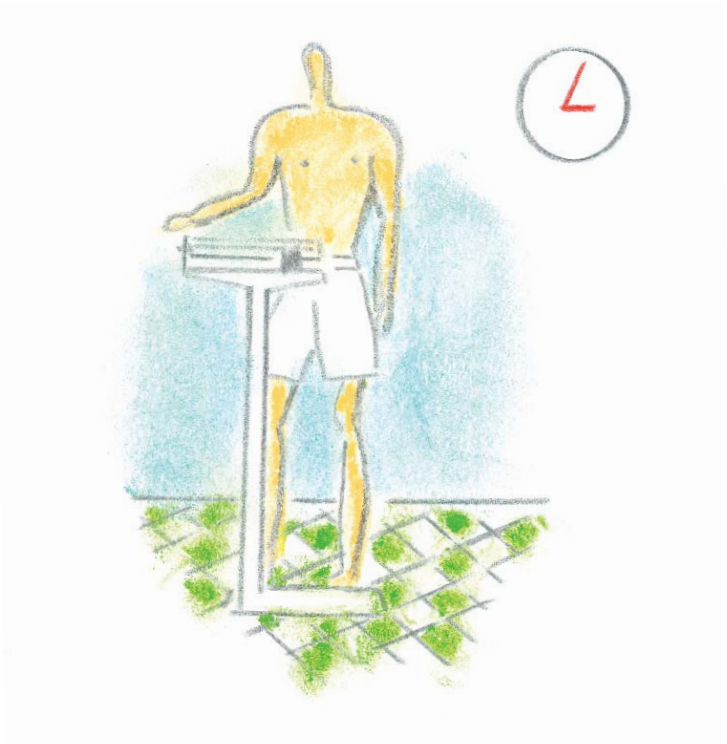
3. Coordinate sustained action on prevention. Prevention can work. Promotion of healthy living to prevent chronic health conditions requires a strategic combination of public policy, targeted clinical care, and a range of community-based campaigns to motivate people to change their eating and exercise habits. This is no small task. Even with the massive efforts to reduce smoking, it has taken over a generation for us to see real change in people's smoking habits. In the looming epidemic of diabetes, Canada faces an unprecedented need for public investments in prevention. These investments must be informed, creative, collective, and sustained, and they must embrace:

> coordination across government ministries;
> change both within health care and beyond, to influence the social systems that affect our lifestyles;
> recognition of the roles of industry, community services, and individual Canadians and their families;
> continued research to show us what is working, what is not, and why; and
> a shift from pilot projects to system transformation, when these projects have been shown to work.

What we found through our research for this report is cause for concern – namely, that the care that Canadians receive for diabetes is simply not good enough and that the country has tremendous untapped potential for prevention. Without attention and action, current trends will result in soaring numbers of Canadians with chronic health conditions. The vision of the First Ministers to renew health care and promote healthy living is in alignment with these needs. It's now time to make their vision a reality.

WHAT ARE HEALTH OUTCOMES? How does the health care system affect our health? Health outcomes are a way of measuring the effectiveness of care and the impact of public policies that influence health.

1



Health outcomes are a measure of the health and illness among Canadians that follow from the use of our health care system, as well as from programs and policies that affect our health and well-being. A health outcome, for example, could be the number of Canadians with diabetes whose sugar levels and blood pressure improve after receiving services from a health care team. It could be the number of Canadians who quit smoking after they participate in a smoking cessation program or after the implementation of a policy that requires cigarette packages to warn about the health consequences of smoking. In short, health outcomes are the results of services, programs and policies that influence health. They are a measure of the effectiveness of our health care system and of the impact of public policies.

This is the first in a series of reports in which the Health Council will examine health outcomes as a marker of the effectiveness of our health care system and the speed of health care renewal. Changing how the health care system works can change health outcomes – so too can changing public policies that influence other determinants of health. The level of health and patterns of illness among Canadians are a culmination of the traits and behaviours of individuals, combined with community contexts, historic experiences, and the availability and use of health care. Traits (such as genetics, gender, age), behaviours and lifestyles clearly impact the health of individuals. Contexts matter – physical, social and economic environments influence the health of individuals and affect the distribution of health across populations. Experiences also matter – experiences in childhood and adolescence affect lifelong health, as do education, employment and income. Access to and quality of health care in Canada also matter – these services should help to prevent acute or chronic health conditions, shorten the duration of illness and reduce the risk of complications.

By international standards Canadians are quite healthy. For example, the average life expectancy at birth in Canada is nearly 80 years, slightly higher than the overall average among the 30 countries in the Organisation of Economic Co-operation and Development.[1] However, not all groups within this country share in that good health. Today, one in three Canadians has at least one of the seven most common chronic health conditions, and trends in risk factors for these conditions suggest that the numbers will continue to rise. As noted in Chapter 2, where we look closely at diabetes as an example of a growing chronic health condition, inequities in health status associated with income and race are particularly troubling.

The Health Council of Canada believes that if individual Canadians take responsibility for their health and if those responsible for leading and delivering public services change the way they organize and provide health care, our population's health will improve and illness will decrease among Canadians. Moving health care renewal decisively in this direction will also help to ensure the sustainability of our health care system in Canada.

In this report, the Health Council explores what can be learned from the care and prevention of diabetes, one example of a chronic health condition, about how to improve health outcomes. We look at the roles of four players in the health care system to help illustrate the current state of outcomes for people with chronic health conditions in Canada and to outline some options for improving health outcomes.

In this report, diabetes refers to type 2 diabetes, which is largely preventable and affects one in 20 Canadians.

The four players are:

- public-policy makers;
- health care system managers;
- health care providers; and
- individuals, families and communities.

Each group has the potential to improve the health outcomes of Canadians. There are others who also influence health and well-being, such as employers and non-governmental organizations, but for the purposes of this report, we focus on these four major groups.

Public-policy makers include politicians, public servants working in all government ministries, officials from regional health authorities and regulatory organizations, and board members of health care institutions. They make decisions that influence the environments in which Canadians live. By implementing those decisions, public-policy makers directly influence the social and economic factors that are important to the health of Canadians and the contexts in which health care system managers and health care providers work. For example, government decisions and regulations influence the availability and quality of healthy food, medications, public recreation, child care, education and health promotion programs, as well as health care services. Governments also have a powerful influence on the nature and speed of health care renewal, which affects the accessibility and the quality of health care.

Health care system managers are administrators at regional health authorities, hospitals, public health units and community health centres. They play a role in health outcomes by planning, designing and overseeing public services, programs and initiatives. By their actions and decisions, these managers influence accessibility to necessary health services, the volume and types of services used across the country, and the experiences people have with that care.

QUALITY OF CARE

In this report, the Council frequently refers to *quality of care*. Quality health care means doing the right thing at the right time in the right way for the right person. Quality of care can be measured in a number of ways, for example:

- How do people experience care?
- Is care coordinated over time?
- Is care safe?
- Does care match expert-recommended guidelines?
- How successfully does care prevent avoidable health problems?
- Is care efficient?
- Does care provide good value for money?

Each day, thousands of **health care providers** in Canada directly influence health outcomes for patients in the way they deliver care. Their decisions and actions also affect access to services, the volume and type of services delivered, and the quality of experiences that people have with health care.

Individuals, families and communities play a pivotal role in shaping the health of Canadians. There are some things that influence individuals' health that they cannot change, such as their age and genes, or things that may be beyond their ability to change, such as their income or where they live. But there are also things that, with the right kind of information and supports, Canadians can do differently each day to change the future path of their own health and that of their families and communities. Each day people make decisions and behave in ways that affect their health and that of their families and communities. Communities and the social networks within them also influence the health of individuals and families.

Ultimately, all of these groups help to determine the level of health and patterns of illness in Canada and the sustainability of our health care system. For example, these four groups affect:

- how much people know about their health and how to prevent illness;
- how and when people seek needed health care;
- how effectively people, families and communities are empowered to manage their own health; and
- how healthy people are.

Evidence suggests that the key to improving health outcomes for all Canadians is to tackle the issues from at least two perspectives. We need to address inequalities in the social and economic factors that affect health (a population health perspective). And, we also need to ensure that appropriate, high-quality health services are equally accessible to everyone (a health services perspective). Measuring and monitoring health outcomes helps us understand where we need to act and how.

Reference

1 Organisation of Economic Co-operation and Development. (2006). OECD Health Data 2006 – Frequently Requested Data: Health status (mortality) – life expectancy at birth, females, males and total population [Excel files; 2003 data]. *www.oecd.org*.

Each day, thousands of health care providers in Canada directly influence health outcomes for patients in the way they deliver care. Their decisions and actions affect access to services, the volume and type of services delivered, and the quality of experiences.

WHY FOCUS ON DIABETES? Diabetes and related chronic health conditions are on the rise, due to an aging, inactive and overweight population. Chronic health conditions affect nearly one in three Canadians.

2

The Health Council has been charged with the task of reporting on how well health care renewal is working in Canada and whether system renewal is improving health outcomes for Canadians. To better understand the system, we have chosen to focus on chronic health conditions – and type 2 diabetes in particular. We made this choice for four key reasons:

1. Chronic health conditions affect nearly one in three Canadians, and diabetes, though largely preventable, is on the rise. At least 1.3 million Canadians have diabetes, or almost five per cent of the population, up from three per cent a decade ago. In the face of increasing prevalence of type 2 diabetes worldwide among children as well as adults, the World Health Organization estimates that 90 per cent of cases could be prevented through a healthy diet, regular physical activity, and not smoking.

2. Most people with diabetes also have other chronic health conditions, and many suffer serious but avoidable complications. Related chronic health conditions, such as heart disease, stroke, and depression, represent the biggest factor in reduced quality of life for people with diabetes. The quality of health care matters a great deal in helping people avoid these complications.

3. Inequalities in health outcomes in Canada are evident for chronic health conditions generally, and for diabetes in particular. Aboriginal communities and people in Canada with lower incomes are at particularly high risk for developing a range of chronic health conditions including diabetes. Certain ethnic groups, such as South Asians, Latin Americans, and people of African descent, also have high rates of diabetes.

4. Diabetes represents a significant health and economic burden for Canada. One of the leading causes of death in Canada, diabetes shortens life expectancy and the number of years people live in good health. The cost of caring for ever-larger numbers of Canadians with diabetes is expected to soar by close to 50 per cent over the next decade.

WHAT ARE CHRONIC HEALTH CONDITIONS?

Chronic health conditions usually develop slowly, last long periods of time, and in most cases, have no cure. A chronic health condition may severely limit a person's ability to work, go to school or take care of daily needs. Examples of chronic health conditions include diabetes, asthma, high blood pressure, and chronic kidney disease.

WHAT IS DIABETES?

There are three types of diabetes.[1]

- **Type 1 diabetes** occurs when the pancreas produces very little or no insulin, a hormone needed to convert sugar from food into energy. It usually starts in childhood or adolescence. Approximately 10 per cent of those with diabetes have type 1 diabetes. They must take insulin for survival.
- **Type 2 diabetes**, the most common form and the focus of this report, occurs when the pancreas does not produce enough insulin or when the body does not effectively use the insulin that is produced. This form of diabetes accounts for about 90 per cent of cases and usually appears in adulthood, but it is becoming more common among children in high-risk ethnic groups (people of Aboriginal, Hispanic, Asian, South Asian or African descent). Type 2 diabetes has genetic roots but is also linked to unhealthy eating and a lack of physical activity.
- **Gestational diabetes** is a temporary condition that sometimes occurs among pregnant women due to a deficiency of insulin that disappears after the baby is born. It affects less then four per cent of all pregnancies. Both the mother and child have an increased risk of developing type 2 diabetes later in life if the mother had gestational diabetes.

COMPLICATIONS OF DIABETES

An estimated 40 per cent of people with diabetes develop long-term complications, although many of these complications can be delayed or prevented.[2] The most common complications of diabetes are:[3, 4]

- heart disease and stroke (heart disease is the leading cause of death among people with diabetes);
- kidney damage which can lead to a need for dialysis or kidney transplant (diabetes is the leading cause of kidney failure in Canada);
- damage to blood vessels in the eyes which can lead to poor vision or blindness (diabetes is the leading cause of adult blindness in Canada); and
- nerve damage and reduced blood flow to hands and feet, which can lead to poor healing of skin wounds and to amputation.

Chronic health conditions, though largely preventable, affect nearly one in three Canadians.

The impact of chronic health conditions on Canadians and our communities is enormous. In 2005, more than 30 per cent of Canadians aged 12 and older reported having at least one of seven selected chronic health conditions – and over one-third of people in this group had multiple chronic health conditions. The distribution differed within each province and territory (Figure 1).

Chronic health conditions are more common with increasing age, and more common among women than men.[5] Aboriginal[6,7] and lower-income Canadians are more likely than the general population to have chronic health conditions. In 2005, 40 per cent of low-income Canadians reported having one or more chronic health conditions, compared to 27 per cent of high-income Canadians. Those with the lowest incomes are three times as likely to have two or more chronic health conditions than the wealthiest Canadians, and the risk steps down as incomes go up (Figure 2).

Diabetes, a common chronic health condition, is on the rise – due to an aging, inactive and overweight population.

The rate of diabetes has been increasing steadily in Canada over the past decade. Close to five per cent (1.3 million people) of Canadians aged 12 and older reported having diabetes in 2005, compared to three per cent a decade ago, in 1994/95.[8] If current trends continue – with our population inactive, overweight and aging, and an estimated 60,000 new cases diagnosed each year[9] – the number of Canadians with diabetes is expected to almost double to 2.4 million by 2016, a rise far beyond what would be expected due to general population growth.[10] The rate of diabetes is also increasing among Canadian children.[11]

Numbers differ by province and territory, ranging (where estimates are reliable) from as high as 6.8 per cent in Newfoundland and Labrador, to as low as 3.9 per cent in Alberta. These rates are significantly different than the national average (Figure 3).[12] Experts estimate at least another five per cent of adults in Canada have either diabetes or pre-diabetes (a precursor condition) but don't know it, so the actual number of people with diabetes is likely even higher.[13,14]

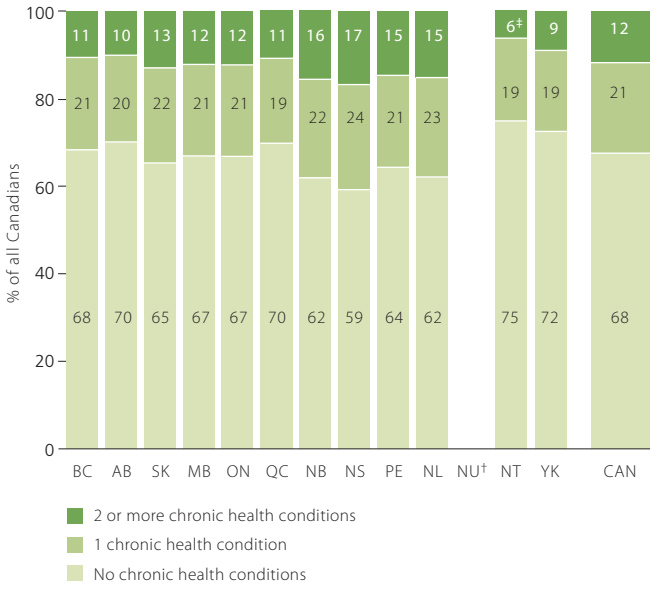


FIGURE 1

Many Canadians have more than 1 chronic health condition*

About 1 in 3 Canadians report having at least 1 chronic health condition, and more than one-third of people in this group have multiple long-term health problems. This graph shows the percentage of people, aged 12 and over, who reported having selected chronic health conditions in a 2005 survey. Proportions are similar among all provinces, though somewhat higher in the Atlantic provinces.

Graph shows crude prevalence for people aged 12 and over, not adjusted for age and gender differences in each province and territory. May not sum to 100% due to rounding.

* Selected chronic conditions are arthritis, high blood pressure, chronic obstructive pulmonary disease, diabetes, heart disease, cancer and mood disorders.
† Data not published. Numbers too small to be reliable.
‡ Interpret with caution. Data are less reliable due to small sample sizes.

Source: Statistics Canada. Canadian Community Health Survey (Cycle 3.1), 2005.

For Canada overall, the percentage of people with diabetes is highest among men aged 65 and over (17 per cent) but somewhat lower among older women (13 per cent) (Figure 9 on page 29). Because the risk of diabetes increases with age, regional increases in rates of the disease are expected to vary across Canada in line with different rates of population growth and the changing age make-up of each province and territory. British Columbia, Alberta, Ontario and the territories are projected to see the greatest hikes in their overall populations and in the proportion of older people, so these areas are also likely to see the greatest growth in local rates of diabetes.[10]

A handful of avoidable risks cause most of the world's burden of chronic health conditions, and these factors are increasingly common in Canada.

While there are many things that influence whether or not someone develops a chronic health condition, there is increasing recognition that lifestyle factors (things that people may be able to change) play the primary role. Seven leading health risks – high blood pressure, high cholesterol, obesity, physical inactivity, heavy drinking, smoking, and not eating enough fruit and vegetables – are underlying causes for many chronic health conditions and their complications.[15] Chronic health conditions often overlap or cluster because they share these risk factors; a person at risk for diabetes, for example, is typically at risk for other chronic health conditions such as heart disease.

The World Health Organization estimates that 90 per cent of type 2 diabetes, 80 per cent of coronary heart disease, and 33 per cent of cancers could be avoided with better nutrition, increased physical activity, and the elimination of smoking.[15] In Canada, recent surveys show that we have a lot of untapped potential for prevention:

> Nearly 60 per cent of Canadian adults are either overweight or obese.[16] Surveys measuring individual body mass index (BMI, calculated from a person's

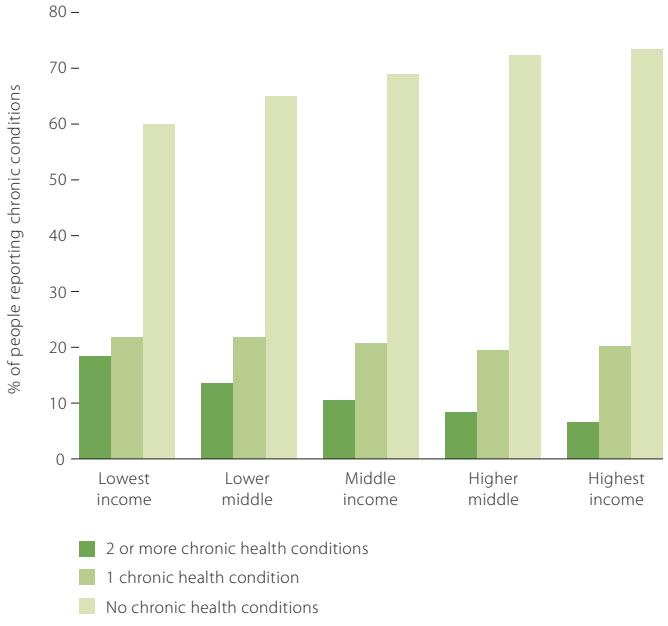


FIGURE 2

Health and wealth – Canadians with chronic health conditions*

Lower-income Canadians are much more likely than higher-income people to have multiple chronic health conditions. The risk steps down as incomes go up. This graph shows the percentage of Canadians, aged 12 and over, who reported having chronic health conditions in a 2005 survey. The population is divided into 5 equal-sized income groups, known as quintiles.

Each set of bars represents 1/5 of Canadian households.

Graph shows crude prevalence for people aged 12 and over, not adjusted for age and gender differences across income groups.

* Selected chronic conditions are arthritis, high blood pressure, chronic obstructive pulmonary disease, diabetes, heart disease, cancer and mood disorders.

Source: Statistics Canada. Canadian Community Health Survey (Cycle 3.1), 2005.

height and weight) have found that close to one in four adults are obese (24 per cent in 2005), an increase of 76 per cent since the late 1970s.[17] More than one in four Canadian children aged two to 17 years are either overweight or obese – also an increase of more than 70 per cent since the late 1970s. Even more dramatic are changes among adolescents: rates of obesity for youth 12 to 17 years old have tripled during this time period[18] (Figures 4 and 5).

> A sedentary lifestyle is linked to obesity. In 2004, children six to 11 years old who spent more than two hours per day in front of a screen (computer, games, television) were twice as likely to be overweight or obese as children who spent one hour or less each day in front of a screen. Likewise, over one-third of youth aged 12 to 17 years who spent 30 hours or more per week in front of a screen were overweight or obese, compared to one-quarter of youth who spent less than 10 hours per week in front of a screen.[18] Overall, nearly half of Canadians aged 12 and older (47 per cent) reported that they were physically inactive in 2005 (Figure 6).

> In 2005, 53 per cent of Canadians aged 12 and older reported eating fruits and vegetables less than five times per day (Figure 7). Adults and youth who eat fruits and vegetables less than three and five times per day, respectively, are more likely to be obese than those who eat them five or more times a day.[17, 18]

> Although smoking rates have been declining, over one in five Canadians aged 12 and up are current smokers.[19] For people with diabetes, high blood pressure and smoking greatly increase their risk for complications such as cardiovascular disease. Yet 60 per cent of Canadians with diabetes also have high blood pressure and 20 per cent also have heart disease, according to a 2005 survey.[12]

Three-quarters of Canadians with diabetes also have other chronic health conditions.

In 2005, about 74 per cent of Canadians aged 12 and older who reported having diabetes also said they had one or more other chronic health conditions (arthritis, high blood pressure, chronic obstructive pulmonary disease, heart disease, cancer, or mood disorders). Of these people, 36 per cent had one chronic health condition in addition to diabetes, and 38 per

(CONTINUED ON PAGE 28)

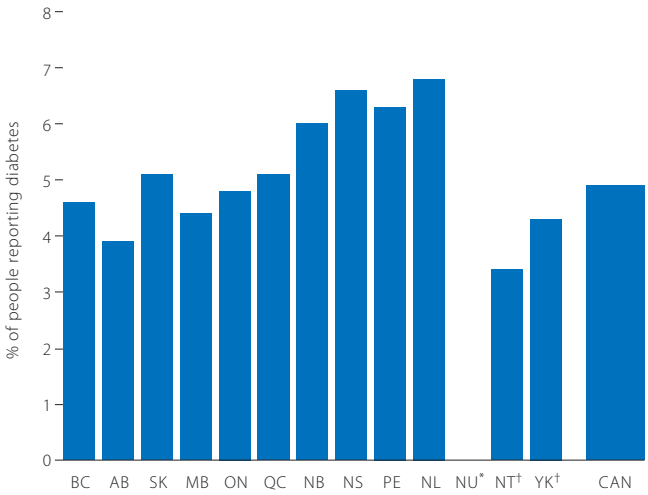


FIGURE 3

1 in 20 Canadians (5%) have diabetes

Overall, at least 5% of Canadians have diabetes. The proportion in each province and territory varies, with the highest percentages in the Atlantic region and lower rates in some western provinces. This graph shows the percentage of people, aged 12 and over, who reported having diabetes in a 2005 survey. Yukon and the Northwest Territories appear to have relatively low rates of diabetes but data from the territories should be interpreted with caution because the number of residents surveyed in the North was small.

Graph shows crude prevalence for people aged 12 and over, not adjusted for age and gender differences in each province and territory.

* Data not published. Numbers too small to be reliable.
† Interpret with caution. Data are less reliable due to small sample sizes.

Source: Statistics Canada. Canadian Community Health Survey (Cycle 3.1), 2005.

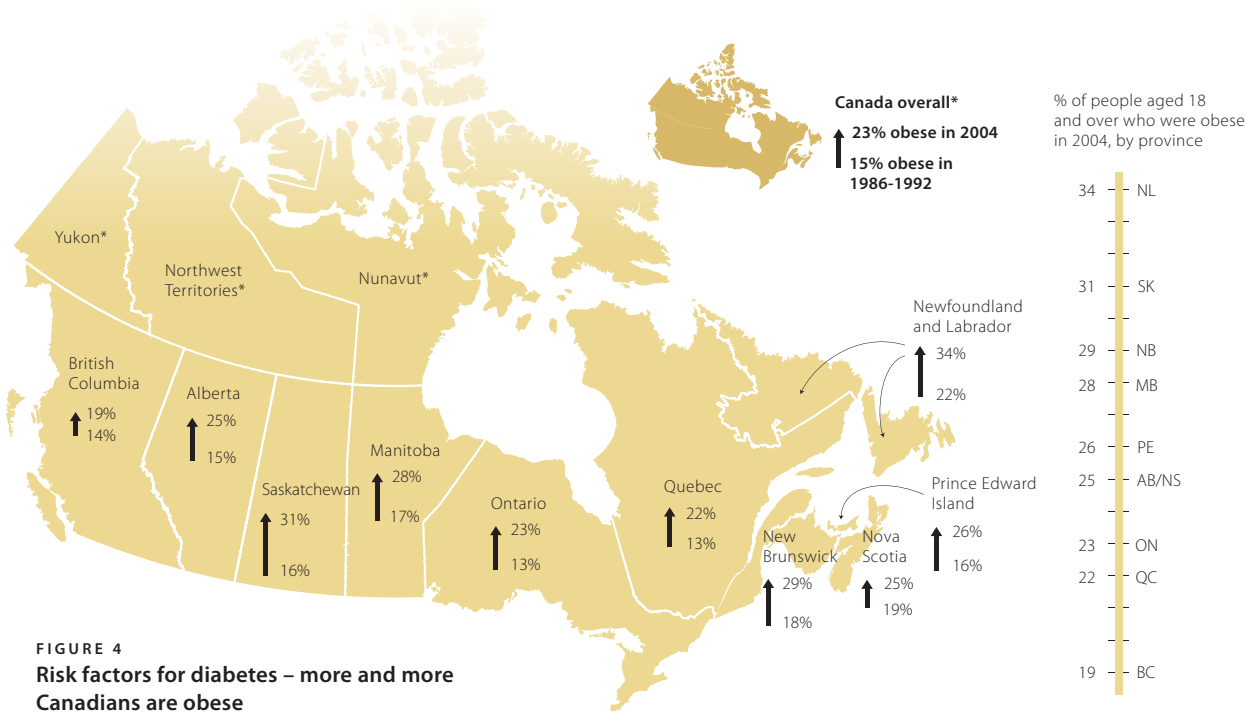


FIGURE 4

Risk factors for diabetes – more and more Canadians are obese

* No data were available for the territories. Surveys were conducted between 1986 and 1992 (age 18-74), depending on province, and for all provinces in 2004 (age 18+). Map shows crude prevalence, not adjusted for differences in the age and gender structure of provinces.

Source: Canadian Heart Health Surveys, 1986-1992; Statistics Canada, Canadian Community Health Survey (Cycle 2.2), 2004.

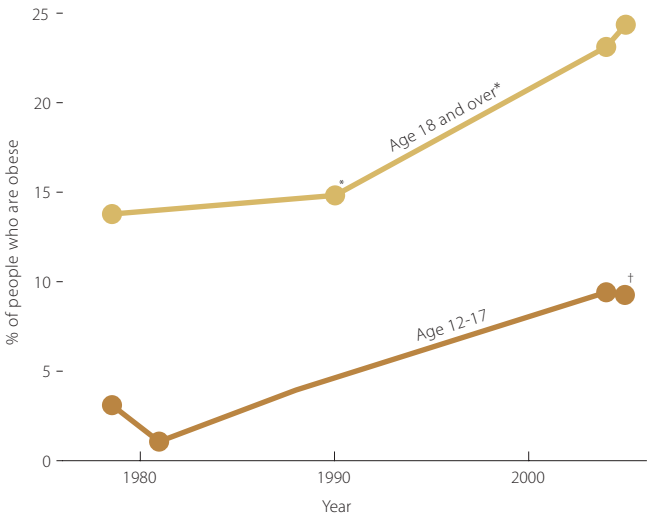


FIGURE 5

Risk factors for diabetes – obesity is increasing in adults and adolescents

* 1986-1992 data: age 18-74 only.
† Interpret with caution. Data are less reliable due to small sample sizes.

Survey respondents were considered obese when their measured body mass index (BMI) was 30 or greater. The territories are excluded in these data, except for 2005.

Sources: Statistics Canada. Canada Health Survey, 1978/79 and Canadian Community Health Surveys (Cycle 2.2), 2004 and (Cycle 3.1), 2005; Canadian Fitness and Lifestyle Research Institute. Canada Fitness Survey, 1981 and Campbell Survey on Health and Well-Being, 1988; Canadian Heart Health Surveys, 1986-1992.

FIGURES 4 AND 5

A number of Canadian surveys have measured people's weight and height, as opposed to asking people to report their weight and height. The map (Figure 4) shows that the percentage of Canadians who are considered obese – based on their weight, height and (for adolescents) age and gender – has risen in every province over the past 20 years. In 2004, between 19% and 34% of people aged 18 and over were obese. The graph (Figure 5) shows that close to 1 in 10 adolescents were obese in 2005, compared to very few in 1978/79, and that obesity has also been rising sharply among adults.

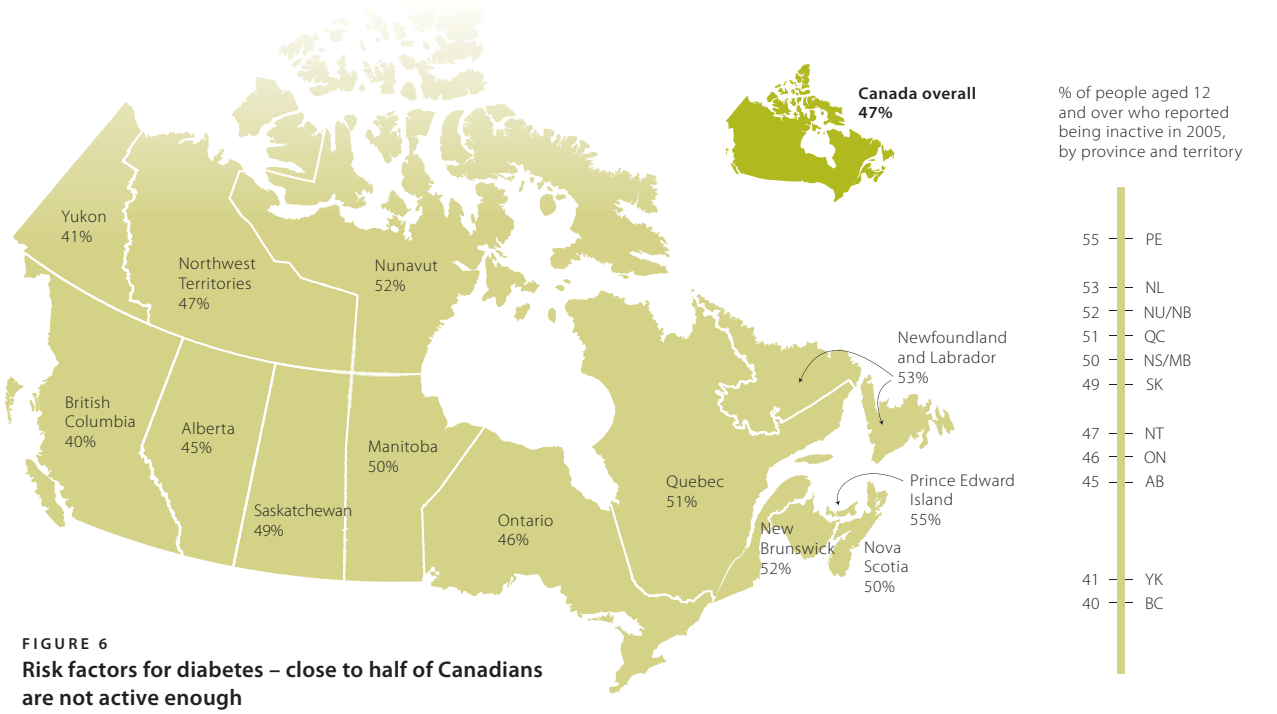


FIGURE 6

Risk factors for diabetes – close to half of Canadians are not active enough

Nearly half (47%) of Canadians aged 12 and over can be considered physically inactive, based on how they described what they do in their leisure time in a 2005 survey. Each person's weight was taken into account in calculating whether they were active, moderately active, or inactive. The percentage of people who were categorized as inactive varied across the country, ranging from 40% to 55%.

Survey respondents (aged 12 and over) were considered inactive based on their average daily physical activity over the past 3 months. People were asked questions about the frequency, duration and intensity of their leisure-time physical activity in 2005. Map shows crude prevalence, not adjusted for differences in the age and gender structure of provinces and territories.

Source: Statistics Canada. Canadian Community Health Survey (Cycle 3.1), 2005.

FIGURE 7

Risk factors for diabetes – most Canadians do not eat enough fruits and vegetables

In a 2005 survey, more than half (53%) of Canadians, aged 12 and over, reported eating fruits and vegetables fewer than 5 times a day. The proportion of people with less healthy diets ranged from 45% to 73% across the provinces and territories.

Map shows crude prevalence, not adjusted for differences in the age and gender structure of provinces and territories.

Source: Statistics Canada. Canadian Community Health Survey (Cycle 3.1), 2005.

cent had more than one. Only about one-quarter had diabetes only. All provinces had similar levels of multiple chronic health conditions among people with diabetes (Figure 8).

People with diabetes are at particularly high risk of having – and dying from – heart disease. In 2005, more than 20 per cent of Canadians with diabetes also had heart disease, compared with just four per cent of people without diabetes.[12] Roughly 80 per cent of all deaths among people with diabetes are from heart disease or stroke.[20] An Ontario study found that, in 1999, nearly one-third of all cases of heart attack and stroke in the province occurred among people with diabetes, although people with diabetes made up less than five per cent of the population.[21]

Not surprisingly, people with diabetes rate their health and quality of life as poorer than do people without diabetes.[22] And it is the burden of having multiple health problems that most contributes to a reduced quality of life for people with diabetes – even taking into account other factors such as their age and weight, how long they have had diabetes, how much they smoke and drink alcohol, and how strongly they feel connected to their community. Significantly, low income (measured by respondents' use of social assistance and their ability to buy adequate food) and stress were the next biggest contributors to reduced quality of life for people with diabetes in this Canadian research.[23]

Inequalities in health outcomes in Canada are evident in diabetes.

Aboriginal communities, lower-income people, and certain ethnic groups in Canada are at particularly high risk for developing diabetes and, for Aboriginal people, higher rates of complications.

Aboriginal people (First Nations, Inuit and Métis)

Depending on the age group, First Nations people are two to eight times more likely to have diabetes than the Canadian population in general, and diabetes is growing much more quickly in First Nations communities, particularly among men aged 45 to 65 (Figure 9). Between 1997 and 2002, the percentage of First Nations men in this age group with diabetes nearly doubled, compared to only modest increases among Canadian men in this age group overall.

An estimated 20 per cent of First Nations adults have diabetes; rates tend to be highest among people living on-reserve.[24] The prevalence of diabetes (based on 2001 data) is highest among First Nations people followed by Métis (six per cent) and lowest among the Inuit (2.3 per cent),[25] although higher rates for Inuit have been reported in some regions. Experts believe that the rates of diabetes among Aboriginal people are two to three times higher because a large number of cases are undiagnosed.[26] Aboriginal people in Canada also have higher rates of heart disease than people of European ancestry.[27]

These higher rates of heart disease and diabetes are thought to be due to an interplay of genes and the social environment. Aboriginal populations in Canada tend to have higher rates of risk factors such as smoking, obesity, high blood pressure, and high cholesterol, as well as a genetic tendency to gain weight, leading to higher rates of pre-diabetes, a precursor condition. In addition, Aboriginal communities have significantly lower employment rates and income than the national average, and low income is associated with higher rates of heart disease and diabetes, and the risk factors that lead to these conditions.[27]

In 2005, more than 20 per cent of Canadians with diabetes also had heart disease, compared with just four per cent of people without diabetes.

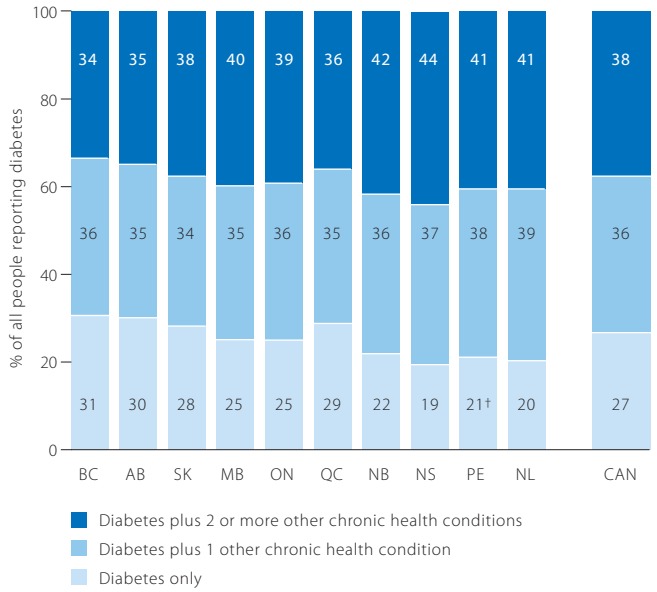


FIGURE 8

Most people with diabetes also have other chronic health conditions*

People with diabetes tend to have complex health care needs. This graph shows the percentage of Canadians aged 12 and over with diabetes who reported also having other chronic health conditions in 2005. About one-quarter had diabetes only, while close to 40% had at least 2 chronic health conditions in addition to their diabetes. The proportions were similar across the provinces. The territories could not be included in this graph because the number of northern residents with diabetes in the survey was too small to provide reliable data.

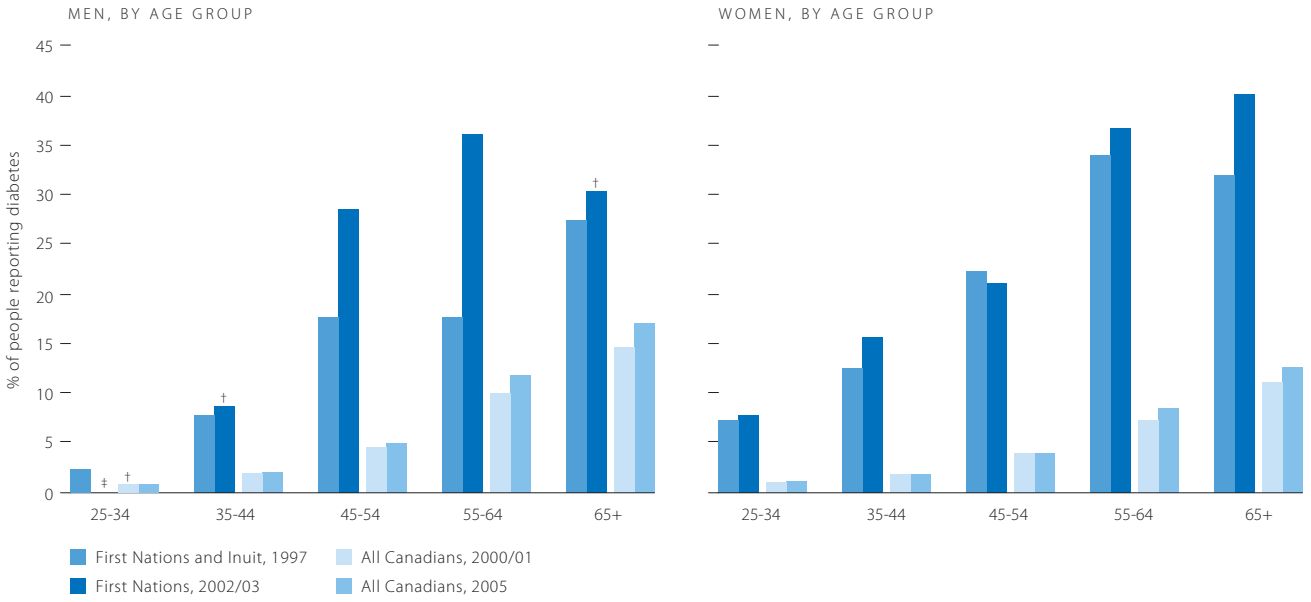
Graph shows crude prevalence for people aged 12 and over, not adjusted for age and gender differences in each province. Data from territories were excluded because numbers were too small to be reliable. May not sum to 100% due to rounding.

* Selected chronic conditions are arthritis, high blood pressure, chronic obstructive pulmonary disease, heart disease, cancer and mood disorders.
† Interpret with caution. Data are less reliable due to small sample sizes.

Source: Statistics Canada. Canadian Community Health Survey (Cycle 3.1), 2005.

FIGURE 9

Diabetes is much more common, and growing faster, among First Nations people



First Nations people are 2 to 8 times more likely to report having diabetes compared to other Canadians, depending on the age group. The biggest increase in diagnoses of diabetes over a recent 5-year period (1997-2002/03) was among First Nations men aged 45 to 64. Among older First Nations men and women (55+ years), more than 1 in 3 people reported having diabetes in 2002/03, compared to about 1 in 10 older Canadians overall.

† Interpret with caution. Data are less reliable due to small sample sizes.
‡ Data not reported. Numbers too small to be reliable.
Reliability of 1997 data was not available.

First Nations data primarily includes people living on-reserve. The 1997 data includes First Nations in 8 provinces and Inuit in Labrador. All Canadians data includes Inuit, Métis and First Nations people living off-reserve.

Sources: Adapted from First Nations Centre at the National Aboriginal Health Organization. (2005). First Nations Regional Longitudinal Health Survey (RHS) 2002/03: Results for Adults, Youth and Children Living in First Nations Communities. Ottawa: NAHO; and Statistics Canada. Canadian Community Health Survey (Cycle 1.1), 2000/01 and (Cycle 3.1), 2005.

Compared to other Canadians with diabetes, First Nations people with diabetes also tend to fare worse in terms of their overall health. On nearly every type of diabetes complication measured in a 1999 study (for example, heart attack, amputations, and kidney dialysis), First Nations people had much higher rates than other Canadians (Figure 10).

Although type 2 diabetes usually starts in adulthood, it is increasingly being observed among First Nations children and adolescents.[28] This trend raises further concerns about the long-term health of Aboriginal communities, where birth rates tend to be higher than the Canadian average.[29] Young people who develop diabetes will have the disease for the rest of their lives and complications are likely to begin when they are young adults.

Ethnic communities

Some ethnic groups in Canada – people of South Asian, Asian, Latin American and African descent – are at high risk for developing diabetes.[22, 30] These groups make up an increasing proportion of Canada's population, with 77 per cent of recent immigrants (about 1.4 million people) now coming from these parts of the world. South Asians – who represent 23 per cent of this population[31] and are Canada's second largest visible minority group[32] – are reported to have higher rates of diabetes and pre-diabetes than rates for other Canadians, and a higher proportion of new cases of diabetes diagnosed each year. South Asians also have a higher prevalence of heart disease. As with Aboriginal people, an interplay of genes and the environment is likely at work. Although South Asians have lower or similar rates of key risk factors (smoking, obesity, high blood pressure and high cholesterol) compared to Europeans, it appears that when South Asians are exposed to a lifestyle of more food and less exercise, they tend to gain weight, a condition that has been linked to blood sugar problems and a higher risk of diabetes and heart disease in these populations.[30, 33]

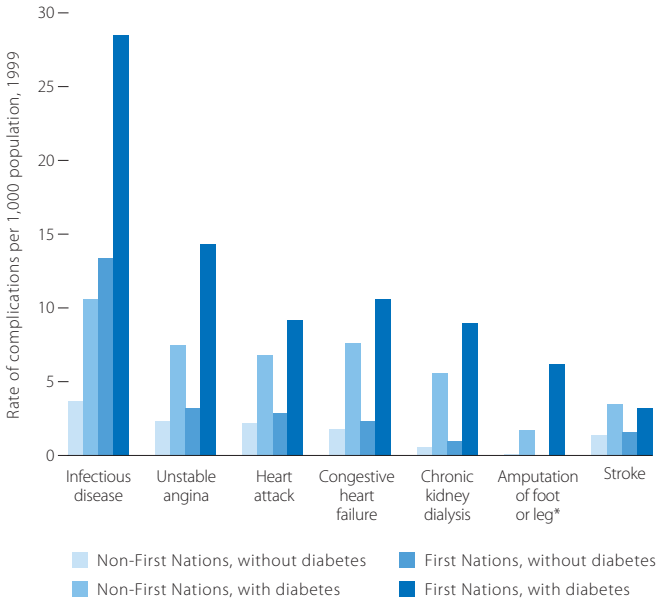


FIGURE 10

Health problems for Ontarians with and without diabetes – First Nations people have more diabetes-related complications

Not only do First Nations people have higher rates of diabetes than Canadians overall, they also are more likely to experience health complications related to this disease. This graph compares the rate of complications among Ontario residents in 1999. Among people with diabetes, First Nations people had rates of amputations and infectious disease 2 to 3 times greater than rates for non-First Nations people. The graph also shows that people with diabetes, regardless of their ethnic background, have a much higher risk for any of the health problems illustrated.

* Not due to injury.

Data are adjusted for differences in age and gender structure of the populations studied.

Source: Adapted from Shah BR, Anand S, Zinman B, Duong-Hua M. Diabetes and First Nations People. In: Hux J, Booth G, Slaughter P, Laupacis A (editors). (2003). *Diabetes in Ontario: An ICES Practice Atlas.* Toronto: Institute for Clinical Evaluative Sciences. *www.ices.on.ca*

Screening in several Canadian cities by the Global Village project of the London InterCommunity Health Centre in Ontario (described in Chapter 5) found high percentages of undiagnosed diabetes and pre-diabetes among ethnic groups. More than 500 people from Central and South America, China, and South Asia, and of African-American ancestry were screened in community settings. Among Chinese and African-Americans screened, the rate of previously undiagnosed diabetes was 26 per cent and 11 per cent, respectively, compared to an estimated two per cent for Canadians generally. The rates of pre-diabetes were even higher for the Chinese (33 per cent) and South Asians (16 per cent).[34]

Socio-economic status

As with chronic health conditions generally (Figure 2), rates of diabetes tend to go up as incomes go down. Canadians with the lowest household incomes are nearly three times more likely to have diabetes than the highest-income group (7.6 per cent compared to 2.7 per cent), and the proportion of people with diabetes steps down steadily as family income goes up (Figure 11). People with the lowest incomes are also more likely than those with the highest incomes to have other chronic health conditions, in addition to diabetes (data not shown).

Diabetes represents a significant, and growing, health care and economic burden for Canada.

Diabetes is among the leading causes of death in Canada,[35] contributing to at least 41,500 deaths each year.[36] The number of deaths related to diabetes is likely much higher because this statistic only includes deaths where diabetes is listed as a specific cause; deaths where diabetes is an underlying cause of heart attack or stroke, for example, may be missed. Adults with diabetes are twice as likely to die prematurely as those who do not have this disease. Type 2 diabetes shortens life expectancy by 5 to 13 years (estimates vary) and cuts short the number of years people can expect to live in good health by some 12 years, compared to people without diabetes.[22, 36]

Illness, disability and death due to chronic health conditions cost the Canadian economy more than $80 billion annually.[37] Diabetes makes a major, and increasing, contribution to those costs. People with diabetes use health care services at levels well above

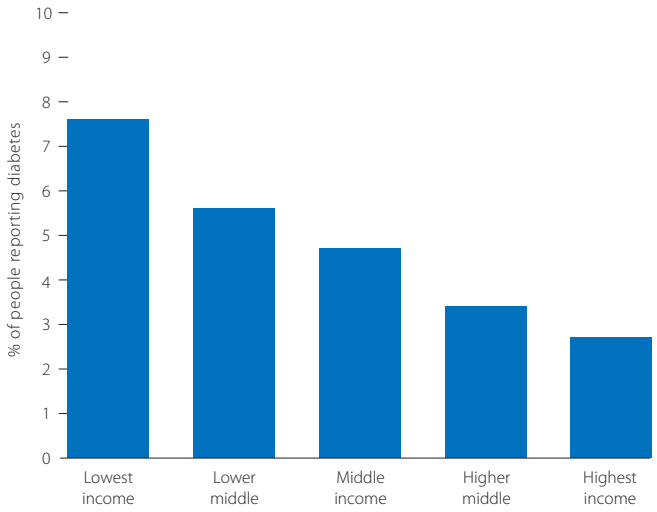


FIGURE 11

Health and wealth – low-income Canadians have more diabetes

The poorest Canadians are almost 3 times more likely to have diabetes than the highest-income Canadians, and the proportions step down steadily as family income goes up. This graph shows the percentage of Canadians aged 12 and over who reported having diabetes in a 2005 survey. The population is divided into 5 equal-sized income groups, known as quintiles.

Each bar represents 1/5 of Canadian households.

Graph shows crude prevalence for people aged 12 and over, not adjusted for age and gender differences across income groups.

Source: Statistics Canada. Canadian Community Health Survey (Cycle 3.1), 2005.

the average for the general population (Figure 12; also see Figure 10). Compared to Canadians overall, people with diabetes:

> are twice as likely to be admitted to a hospital or nursing home;
> are three times more likely to use home care services;
> have twice as many consultations with doctors and three times as many with nurses.

Not surprisingly, people with more chronic conditions use more health care services. For example, the 11 per cent of people with diabetes who also have three or more other chronic health conditions use health care services even more intensively than people with diabetes only (Figure 12). People with more complex health conditions:

> are four times more likely to be admitted to a hospital or nursing home compared to Canadians generally, and three times more likely than people with diabetes only;
> are seven times more likely to use home care compared to Canadians generally, and five times more likely than people with diabetes only; and
> see health care providers three to five times more often than the general population, and two to three times more often than people with diabetes only.

These patterns of health care use signal that our health care system is serving the people most in need. That's positive. But the cost implications of our escalating demands for complex care are alarming. More than one-third of expenditures for diabetes care in Canada has been attributed to major complications and related chronic health conditions, particularly heart disease and stroke.[38]

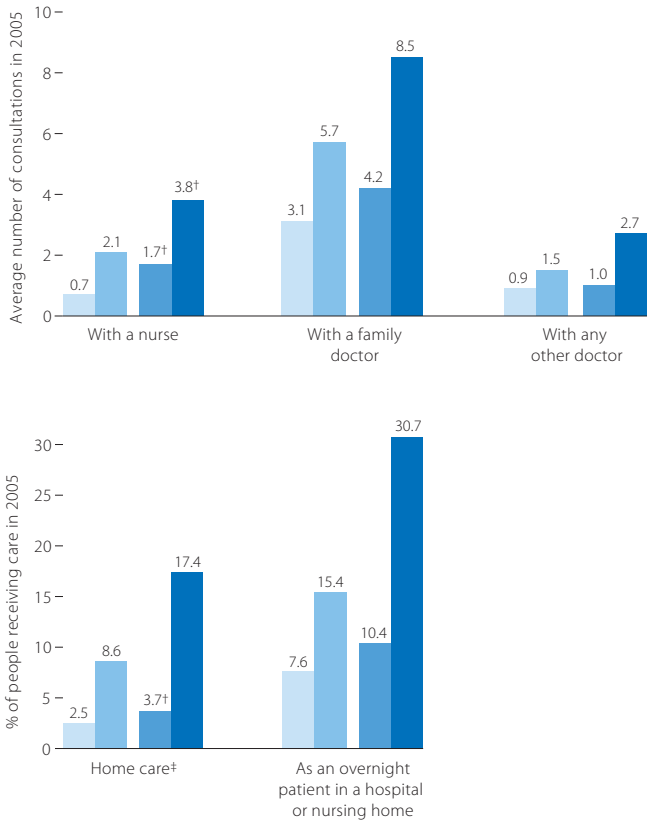


FIGURE 12

People with diabetes plus other chronic health conditions* use the most health care

Canadians with diabetes use many more health care services than the national average. They see a doctor and/or stay in hospital twice as often as Canadians overall, and are 3 times as likely to consult with a nurse and/or receive home care. People with diabetes plus multiple chronic health conditions use the most health care services overall. These graphs are based on interviews with Canadians aged 12 and over (for home care use, people aged 18 and over) in which people reported on their use of health care in 2005.

* Selected chronic conditions are arthritis, high blood pressure, chronic obstructive pulmonary disease, heart disease, cancer and mood disorders.
† Interpret with caution due to small sample sizes.
‡ Received home care partially or entirely paid for by government, for population aged 18 and over.

Source: Statistics Canada. Canadian Community Health Survey (Cycle 3.1), 2005.

If current trends continue, the cost of caring for ever-larger numbers of Canadians with diabetes is conservatively predicted to soar by 50 per cent or more over the next decade. The largest driver of these rising costs is expected to be the mounting number of people with diabetes and its complications, not inflation or the cost of delivering health care. More Canadians will be living longer with complex chronic health conditions.[39]

There is good news amid all these grim statistics: some of the major health consequences of diabetes have improved. The rate of heart attacks and strokes among people with diabetes declined significantly in Ontario throughout the 1990s (by 15 per cent and 24 per cent, respectively) and significantly more than among people without diabetes.[21] (Similar research from other parts of Canada is not yet available.)

These data suggest that how we care for people with diabetes (the subject of the next chapter) may be getting better. But if more and more Canadians continue to develop diabetes, the gains we can make in improving health outcomes for people with the disease will be overtaken by the numbers of people who need care. Think of it like shopping at a super sale: you can save money on each item, but if you buy a lot more than you need, you end up spending much more than you've saved overall.

References

1 Canadian Diabetes Association. (2006). Diabetes Facts. [web page]. *www.diabetes.ca/Section_About/thefacts.asp;* and Diabetes Dictionary [web page, no date]. *www.diabetes.ca/Section_About/dictionary.asp*.

2 Public Health Agency of Canada. (2003). Diabetes – Facts & Figures. [web page]. *www.phac-aspc.gc.ca/ccdpc-cpcmc/diabetes-diabete/english/facts/index.html*.

3 Public Health Agency of Canada. (2003). What are the complications of diabetes? [web page]. *www.phac-aspc.gc.ca/ccdpc-cpcmc/diabetes-diabete/english/whatis/complications.html*.

4 Canadian Institute for Health Information. (2006). *Treatment of End Stage Organ Failure in Canada 1995-2004.* Ottawa: CIHI. *www.cihi.ca*.

5 Broemeling AM, Watson D and Black C. (2005 February). *Chronic Conditions and Co-morbidity among Residents of British Columbia.* Vancouver: Centre for Health Services and Policy Research.

6 In this report, Aboriginal refers to people of First Nations, Inuit and Métis ancestry in Canada.

7 Tjepkema M. (2002). The health of the off-reserve Aboriginal population. In: How healthy are Canadians? *Health Reports – 2002 Annual Report;* 13 Supplement. Ottawa: Statistics Canada.

8 Statistics Canada. National Population Health Surveys, 1994/95, 1996/97, 1998/99 (Table 104-0011), and Canadian Community Health Surveys, 2000/01 (Table 105-0011), 2003 (Table 105-0211), 2005 (Table 105-0411). Ottawa: Statistics Canada. This rate differs from that reported by the National Diabetes Surveillance System (5.3%) which looks at administrative data on health care use by people aged 20 and over. The NDSS rate is reported in: Health Canada. (2006). *Healthy Canadians – A Federal Report on Comparable Health Indicators 2006. www.hc-sc.gc.ca/hcs-sss/pubs/care-soins/index_e.html*.

9 Health Canada. (1999). *Diabetes in Canada: National Statistics and Opportunities for Improved Surveillance, Prevention and Control.* Ottawa: Health Canada. *www.phac-aspc.gc.ca/publicat/dicdac99/pdf/Diab99_e.pdf*.

10 Ohinmaa A, Jacobs P, Simpson S, Johnson J. (2004). The projection of prevalence and cost of diabetes in Canada: 2000 to 2016. *Canadian Journal of Diabetes;* 28(2): 116-123. *www.diabetes.ca/Files/JohnsonCJDJune2004.pdf*.

11 To T, Curtis JR and Daneman D. (2003). Diabetes in children. In: Hux JE, Booth GL, Slaughter PM et al. *Diabetes in Ontario: An ICES Practice Atlas.* Toronto: Institute for Clinical Evaluative Sciences.

12 Sanmartin S and Gilmore J. (2006). Diabetes care in Canada: results from selected provinces, 2005. In: Statistics Canada. *Smoking and Diabetes Care: Results from the CCHS Cycle 3.1 (2005).* Catalogue no. 82-621-XIE. Ottawa: Statistics Canada. *www.statcan.ca.*

13 Young TK and Mustard CA. (2001). Undiagnosed diabetes: does it matter? *CMAJ;* 164(1): 24-28.

14 Leiter LA, Barr A, Belanger A et al. (2001). Diabetes screening in Canada (DIASCAN) study: prevalence of undiagnosed and glucose intolerance in family physician offices. *Diabetes Care;* 24(6): 1038-1043.

15 World Health Organization. Global Strategy on Diet, Physical Activity and Health. Chronic Disease Risk Factors: Chronic disease information sheets. [web pages, no date]. *www.who.int/dietphysicalactivity/publications/facts/.*

16 Statistics Canada. (2005). Canadian Community Health Survey (Cycle 3.1). Ottawa: Statistics Canada.

17 Tjepkema M. (2006). Adult obesity in Canada: measured height and weight. In: Statistics Canada. *Nutrition: Findings from the Canadian Community Health Survey.* Catalogue no. 82-620-MWE. *www.statcan.ca*. Note: Other surveys that ask people to report their own weight tend to produce lower estimates of obesity.

18 Shields M. Overweight Canadian children and adolescents. In: Statistics Canada. *Nutrition: Findings from the Canadian Community Health Survey.* Catalogue no. 82-620-MWE. *www.statcan.ca.*

19 Shields M. (2006). An update on smoking from the 2005 Canadian Community Health Survey. In: Statistics Canada. *Smoking and Diabetes Care: Results from the CCHS Cycle 3.1 (2005).* Catalogue no. 82-621-XIE. *www.statcan.ca.*

20 Canadian Diabetes Association. Heart Disease and Stroke. [web page, no date] *www.diabetes.ca/Section_About/heart-disease.asp.*

21 Booth GL, Kapral MK, Fung K, Tu JV. Recent trends in cardiovascular complications among men and women with and without diabetes. (2006). *Diabetes Care;* 29(1): 31-37.

22 Manuel DG and Schultz SE. (2003). Diabetes health status and risk factors. In: Hux JE, Booth GL, Slaughter PM et al. *Diabetes in Ontario: An ICES Practice Atlas*. Toronto: Institute for Clinical Evaluative Sciences.

23 Maddigan, SL, Feeny DH, Majumdar SR et al. (2006). Understanding the determinants of health for people with type 2 diabetes. *American Journal of Public Health;* 96(9): 1649-1655.

24 National Aboriginal Health Organization. (2005). *First Nations Regional Longitudinal Health Survey (RHS) 2002/03 : Results for Adults, Youth and Children Living in First Nations Communities.* Ottawa: NAHO. *www.naho.ca/firstnations/english/documents/RHS2002-03TechnicalReport_001.pdf.* Note: This survey included primarily people living on-reserve but some off-reserve communities in the North.

25 Statistics Canada. (2003). *Aboriginal People's Survey 2001 – Initial Findings: Well-being of the Non-reserve Aboriginal Population.* Ottawa: Statistics Canada. Note: The comparison refers to First Nations people living off reserve; 8.3% reported having diabetes in this survey.

26 Health Canada. (2000). *Diabetes Among Aboriginal (First Nations, Inuit, Metis) People in Canada: The Evidence.* Ottawa: Health Canada.

27 Anand SS, Yusuf, S, Jacobs R et al. (2001). Risk factors, atherosclerosis, and cardiovascular disease among Aboriginal people in Canada: the Study of Health Assessment and Risk Evaluation in Aboriginal Peoples (SHARE-AP). *The Lancet;* 358: 1147-53.

28 Dean HJ, Sellers EAC and Young TK. (2003). Type 2 diabetes in youth in Manitoba, Canada, 1986 to 2002. *Canadian Journal of Diabetes;* 27(4): 449-54.

29 Statistics Canada. (2003). Aboriginal peoples of Canada: a demographic profile. 2001Census analysis series. [web page] *www.statcan.ca.*

30 Anand SS, Yusuf S, Vuksan V et al. (2000). Differences in risk factors, atherosclerosis, and cardiovascular disease between ethnic groups in Canada: the Study of Health Assessment and Risk in Ethnic groups (SHARE). *The Lancet;* 356: 279-284.

31 Statistics Canada. (2003). Canada's ethnocultural portrait: the changing mosaic. 2001 Census analysis series. [web page]. *www.statcan.ca.*

32 Statistics Canada. (2005). Visible minority population, by age group. 2001 Census [web page]. *www40.statcan.ca/l01/cst01/demo50a.htm?sdi=south%20asians.*

33 McKeigue PM, Hsah B and Marmot MG. (1991). Relation of central obesity and insulin resistance with high diabetes prevalence and cardiovascular risk in South Asians. *The Lancet;* 337: 382-386.

34 Harvey B, Harris S, Biederman T et al. (2006). Diabetes risk profile and 75gm OGGT: Results for a convenience sample of 521 Black, Chinese, Indo-Asian and Latin Canadians. Canadian Public Health Association 97th Annual Conference. Vancouver, May 2006. *www.cpha.ca/conf97/english/posters.html.*

35 Statistics Canada. (2006). Mortality, summary list of causes 2003. Deaths by selected grouped causes, sex and geography – Canada. Catalogue no. 84 F0209 Table 1-1 *www.statcan.ca/english/freepub/84F0209XIE/2003000/t001_en.pdf.*

36 Canadian Diabetes Association. The prevalence and cost of diabetes. [web page, no date]. *www.diabetes.ca/Section_About/prevalence.asp.*

37 Canadian Disease Prevention Alliance of Canada. The case for change. [web page, no date]. *www.chronicdiseaseprevention.ca/content/about_cdpac/mission.asp.* Note: Estimate based on data from Health Canada's 2002 report, *Economic Burden of Illness in Canada*, 1998.

38 Simpson SH, Corabian P, Jacobs P, Johnson F. (2003). The cost of major comorbidity in people with diabetes mellitus. *CMAJ;* 168(13): 1661-1667.

39 Ohinmaa et al. (2004) [see reference 10]. Note: This paper estimated costs using constant 1996 dollars. We estimated the pre-inflation cost increase of 50% for 2005 – 2016 from data presented in this paper.

HOW DO WE PROVIDE CARE NOW AND HOW CAN WE DO IT BETTER? "An effective health system requires a balance between individual responsibility for personal health and our collective responsibility for the health system."

First Ministers' 2003 Accord on Health Care Renewal

3

In the previous chapter, we outlined the impact of diabetes on people and on the country as a whole. The Health Council's job is to report directly to Canadians on how the health care system is performing and how health care renewal is progressing. To illustrate the system's performance, we focus on type 2 diabetes. In this chapter, we look at the current state of care for people with diabetes and the results or outcomes of that care, and we describe what we can do to improve care. We present evidence showing that:

> Small improvements in health care for people with chronic health conditions can make a big difference – to individual health and to the future cost of their health care.

> We can significantly improve how we deliver care for people with chronic health conditions in Canada.

In the next chapter, we'll discuss what can be done to prevent Canadians from developing diabetes or related chronic health conditions.

Current care and its outcomes

Our health care services have evolved along a "find it and fix it" orientation that may work well for short-term health problems but does not match the complex, ongoing needs of people with chronic conditions.[1] As a result, current care of chronic health conditions has been described as "often a poorly connected string of episodes determined by patient problems,"[2] rather than the coordinated network of supportive, evidence-based services that would benefit patients, their families, health care providers, and the sustainability of the system itself. Just such a "prevent it, find it, manage it" approach is the vision behind Canada's current efforts in primary health care renewal. Despite government commitments, progress on primary health care renewal has been too slow, an issue discussed in the Health Council's February 2007 report, *Health Care Renewal in Canada: Measuring Up?*

In the example of diabetes, quality of care affects the degree to which people:

> receive appropriate health services and information;

> know about the factors that prevent or delay the onset of diabetes and its complications;

> feel confident about managing their own health; and

> are able to take action to maintain the best possible health.

Research on diabetes care in Canada and other countries shows that we have much work to do before we achieve a "prevent it, find it, manage it" system for people with chronic health conditions. In reviewing a range of studies conducted from 1991 to 2005, we learned that, despite the tremendous efforts and good intentions invested in delivering health care in Canada, the way care is currently provided leaves too many people with diabetes vulnerable to complications that could be avoided.

1. Less than half of Canadians with diabetes undergo all the lab tests and procedures that experts recommend.

Serious and long-term complications – heart attack, stroke, kidney failure, amputations, and blindness – affect an estimated 40 per cent of people with diabetes,[3,4] despite the fact that these poor outcomes can often be delayed or prevented. The best defence against complications from diabetes is careful management of blood sugar, fats in the blood (such as cholesterol), blood pressure, and weight. Monitoring these risk factors through regular lab tests and procedures is a key step in avoiding complications. Patients and providers need the information from these tests and procedures to develop individual plans for care and management and to adjust these plans when health conditions change.

The Canadian Diabetes Association (CDA), supported by research evidence and expert advice, has developed a schedule of recommended lab tests and procedures for diabetes care. In 2005, Statistics Canada asked people with diabetes in six jurisdictions (Newfoundland and Labrador, Prince Edward Island, New Brunswick, Ontario, Manitoba and Yukon) about the tests and procedures they received. The results of this survey suggest that a substantial number of people with diabetes do not receive all the recommended tests and procedures (Figure 13).

The Statistics Canada survey also reveals that people who report they have been diagnosed with diabetes are twice as likely to get a blood sugar (A1C) test – a lab test that measures the average blood sugar level over the past several months – if they have a regular medical doctor. Fortunately, almost all people with diabetes who participated in this survey (97 per cent) said they had a regular doctor in 2005.[5]

Several regional surveys in Canada have found similarly low levels of care in relation to expert recommendations for most of the tests and procedures reviewed:

- In a 2004 study in Saskatchewan, 60 per cent of people with diabetes had received two A1C tests in the past year;[6]
- In a study of care in British Columbia in 2001/2002, just 35 per cent of people with diabetes had received two or more A1C tests in that year, about half (47 per cent) had their eyes checked, just over one-quarter (28 per cent) had undergone a kidney function test, and 70 per cent had received a blood test for cholesterol;[7]
- In 1999/2000 in eastern Ontario, 58 per cent of people with diabetes had at least one A1C test during the year, but only 15 per cent received three or four A1C tests, the number recommended in the CDA guidelines.[8]

In an international 2005 survey, small samples of adults with diabetes in six countries were asked whether they received various tests and services to monitor their health.[9] The results suggest that people with diabetes in all of these countries may not be receiving the

FIGURE 13

How does diabetes care match up with expert guidelines? Results from a Canadian survey

WHAT THE CANADIAN DIABETES ASSOCIATION RECOMMENDS TO HEALTH CARE PROFESSIONALS*	WHAT CANADIANS WITH DIABETES REPORTED IN A STATISTICS CANADA SURVEY IN 2005
Blood sugar (A1C) should be measured approximately every 3 months to ensure that levels are as close to normal as possible. (This is a lab test, not the self-monitoring for blood sugar that many people with diabetes do at home.)	74% had an A1C test at least once in the past 12 months. On average, these people were tested 3.4 times during the year, or about every 3 to 4 months.†
Blood pressure should be measured at every diabetes health care visit.	In NS and PEI, the only 2 provinces that asked this question, 93% had their blood pressure checked in the last 6 months. This data should be interpreted with caution due to the small sample size.‡
A blood cholesterol test should be conducted at the time of diagnosis of diabetes and then every 1 to 3 years.	Data not available.
Eye exams should generally be performed at least every 1 to 2 years.	61% had an eye check-up in the past 2 years.‡
Kidney tests should be performed at diagnosis of type 2 diabetes and then once a year.	71% had a kidney test in the past year.‡
Foot examinations should be performed at least once a year for all people with diabetes, beginning at puberty and more frequently for people at high risk of nerve damage.	48% had a professional foot exam in the last year. 65% had checked their own feet (part of recommended self-care) in the past year.†

* Canadian Diabetes Association clinical practice guidelines expert committee. Clinical practice guidelines for the prevention and management of diabetes in Canada. *Canadian Journal of Diabetes* 27.S2 (2003): S1-S163. *www.diabetes.ca/cpg2003.*

† Sanmartin C and Gilmore J. (2006). Diabetes care in Canada. Results from selected provinces. In *Smoking and Diabetes Care: Results from the CCHS Cycle 3.1 (2005).* Catalogue No. 82-621-XIE. Ottawa: Statistics Canada. *www.statcan.ca.*

‡ Statistics Canada. Canadian Community Health Survey (Cycle 3.1), 2005.

services that they should (Figure 14). Canada had a significantly lower proportion of people who received all four of the recommended tests and procedures covered in this survey than did other countries. Less than 40 per cent of Canadians with diabetes received all four recommended tests.

2. More than half of Canadians with diabetes have poor cardiovascular health and half do not achieve recommended levels of blood sugar.
Results from lab tests and procedures give patients and health care providers the information they need to take appropriate action, if required. But studies in Canada suggest that the response to test results may be inadequate in many cases.

The Diabetes in Canada Evaluation (DICE) study in 2005 examined the charts of approximately 2,500 patients with type 2 diabetes from family physicians' offices in all 10 provinces. This study found that the average blood sugar level (A1C) from lab tests was 7.3 per cent (less than 7 is the target; 6 or less is ideal – the normal range is considered to be 4.0 to 5.9 per cent). Nearly one in five Canadians with diabetes (17 per cent) were considered to have inadequate control of their blood sugar (A1C levels above 8.4), and one-third (32 per cent) were in a range called "suboptimal" (A1C between 7.0 and 8.4). The bottom line is that half of the patients had A1C levels above the desired level.[10]

The national DICE study also found that 63 per cent of people with type 2 diabetes had high blood pressure and 59 per cent had high cholesterol, two conditions that increase the risk of heart disease, stroke and other complications from diabetes. In Saskatchewan just over half of the people with diabetes (55 per cent) had high cholesterol.[6] Similar results have been documented in northern Alberta.[11]

Although the rates of stroke and heart attack among people with diabetes have been declining,[12] it appears that control of key risk factors for these cardiovascular complications continues to be poor.

3. Too few Canadians get the help they need to avoid diabetes complications.
Patients and their primary health care providers can decide to manage blood sugar, cholesterol, and blood pressure through treatment plans that include medications to control blood sugar and cardiovascular health, lifestyle changes (a combination of a healthier diet and increased physical activity leading to weight loss), or a combination of the two.

The benefits of both approaches – lifestyle changes and medications – are well established,[13, 14, 15] but many Canadians with diabetes are not getting the best possible benefit of either approach. The remainder of this chapter focuses on medication and other aspects of clinical care; we look at approaches to lifestyle change more closely in the next chapter, *Prevention: what works?*

FIGURE 14
Getting recommended tests and procedures – Canada compares well in some areas, poorly in others

	CANADA	AUSTRALIA	NEW ZEALAND	UNITED KINGDOM	UNITED STATES	GERMANY
Number of adults with diabetes surveyed	**103**	97	69	207	296	238
Blood sugar (A1C) check in past 6 months	**90%**	86%	79%[a,b]	85%	90%	91%
Foot exam in past year	**52%**[a,b,c]	57%[c]	66%	75%	70%	65%
Eye exam in past year	**73%**[b]	73%[b]	66%[b,c]	83%[a]	69%[b]	85%
Cholesterol check in past year	**91%**	93%	87%[b]	92%	92%	95%
Received all 4 services	**38%**[a,b,c]	**41%**[a,b,c]	**40%**[a,b,c]	**58%**	**56%**	**55%**

Reading from left to right starting with Canada the letters [a,b,c] indicate that the country differed significantly ($p < 0.05$) from other countries in the study: [a] differs with the United States; [b] differs with Germany; [c] differs with the United Kingdom.

Source: Adapted from Schoen C, Osborn R, Huynh P et al. (2005). Taking the pulse of health care systems: experiences of patients with problems in six countries. *Health Affairs;* 3 Nov [web exclusive]: W5-509-525.

Given the known benefits of medication to control blood sugar, the level of prescribing in Canada seems low, particularly for the drug combinations recommended by experts. The national DICE study found that among Canadians with diabetes who have high blood sugar, 79 per cent had treatment plans that stressed lifestyle changes but just 56 per cent had more aggressive treatment plans that included referral to a specialist or medication to manage their blood sugar.[10] Another Canadian study found that 14 per cent of people with diabetes who had high blood sugar were taking no medications and an additional 50 per cent were taking just one medication to help control their blood sugar.[11]

Medication use to prevent cardiovascular problems among Canadians with diabetes also seems low, even for people at high risk of heart attack or stroke. One study found that, at most, only 22 per cent of patients with diabetes who also had been diagnosed with heart or artery disease were prescribed the well-established combination of three medications to reduce the risk of death from heart attack or stroke.[16] In another Canadian study, two-thirds of seniors with diabetes received medication to lower their blood pressure and less than one-quarter received medication to reduce the fat levels in their blood, despite the known benefits of these medications.[17] In northern Alberta, less than 15 per cent of people with diabetes and high levels of fat in their blood were receiving some form of therapy to lower these levels.[11]

We know that specialists are more likely than family physicians to prescribe appropriate medications to improve cardiovascular health.[18] But the answer does not lie simply in sending more patients to specialists. In fact, Canada is moving in the opposite direction: towards enhancing the role of primary health care teams *supported* by specialists, even for patients with complex conditions.

We don't know the reasons behind these puzzling statistics. Is there an optimum rate for prescribing preventive medications for people with diabetes? That's still a matter of debate. The authors of the DICE study concluded that "current treatment approaches are not intensive enough for a large proportion of patients, especially those with longer duration of disease."[10] Is it that doctors are not prescribing? Are patients not filling prescriptions and, if so, is it out of choice or due to financial constraints? The personal cost of diabetes care varies dramatically depending on where you live in Canada – ranging from full public coverage of medications and supplies in some jurisdictions to several thousand dollars of out-of-pocket expenses in others.[19]

Whatever the reasons, the numbers related to medications are cause for concern, particularly because the research results are consistent across national, provincial and regional studies in Canada. This suggests that either physicians are not prescribing as much as experts would expect, or people with diabetes are not purchasing or taking recommended medications.

4. Health care providers can do more to help patients with diabetes manage their conditions.

Self-care is a critical component of diabetes care. In addition to careful attention to eating healthy food, exercising,[14] and not smoking,[20] people with diabetes need specific knowledge, skills and confidence to manage their own health, and they also need to understand the importance of regular tests and procedures.

A partnership between patients and their health care providers is a necessary condition for successful self-care. People with diabetes who have self-care plans or who see nurses as a regular part of their care are significantly more likely to receive all the recommended tests and procedures described earlier in this chapter.[9]

Self-care is a critical component of diabetes care. In addition to careful attention to eating healthy food, exercising, and not smoking, people with diabetes need specific knowledge, skills and confidence to manage their own health.

Despite evidence that health care providers can help patients with diabetes make lifestyle changes, many primary health care physicians in Canada do not use the most effective strategies to bring this about. Nearly all report that they advise patients with diabetes about the need for healthy eating and exercise, but only about half refer patients for more active support such as nutrition or fitness counselling. Family physicians report that lack of time to spend with patients and patients' difficulty in making lifestyle changes are among the biggest obstacles to using this effective strategy to manage diabetes. But in addition, more than half say they don't know about or don't have access to community-based programs that could help their patients eat better and become more active.[21]

Some jurisdictions in Canada have established programs to help people with diabetes improve their self-management skills and to train health professionals to provide ongoing education and support. For example:

- In Quebec, Diabetes Centres offer health education and training for people with diabetes. Many of the centres do not require a referral from a physician.[19]
- In Ontario, the Ministry of Health and Long-Term Care recently announced funding for 69 new diabetes education teams. The teams consist of a dietitian and a nurse who help patients take an active role in the day-to-day management of their condition.[22]
- In Manitoba, Red River College in Winnipeg helps prepare health professionals for their role as educators by designing a curriculum especially for diabetes and chronic disease educators.[23]
- The Canadian Diabetes Educator Certification Board gives the status of Certified Diabetes Educator to eligible regulated health professionals who have passed an examination.[24]

5. Primary health care offices in Canada aren't organized for the best possible care of chronic conditions.
Primary health care physicians in Canada and six other countries were surveyed in 2005 about various aspects of their practices (Figure 15).[25] Only 55 per cent of Canadian primary care physicians say their practice is well-prepared to handle patients with multiple chronic conditions – the lowest proportion among the seven countries surveyed; Germany ranked highest with 93 per cent. Only 32 per cent routinely use other health care professionals to help deliver care for patients with chronic conditions (81 per cent in the UK). Very few (14 per cent) of Canadian physicians say they routinely give chronic disease patients written instructions on how to manage the conditions at home (63 per cent in Germany, again the highest). Clearly, we can do better in Canada.

Today, we can book a flight, replenish our cash and pay our bills electronically, but Canadians may be surprised to learn that most physicians in Canada still rely on paper records in their offices and don't routinely use technology to help them better manage and coordinate care. Just 23 per cent of primary health care physicians use electronic medical records in Canada, far behind the progress made in Australia (79 per cent), the UK (89 per cent), New Zealand (92 per cent) and the Netherlands (98 per cent). Canada also trails other countries when it comes to computerized systems to access test results, to remind patients about follow-up care, and to prescribe medication (Figure 15). Meanwhile, other countries are making significant headway in creating a secure electronic record of patients' health information.

Primary health care renewal is, fundamentally, about reorganizing the way providers deliver care so that it is safer, more effective, and more efficient. Canadian physicians fall behind here too (Figure 15). Only 44 per cent of those surveyed have been trained in tools and methods to improve quality of care (87 per cent in Germany). Very few physicians in Canada (13 per cent) receive financial incentives to enhance preventive

FIGURE 15

Survey of primary care physicians in 7 countries – Canada is slow to adopt tools that support quality care for chronic health conditions

CARE FOR CHRONICALLY ILL PATIENTS AND USE OF TEAMS	AUSTRALIA	**CANADA**	GERMANY	NETHERLANDS	NEW ZEALAND	UNITED KINGDOM	UNITED STATES
Well-prepared practices to provide optimal care for chronic diseases	69%[a,b,c,e]	**55%**[b,c,d,e,f]	93%[c,d,e,f]	75%[d,f]	67%[e]	76%[f]	68%
Routinely use multidisciplinary teams in delivering chronic care	32%[b,c,e]	**32%**[b,c,e]	49%[d,e,f]	50%[d,e,f]	30%[e]	81%[f]	29%
Definite support for expanding the roles of non-physicians in delivering chronic care	24%[a,b,d,e]	**30%**[b,e,f]	15%[c,d,e,f]	27%[d,e,f]	34%[e,f]	41%[f]	21%
Routine provision of written patient instructions about how to manage their care for their chronic diseases at home	29%[a,b,d,e]	**14%**[b,c,e,f]	63%[c,d,e,f]	25%[d,f]	18%[f]	21%[f]	33%
MEDICAL RECORDS SYSTEMS							
Physicians using electronic medical records in their practice	79%[a,b,c,d,e,f]	**23%**[b,c,d,e,f]	42%[c,d,e,f]	98%[d,e,f]	92%[f]	89%[f]	28%
Routine electronic access to patients' test results	76%[a,b,c,d,e,f]	**27%**[b,c,d,e,f]	34%[c,d,e,f]	78%[d,e,f]	90%[e,f]	84%[f]	48%
Very difficult to generate patient reminders using current records system	12%[a,b,c,d,e,f]	**57%**[b,c,d,e,f]	19%[d,e,f]	18%[d,e,f]	4%[f]	5%[f]	41%
Routine electronic prescribing of medication	81%[a,b,e,f]	**11%**[b,c,d,e,f]	59%[c,d,e,f]	85%[d,e,f]	78%[e,f]	55%[f]	20%
PARTICIPATION IN QUALITY IMPROVEMENT AND RECEIPT OF FINANCIAL INCENTIVES							
Training in quality improvement methods and tools (past 2 years)	60%[a,b,d,f]	**44%**[b,c,d,e,f]	87%[c,d,e,f]	62%[d,f]	69%[e]	61%[f]	67%
Financial incentives for enhanced preventive care activities	53%[a,b,c,d,e,f]	**13%**[b,d,e]	28%[c,d,e,f]	18%[d,e,f]	42%[e,f]	72%[f]	12%
Financial incentives to managing patients with chronic diseases or complex needs	62%[a,b,c,d,e,f]	**37%**[b,c,d,e,f]	24%[c,d,e,f]	47%[d,e,f]	68%[e,f]	79%[f]	8%

Reading from left to right starting with Australia the letters [a-f] indicate that the country differed significantly ($p < 0.05$) from other countries in the study: [a] differs with Canada; [b] differs with Germany; [c] differs with the Netherlands; [d] differs with New Zealand; [e] differs with the United Kingdom; [f] differs with the United States.

Source: Adapted from Schoen C, Osborn R, Huynh P et al. (2006). On the front lines of care: primary care doctors' office systems, experiences, and views in seven countries. *Health Affairs;* 2 Nov [web exclusive]: W555-571.

care (72 per cent in UK), and just 37 per cent receive these incentives specifically to manage patients with chronic health conditions or other complex needs (79 per cent in the UK).

Making improvements in these areas would not necessarily cost more than the way we deliver care currently. It would require, however, a different way of thinking and doing things. The results of this survey show that Canada lags seriously behind other developed countries in areas critical to the success of primary health care renewal and, ultimately, to our ability to improve outcomes for people with chronic health conditions.

In summary, despite the tremendous efforts and good intentions invested in delivering health care in Canada, the way that care is currently provided leaves too many people with chronic health conditions vulnerable to complications that can be avoided. There is a breakdown between expert recommendations on lab tests and procedures and the actual number that are performed. And there is a breakdown between poor test results and action on that information. Despite consistent evidence of poor quality care and compromised health among people with diabetes, primary health care physicians in Canada don't feel prepared to manage the care of people with chronic health conditions in ways that meet expert guidelines. They don't work in teams, and they do not have ready access to the timely and trusted information and supports that they require to improve the situation for their patients. We should do much better; other countries with similar public health care systems have shown that it can be done.

How can we improve care?

Health care system renewal efforts in Canada have focused on specific sectors rather than integration, on wait times for management of acute conditions, and on single disease strategies – rather than on the complex challenges of caring for people with multiple chronic health conditions. But Canadians don't just wait for one type of care nor do they have just one disease. It is currently possible to be treated for diabetes on Monday, for heart problems on Tuesday, for depression on Wednesday, but at no time receive the coordinated, comprehensive care required by a person with a number of health issues. There is a clear need for better integration of information and services to support people with single or multiple conditions.

Where should we invest our efforts to improve care and health outcomes for Canadians with chronic health conditions? A redesign of the traditional family doctor's practice – to introduce teams, technology and other tools for change – will help achieve better care for patients with chronic health conditions and ultimately help promote better health outcomes.

1. Interprofessional teams and case management make a difference.

There is strong evidence that involving interprofessional teams in the ongoing management of people with diabetes results in better health outcomes. Changes that include adding more health care professionals such as pharmacists and nutritionists to teams of nurses and doctors, active participation by more than one kind of professional, and expanding or revising professional roles have all been shown to be associated with significantly better sugar control for patients with diabetes.[26] Some doctors are ready for change: 30 per cent of Canadian primary health care physicians surveyed in 2005 supported expanded roles for non-physicians in delivering care to their chronically ill patients.[25]

The use of case managers appears to be a key component of an effective interprofessional office.[26] Case management is a system of coordinating care for individual patients in collaboration with a primary health care physician and other team members. A case manager arranges referrals for patients and follows up with patients and the team after test results

come in. Primary health care offices that have case managers find that their patients have better blood sugar control, especially when the case manager can adjust medications without a physician's approval. It appears not to matter whether the case manager interacts with the patient in person or on the phone. A centralized case manager can help keep the patient and his or her complex health care needs at the centre of team-based care.

2. Collaboratives can help improve care.
One approach to improving the performance of teams that serve people with chronic health conditions is the establishment of "collaboratives." In Canada, collaboratives are usually teams that bring health care system managers and health care providers together to plan how to do things differently, to do things differently, to study the impact of change, and to act on that new knowledge. This quality improvement strategy has proven effective at increasing patient and provider satisfaction – and health outcomes – by enabling participants to share experiences, accelerate learning, and spread best practices.[27, 28, 29, 30]

Collaboratives help overcome some of the historic barriers to change: the lack of time for busy practitioners to follow established practice guidelines, the lack of care coordination, the lack of systems designed to track patients and their outcomes, and the lack of time and procedures to adequately educate patients to manage their conditions.[31, 32] In Chapter 5, we highlight collaboratives targeting diabetes and other chronic health conditions in British Columbia, Saskatchewan, and Newfoundland and Labrador.

3. Information technology helps health care providers do their best work – and policy makers know what's working to improve health outcomes.
Electronic health records and other electronic systems enable health care teams to have ready access to vital information about their patients and to share information about the progress of care. Technology can be used to remind office staff to contact patients for follow-up care and to remind health care providers to conduct recommended tests. It can also help patients and providers to keep track of prescriptions and test results.

There is strong evidence that the use of information technology as a tool for quality improvement in health care can result in better care and lead to better health outcomes.[33, 34] But only one in five family physicians in Canada has access to electronic systems for patient care – the lowest proportion among 11 countries recently compared on measures of information technology in primary health care[35] – and most of the systems that do exist in Canada produce only a partial electronic health record.

When technology is used to gather data on quality of care from a large number of providers, for example through collaboratives (see Chapter 5: *Where are we succeeding?*), public-policy makers and health care system managers have information to evaluate how well our systems are working to improve health outcomes, or not.

4. Financial incentives for health care providers can be part of solutions to improve quality of care.
A number of countries with publicly funded health care systems are using financial incentives for physicians in order to stimulate changes in the quality of health care. The UK, for example, began a "pay-for-performance" scheme in 2004: a physician's income can increase by up to 25 per cent if he or she meets a series of evidence-based targets (such as monitoring blood sugar and checking blood pressure) for patients with chronic health conditions. As a result, UK physicians have delivered 80 per cent of the recommended targets for eligible patients with diabetes.[36]

In Canada, some provinces are experimenting with financial incentives for doctors to learn about how to change the way they organize care and to make changes in their practices. For example, British Columbia has adopted a pay-for-performance system to improve the quality of diabetes care. Family physicians are eligible for an annual payment of $125 for each diabetes patient who receives care according to the BC Clinical Practice Guidelines.[37]

Primary health care offices that have case managers find that their patients have better blood sugar control.

A key challenge for Canada in evaluating the effectiveness of this tool will be the lack of comprehensive information systems to measure whether financial incentives make a difference. We know from research in other countries that pay-for-performance schemes must be carefully designed and used as part of a multi-faceted approach to improving the quality of care delivered by health care providers.[38] Financial incentives are not the only answer but can be part of a solution.

5. When people with diabetes receive higher levels of recommended care, it pays off in health and economic terms.

Even modest improvements in test results can make dramatic differences in the health of people with diabetes, by lowering the risk of complications. That's why getting the recommended tests and procedures – and acting on the results – is so important. Each one per cent reduction in average blood sugar levels (for example, a reduction in A1C to seven per cent from eight per cent) has been linked to:

- a 37 per cent decline in the risk of damage to blood vessels (which can lead to conditions such as kidney disease and eye damage);
- a 14 per cent lower rate of heart attack; and
- a 21 per cent reduction in deaths related to diabetes.[39]

Lowering blood sugar levels can reduce the risk of eye disease by 76 per cent and kidney disease by just over 50 per cent.[40]

Monitoring the health of people with chronic conditions also pays off in terms of how people use health care services. Older, sicker Canadians with diabetes have been shown to be less likely to be admitted to hospital if they receive more of the recommended lab tests and procedures through visits to their family doctor (Figure 16). Not only does community-based care cost the health care system less than hospital care (although the cost of prescription drugs was not factored into this study), but it is also likely that patients who do not need hospital care are enjoying a better quality of life. Their lower use of hospital care could indicate that people who receive more preventive care have lower rates of complications from their diabetes. (See sidebar: *The Case of Ruth and Anna.*)

The same BC research shows that getting the appropriate lab tests and procedures does not necessarily mean that people should simply see their doctor more often. Of the more than 20,000 patients studied (not just the older, sicker ones like Ruth and Anna), 45 per cent on average received lab tests to monitor blood sugar on the recommended schedule – and that proportion did not increase much for patients who saw their doctor more than five times a year (Figure 17). Results were similar for other types of recommended lab tests for people with diabetes: quality of care reached a plateau after around five visits.[41] We may need more health care providers – or more of the right kind of providers – for a number of reasons, but that alone will not improve health outcomes. It's what takes place

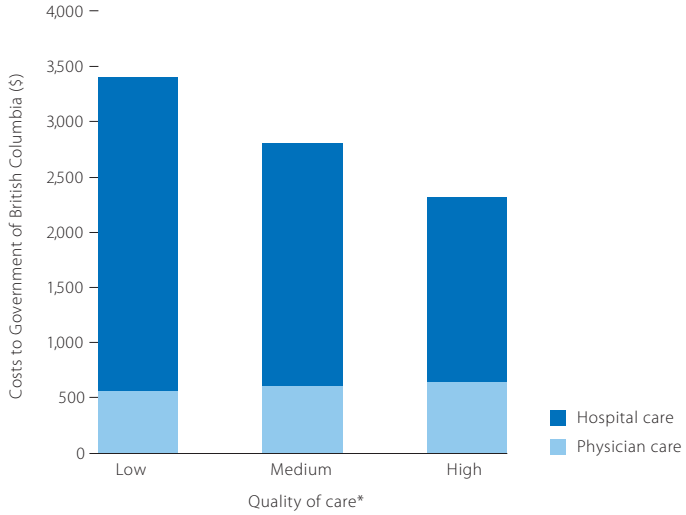


FIGURE 16

More preventive care means less time in hospital – and lower hospital costs

This graph shows the average annual per-patient costs for older, sicker adults in a region of southern British Columbia during the 5-year period 1996-2001. People who received more recommended lab tests and procedures during their visits to doctors (high quality of care) used the least amount of hospital care. The cost of physician services is much lower than the cost of hospital care, so these people had lower total health care costs. This study did not include the cost of medications, lab tests or other services that contribute to the public cost of health care.

* Levels of quality of care are based on the % of recommended lab tests and procedures that patients with diabetes received, averaged over 5 years. Low = 31%; medium = 52%; high = 73%. Study population was 7,000 older, sicker patients with diabetes in Fraser Health Authority, BC, 1996-2001.

Source: Krueger H. (2006). The Relationship between Long-Term Adherence to Recommended Clinical Procedures and Health Care Utilization for Adults with Diagnosed Type 2 Diabetes. [PhD dissertation]. University of British Columbia, Department of Health Care and Epidemiology.

THE CASE OF RUTH AND ANNA

Elderly cousins share disease, but not experiences of care

This fictional story, based on research about real patients in British Columbia, illustrates some of the economic benefits of doing things differently.

Ruth and her cousin Anna are both 69 years old. They grew up together – and now they have diabetes in common, a condition they have shared since they were each diagnosed at age 45.

Since then, Ruth has seen a physician routinely and has received a high level (about three-quarters) of recommended lab tests and procedures to help prevent complications. Now, at age 69, she sees a doctor 16 times each year. These physician visits cost the British Columbia health insurance system around $645 a year.

Anna sees a physician only somewhat less often than Ruth (14 times a year), but Anna has been getting only about one-third of the recommended tests and procedures. Anna's physician visits cost the BC system about $570 in total each year.

Because Anna and her doctors have not had as much information to help them monitor her health and control emerging complications, Anna is much more likely than Ruth to use hospital care. Ruth has about a one-in-two chance (56 per cent) of being admitted to a hospital in the next five years. But Anna's risk of needing hospital care is substantially higher – about a two-in-three chance (64 per cent). And when Anna goes to a hospital, she will stay nearly twice as long as Ruth – 12 days, compared to six or seven days for Ruth.

The cost of Ruth's physician visits each year are higher than Anna's, but the higher level of recommended tests and procedures that Ruth receives results in less need for expensive hospital care. In the end, the total cost of Ruth's physician and hospital care is 47 per cent lower than Anna's – $2,320 per year for Ruth, compared to $3,400 for Anna (Figure 16). And Ruth enjoys a better quality of life with fewer complications from her diabetes.

The data behind the story of Anna and Ruth

The people in the story about diabetes care are not real, but their situations are drawn from an analysis of actual health care data. The study looked at the type of care received over five years (1996 - 2001) by more than 20,000 adults with diabetes living in the Fraser Health Authority in southern British Columbia. The older, sicker patients, like Anna and Ruth, comprised about 7,000 people in this study.[41]

People were divided into three categories, based on how well their care met accepted recommendations to help prevent the common complications of diabetes:

- A *high* quality of care means they received, on average, 73 per cent of recommended tests over the five-year period.
- Patients with a *medium* quality of care received, on average, 52 per cent of recommended tests.
- A *low* quality of care means patients received, on average, 31 per cent of recommended tests.

The study then calculated the average annual costs of care in doctor's offices and in hospital, for patients in each category. Cost figures apply to BC; health care costs will be different in each province and territory. But in all jurisdictions, hospital care is more expensive than physician care, and the use of hospital care suggests that patients are sicker – requiring surgery or intensive care, for example. The study did not include the costs of medications or tests.

When health care providers work together and use a combination of strategies and tools, patients are much more likely to receive care that meets expert guidelines and, ultimately, to see better health outcomes.

during those health care visits that matters more. This evidence underlines the importance of changing how we deliver care – by altering some of the roles of care providers (for example, making more use of case managers) and by changing the way care is organized and measured (for example, creating more collaboratives).

6. Helping people manage conditions is key.
A large burden of self-care rests on individuals with diabetes. Canadians who effectively manage their diabetes take their prescribed medications and follow advice from their health care professionals; they exercise regularly, follow a healthy diet, and periodically check their skin for sores. The evidence is clear that teaching people how to be partners in their own health helps them stay healthier. Patients who best understand how to take care of their diabetes are the most likely to actually engage in regular self-care.[42] This underscores the importance of education and support for patients and their families.

Self-management programs for people with diabetes have produced modest but important improvements in blood pressure and blood sugar levels – reductions that are associated with fewer complications such as heart attacks and strokes.[43] These programs have been less successful in promoting weight loss,[43, 44] but exercise has been shown to improve blood sugar control even without weight loss.[45]

Group training is an effective method of delivering health education and teaching about diabetes, as well as promoting weight loss and reducing blood pressure.[46] Patient education appears to be equally effective whether groups are conducted by physicians, nurses, or dietitians. People learning self-management in group settings know more about diabetes and do better at improving their blood sugar, blood pressure, and weight, compared to patients who do not get this type of support. This evidence highlights the benefits of self-management programs, although experts have not identified the single most effective method for designing such a program.

In conclusion, with the right kind of changes in the way we care for people with chronic health conditions, Canadians can look forward to a higher quality of care and better health outcomes. Our current approach to managing these complex health problems is piecemeal and out of date; the care we provide is unsatisfactory. The first line of action is primary health care – and governments have made commitments to renew this sector by, for example, expanding collaborative care. This is the right direction. We expect that these teams will make a difference, particularly if they include case managers.

As the Health Council noted in our recent report, *Health Care Renewal in Canada: Measuring Up?* (February 2007), the last few years have seen only modest growth in the number of group practices and small shifts toward interprofessional teams with case managers. There has been too little integration among family practices, specialists, pharmacies and hospitals to support continuity of care and too few investments to strengthen the family practices where many Canadians receive both care and information critical to managing their conditions.

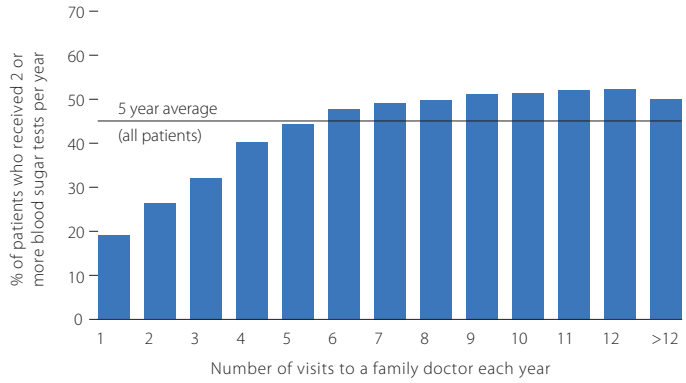


FIGURE 17
Getting blood sugar checked in BC – more visits don't always lead to better diabetes care
What is the best way to ensure that people with diabetes get a lab test to check their blood sugar every 3 months, as recommended in expert guidelines? This graph suggests that simply seeing the family doctor more often is not the sole solution. No more than 50% of diabetes patients in this study of a BC health region received all of the recommended tests, on average, no matter how many times they saw their doctor.

Study population was 20,000 patients with diabetes in Fraser Health Authority, BC, 1996-2001.

Source: Krueger H. (2006). The Relationship between Long-Term Adherence to Recommended Clinical Procedures and Health Care Utilization for Adults with Diagnosed Type 2 Diabetes. [PhD dissertation]. University of British Columbia, Department of Health Care and Epidemiology.

But, as we've seen in this chapter, when health care providers work together and use a combination of strategies and tools, such as case management, information technology, financial incentives, and diabetes education, patients are much more likely to receive care that meets expert guidelines and, ultimately, to see better health outcomes. The experience of the publicly funded Veterans Health Administration in the US, profiled in Chapter 5, provides another example of transformed care and prevention of chronic health conditions that has paid off in better health as well as in costs saved.

The next chapter – *Prevention: what works?* – looks at how Canada can improve its progress in the prevention of diabetes and chronic health conditions.

References

1 World Health Organization. (2001). *Innovative Care for Chronic Conditions.* [meeting report]. Geneva: WHO. *www.who.int/chp/knowledge/publications/icccmeeting.pdf.*

2 Rothman AA and Wagner EH. (2003). Chronic illness management: what is the role of primary care? *Annals of Internal Medicine;* 138(3): 256-261.

3 Public Health Agency of Canada. (2003). Diabetes: facts & figures. [web page]. *www.phac-aspc.gc.ca/ccdpc-cpcmc/diabetes-diabete/english/facts/index.html.*

4 Public Health Agency of Canada. (2003). What are the complications of diabetes? [web page]. *www.phac-aspc.gc.ca/ccdpc-cpcmc/diabetes-diabete/english/whatis/complications.html.*

5 Sanmartin C and Gilmore J. (2006). Diabetes care in Canada: results from selected provinces. In: Statistics Canada. *Smoking and diabetes care: results from the CCHS Cycle 3.1 (2005).*Catalogue No. 82-621-XIE. Ottawa: Statistics Canada. *www.statcan.ca*.

6 Chan B, Klomp H, Cascagnette P. (2006). *Quality of Diabetes Management in Saskatchewan.* Saskatoon: Health Quality Council. *www.hqc.sk.ca.*

7 Watson DE, Krueger H, Mooney D, Black C. (2005). *Planning for Renewal - Mapping Primary Health Care in British Columbia.* Vancouver: Centre for Health Services and Policy Research. *www.chspr.ubc.ca.*

8 Woodward G, van Walraven C, Hux JE. (2006). Utilization and outcomes of HbA1C testing: a population-based study. *CMAJ;* 174(3): 327-329.

9 Schoen C, Osborn R, Huynh PT et al. (2005). Taking the pulse of health care systems: experiences of patients with health problems in six countries. *Health Affairs;* 3 Nov [web exclusive]: W5-509-525.

10 Harris SB, Ekoe JM, Zdanowiczy et al. (2005). Glycemic control and morbidity in the Canadian primary care setting (results of the Diabetes in Canada Evaluation study). *Diabetes Research and Clinical Practice;* 70(1): 90-97.

11 Toth EL, Majumdar SR, Guirguis LM et al. (2003). Compliance with clinical practice guidelines for type 2 diabetes in rural patients: treatment gaps and opportunities for improvement. *Pharmacotherapy*; 23(5): 659-665.

12 Booth GL, Kapral MK, Fung K et al. (2006). Recent trends in cardiovascular complications among men and women with and without diabetes. *Diabetes Care;* 29(1): 32-7.

13 UK Prospective Diabetes Study Group. (1998). Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *The Lancet;* 352(9131): 837-853.

14 Sigal RJ, Kenny GP, Wasserman DH, Castaneda-Sceppa C. (2004). Physical activity/exercise and type 2 diabetes. American Diabetes Association Consensus Statement. *Diabetes Care;* 27(10): 2518-2539.

15 UK Prospective Diabetes Study Group. (1998). Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UPKDS 38. *BMJ;* 317(7160): 703-713.

16 Brown LC, Johnson JA, Majumdar SR et al. (2004). Evidence of suboptimal management of cardiovascular risk in patients with type 2 diabetes mellitus and symptomatic atherosclerosis. *CMAJ*; 171: 1189-1192.

17 Shah BR, Mamdani M, and Kopp A. Drug use in older people with diabetes. (2003). In: Hux JE, Booth GL, Slaughter PM, Laupacis A (eds). *Diabetes in Ontario: An ICES Practice Atlas*. Institute for Clinical Evaluative Sciences. *www.ices.on.ca.*

18 Shah B, Hux JE, Laupacis A et al. (2006). Use of vascular risk-modifying medications for diabetic patients differs between physician specialties. *Diabetic Medicine;* 23(10): 1117-1123.

19 Canadian Diabetes Association and Diabetes Quebec. (2005). *Diabetes Report 2005: The Serious Face of Diabetes in Canada.* Toronto: CDA. *www.diabetes.ca/section_advocacy/diabetesreport2005.asp*

20 Eliasson B. Cigarette smoking and diabetes. (2003). *Progress in Cardiovascular Diseases;* 45(5): 405-413.

21 Harris SB, Petrella RJ, Lambert-Lanning A et al. (2004). Lifestyle management for type 2 diabetes: are family physicians ready and willing? *Canadian Family Physician;* 50: 1235-1243.

22 Ontario Ministry of Health and Long-Term Care. McGuinty government improving diabetes care: new education and care teams to help 69,000 Ontarians. [press release, Nov 30, 2005]. *http://ogov.newswire.ca/ontario/GPOE/2005/11/30/c1609.html?lmatch=&lang=_e.html*

23 Canadian Diabetes Association and Diabetes Quebec. (2005). *Manitoba and Diabetes Report 2005*. Supplement to *Diabetes Report 2005: The Serious Face of Diabetes in Canada.* Toronto: CDA. *www.diabetes.ca.*

24 Canadian Diabetes Educator Certification Board. (2006). Diabetes Educator Certification Requirements. *www.cdecb.ca.*

25 Schoen C, Osborn R, Trang HP et al. (2006) .On the front lines of care: primary care doctors' office systems, experiences, and views in seven countries. *Health Affairs;* 2 Nov [web exclusive]: W555-571.

26 Shojania KG, Ranji SR, McDonald KM et al. (2006). Effects of quality improvement strategies for type 2 diabetes on glycemic control: a meta-regression analysis. *JAMA;* 296(4): 427-440.

27 Asch SM, Baker DW, Keesey JW et al. (2005). Does the collaborative model improve care for chronic heart failure? *Medical Care;* 43(7): 667-675.

28 Tsai AC, Morton SC, Mangione CM, and Keeler EB. (2005). A meta-analysis of interventions to improve care for chronic illnesses. *American Journal of Managed Care;* 11(8): 478-488.

29 Piatt GA, Orchard TJ, Emerson S et al. (2006). Translating the chronic care model into the community: results from a randomized controlled trial of a multifaceted diabetes care intervention. *Diabetes Care;* 29(4): 811-817.

30 Additional evaluations can be found in: Rand Corporation. (2006). Improving chronic illness care: evaluation. [bibliography]. *www.rand.org/health/projects/icice/findings.html.*

31 Wagner EH, Austin BT, Von Korff M. (1996). Organizing care for patients with chronic illness. *Milbank Quarterly;* 74: 511-544.

32 For more information on collaboratives and the chronic care illness model, please see the website, Improving Chronic Illness Care, a program of the Robert Wood Johnson Foundation, *www.improvingchroniccare.org;* and the website of the Institute for Healthcare Improvement, *www.ihi.org*.

33 Jackson CL, Bolen S, Brancati FL et al. (2006). A systematic review of interactive computer-assisted technology in diabetes care. *Journal of General Internal Medicine;* 21(2): 105-110.

34 Renders CM, Valk GD, Griffin SJ et al. (2001). Interventions to improve the management of diabetes in primary care, outpatient, and community settings: a systematic review. *Diabetes Care;* 24(10): 1821-1833.

35 Protti D. (2006). Adoption of IT [information technology] by GP/FMS [general practitioners and family medicine specialists]: a 10-country comparison. *www.cma.ca/index.cfm/ci_id/49044/la_id/1.htm.*

36 Doran T, Fullwood C, Gravelle H et al. (2006). Pay-for-performance programs in family practices in the United Kingdom. *New England Journal of Medicine;* 355(4): 375-384.

37 British Columbia Ministry of Health. (2006). Full services family practice incentive program. [web page]. *www.health.gov.bc.ca/cdm/practitioners/fullservice.html.*

38 Epstein AM. (2006). Paying for performance in the United States and abroad. *New England Journal of Medicine;* 355(4): 406-8.

39 Stratton IM, Adler AI, Neil HA et al. (2000). Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. *BMJ*; 321(7258): 405-412.

40 The Diabetes Control and Complications Trial Research Group. (1993). The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *New England Journal of Medicine;* 329(14): 977-986.

41 Krueger H. (2006). The Relationship between Long-Term Adherence to Recommended Clinical Procedures and Health Care Utilization for Adults with Diagnosed Type 2 Diabetes. [PhD dissertation]. University of British Columbia, Department of Health Care and Epidemiology.

42 Heisler M., Bouknight RR, Hayward RA et al. (2002). The relative importance of physician communication, participatory decision making, and patient understanding in diabetes self-management. *Journal of General Internal Medicine*; 17: 243-252.

43 Chodosh J, Morton SC, Mojica W et al. (2005). Meta analysis: chronic disease self-management programs for older adults. *Annals of Internal Medicine;* 143: 427-438.

44 Norris SL, Zhang X, Avenell A et al. (2005). Long-term non-pharmacological weight loss interventions for adults with type 2 diabetes mellitus. *Cochrane Database of Systematic Reviews;* Issue 2. *www.cochrane.org.*

45 Thomas DE, Elliot EJ, and Naughton GA. (2006). Exercise for type 2 diabetes mellitus. *Cochrane Database of Systematic Reviews,* Issue 3. *www.cochrane.org.*

46 Deakin T, McShane CE, Cade JE, Williams R. (2005). Group based training for self-management strategies in people with type 2 diabetes mellitus. *Cochrane Database of Systematic Reviews;* Issue 2. *www.cochrane.org.*

Small improvements in health care for people with chronic health conditions can make a big difference – to individual health and to the future cost of health care.

PREVENTION: WHAT WORKS? "All governments recognize that public health efforts on health promotion, disease and injury prevention are critical to achieving better health outcomes for Canadians and contributing to the long-term sustainability of medicare by reducing pressure on the health care system."

First Ministers' 2004 10-year Plan to Strengthen Health Care

4

Despite the problems identified in the last chapter, the news is not all bad. The rates of heart attack and stroke among Canadians with diabetes are declining, an important indication that care is getting better. At the same time, however, the number of people developing diabetes continues to rise. This trend threatens to overwhelm the gains we can make through better health care.

Are we doing enough to prevent the avoidable burden of this and other chronic health conditions? In this chapter, we outline the evidence on effective strategies for prevention of diabetes and highlight some initiatives underway in Canada. The chapter also describes areas in which all groups – public-policy makers, health care system managers and care providers, individual Canadians and our families and communities – can influence the success of prevention activities and, ultimately, improve health outcomes.

What we know is this:

- Targeted screening can have a significant impact on ensuring that people at high risk of diabetes, or who have this condition but don't yet know it, are provided with timely care.
- Both medication and lifestyle changes are effective approaches to delay or prevent the onset of diabetes, but lifestyle changes have added benefits.
- Prevention of chronic health conditions requires sustained, coordinated action on many fronts both inside and outside of the health care system and traditional health promotion activities.

1. Targeted screening identifies people who could benefit from preventive care.

Screening is the process of detecting a disease like diabetes in a person who has no symptoms. About two to three per cent of adults in Canada have diabetes but don't know it.[1,2] Screening is also used to identify people with pre-diabetes – a condition considered to be a precursor to the disease.

Early detection may improve health outcomes and save health care dollars. Most experts agree that screening the entire population does not make much sense because it is very expensive and the number of identified additional cases would not be very high. In fact, it is at least five to 10 times more cost effective to target screening initiatives to specific populations than to screen the full adult population for diabetes.[3,4]

Health care providers in Canada use guidelines to help them identify high-risk people who could benefit most from screening. For example, the Canadian Diabetes Association recommends that health care providers screen people aged 40 or over for diabetes during office visits every three years, or earlier if they have other factors such as a first-degree relative with diabetes, obesity, or heart disease.[5] The Canadian Task Force on Preventive Health Care recommends against screening the entire population but says that screening those with high blood pressure or high cholesterol can reduce poor heart health outcomes, such as heart attacks and strokes.[6,7] These guidelines are intended to target investments in screening most efficiently and effectively.

The early identification of people with pre-diabetes or undiagnosed disease provides important opportunities to stop or delay the onset of diabetes and to offer the best possible care. Screening of high-risk ethnic groups (Aboriginal people, South Asians, Latin Americans, among others) is one area where we need greater investments. These groups have a high rate of diabetes compared to the general population in Canada but also, as a number of studies have found, a higher rate of having undiagnosed diabetes (see Chapter 2). The InterCommunity Health Centre in London, Ontario, screens local high-risk ethnic populations and supports preventive action for families through its Latin American Diabetes Program. (See Chapter 5 for a spotlight on this innovative work.)

Prevention of chronic health conditions requires sustained, coordinated action on many fronts both inside and outside of the health care system and traditional health promotion activities.

2. Preventive medications and lifestyle changes are two tried-and-true methods of preventing or delaying the onset of diabetes.
People with pre-diabetes who get regular exercise, eat a healthier diet, and lose weight can delay or prevent the onset of diabetes. People with pre-diabetes who undertook intensive lifestyle changes were almost 60 per cent less likely to develop diabetes than high-risk people who did not make lifestyle changes. With just a modest weight loss (approximately 4 kg) over a period of three to six years, approximately 60 per cent of people at high risk of diabetes were able to prevent the onset of disease.[8, 9]

Medications to control blood sugar can also be effective in preventing or delaying the onset of diabetes for high-risk people. However, people using these medications still need to ensure that they stay active and eat well, so that an unhealthy lifestyle does not cancel out the benefits of their medications. In fact, lifestyle changes appear to be at least as effective as – if not more so – than medications in preventing the progression of diabetes. In addition, a healthier lifestyle has the added advantage of reducing the risk of a range of chronic diseases, and this approach has none of the potential side effects that medications may have.[9, 10]

3. Action must go beyond the traditional boundaries of health care.
To a great extent, action to reduce the risk that more people will develop chronic health conditions must take place outside of the usual territory of health care. Public-policy makers, health care system managers, health care providers, individual Canadians and our families and communities all have opportunities to contribute to better health outcomes by taking action on prevention.

Public-policy makers can actively promote healthy body weights through, for example, the influence they have on the price and availability of various kinds of food, as well as on the price and availability of recreational activities.

Across the country, governments have made commitments that support the prevention of chronic health conditions. Awareness is growing about the need to consider the social and environmental causes of poor health. Healthy living strategies are taking root. In the sidebar *Diabetes prevention: what are governments doing?* (page 54), we provide a snapshot of current commitments and policy initiatives. These strategies are generally designed to increase awareness about diabetes and risk factors for chronic health conditions. In some cases, the strategies also provide funds to support health care system managers and health care providers to enhance their work in preventing and delaying the onset of diabetes.

Health care system managers and care providers can play an important role by linking their patients to community support strategies and by helping community-based agencies and businesses to design and implement health promotion and disease prevention programs. They can help individuals and families access the information and education they need to improve their health and to understand when decisions and actions adversely affect health. The next chapter profiles the Island Lake Regional Renal Health Program, underway in a First Nations region of northern Manitoba. The program was developed in response to the high rates of chronic kidney disease in the area, largely due to diabetes, and the initiative links innovative health care delivery with community programs that are enabling a new focus on prevention of diabetes and other chronic health conditions.

Community programs that target the reduction of risk factors for chronic disease and promote healthy lifestyles are an attractive option to improve the health of Canadians. Community-wide programs can result in small benefits for many people in the population and large benefits to high-risk individuals. When these benefits are added up across an entire population, they are likely to have a substantial positive impact on overall health outcomes.

Experts note that these programs should have community ownership and stable and sustained funding. Programs should engage multi-faceted strategies to offer smoking cessation programs, opportunities for fitness activities, and advice on diet and exercise. Community initiatives should be delivered in the places Canadians live, work, learn and play. Sustainable programs should involve collaboration among multiple sectors – education, business, media, social services and health care.[11, 12]

Strategies should target environmental risk factors, and they should work towards individual behaviour change. For example, we know that communities with more fast food restaurants have higher rates of death and hospital admissions from heart disease.[13] Addressing this kind of environmental factor, however, may lie outside the direct influence of a community program. This underscores the importance of public policy that tackles the broad determinants of health, while also supporting community-level initiatives.

We highlight several successful community initiatives in Chapter 5. A few examples of other approaches include:

- Pauktuutit Inuit Women of Canada developed an Inuit-specific teaching tool to raise awareness about diabetes and healthy living. A project coordinator and an Inuk living with diabetes hold focus groups in English and Inuktitut in Inuit communities in the North.[14]
- The KidSport Fund by Sport PEI helps families in Prince Edward Island enrol their children in sporting activities through financial assistance.[15]
- In Nunavut and the Northwest Territories, the Drop the Pop campaign – a partnership between local schools, government agencies and the NWT/NU Dental Association – encourages students and family members to choose alternatives to high-sugar drinks in an annual challenge. Schools use prize money to fund supplies for healthy eating and active living programs, and the program is expanding across the North.[16]

These initiatives have used a wide array of techniques to reach the general population, ranging from mass marketing via television and print media, as well as targeted activities such as seminars, coaching and counselling to reach high-risk groups.

4. Translating the success of controlled studies to communities at large has been challenging.
Studies in China, Finland, and the United States – three culturally diverse countries with very different health care systems – have all demonstrated that a modest weight loss over a period of three to six years by people with pre-diabetes can prevent or delay a substantial number of type 2 diabetes cases. In these studies, volunteers received programs ranging from one-on-one learning sessions to group workshops on diet and exercise with individual goal-setting and follow-up. Participants developed 46 to 58 per cent fewer new cases of diabetes, compared to control groups.[8, 9, 17] And three years after the end of the Finnish study, the group of people who had originally received the program continued to benefit: there were 43 per cent fewer new cases of diabetes in this group, compared to the control group.[18]

Broad community-wide studies have tried to replicate the success of these controlled experiments in communities at large. These studies typically use mass-media campaigns combined with clinics and seminars designed to teach people how to best adopt a healthier lifestyle. To evaluate whether programs are effective, researchers compare changes in the risk factors (such as levels of physical activity, weight and eating habits) and in the death rate from various chronic diseases (such as diabetes and heart disease) in the city that received the program to another similar city where no major campaigns to promote healthy lifestyles were underway. Some interventions have been able to produce community-wide increases in people's knowledge of risk factors for chronic disease and reductions in health problems such as high blood pressure, high cholesterol, and smoking.[11] Unfortunately, the majority of these studies failed to show any significant reductions in heart attacks, strokes, or deaths (the ultimate marker of success) in the study city relative to the comparison city – although one US project demonstrated reductions in deaths from cancer and heart disease.[11, 19, 20] Community-based projects in Canada focusing on a socially disadvantaged population in Quebec and a rural Aboriginal population in British Columbia also struggled to demonstrate success.[21, 22]

Some community-driven initiatives that are informed by research have shown important reductions in chronic diseases in Canada. For example, the Kahnawake Schools Diabetes Prevention Project has run for 12 years and features a host of interventions focused on school-aged children and their families to reduce the risk of developing diabetes. The overall rate of growth of new cases in this Aboriginal community in Quebec has decreased substantially. Incidence rates (new cases) in Kahnawake are now similar to national rates, a situation in sharp contrast to that in most other Aboriginal communities, where rates are rising (Figure 9, Chapter 2). This impressive project is highlighted in Chapter 5: *Where are we succeeding?*

There are a range of possible reasons for these mixed results. Community studies lack the intensity of intervention used in controlled studies. Community members do not get a personal coach or tailored lifestyle programs, and there are no friendly reminders from study staff about adhering to the program. Furthermore, people who enrol in a controlled study are probably more motivated to change their behaviour than people who choose not to volunteer. Clearly, more work needs to be done to translate successful research-driven interventions to new settings because even small improvements in individual health likely sum up to improved health status for entire communities.

It is difficult to pinpoint which factors determine success. Any single intervention designed to reduce the burden of chronic disease takes many years to demonstrate significant effects because most people in any given population are probably at low risk for developing heart disease or diabetes in the near future. Also, the benefits of a healthy lifestyle are not limited to reducing the risk of one particular chronic disease. More research is needed to determine how to best encourage large groups of people to adopt and maintain healthier lifestyles.

5. Combined strategies that harness the authority of governments and the energy of community programs can be highly effective.

While we know relatively little about the potential impact of any one approach to improving risk factors for chronic health conditions, we have seen how effective lifestyle campaigns can be. Consider the success of combined strategies that have gotten so many of us to quit smoking, use our seat belts, and not drink and drive. They boosted the influence of public information and mass media campaigns with the power of regulations or legislation. It takes years of work to change social norms, but it can be done. Campaigns must be funded by public-policy makers but can be led or hosted by health care system managers and local communities. Research should continue to investigate what kinds of policy interventions have the greatest potential to stimulate behaviour change among Canadians at the level of individuals, families and communities.

The importance of working across government ministries to integrate policy approaches is gaining recognition. British Columbia's ActNow BC program, highlighted in Chapter 5, is one example of collaboration in Canada between a ministry of health and other government partners not traditionally involved in health promotion and prevention initiatives. And work led by the World Health Organization has described how agriculture policy, for example, can contribute to healthier lifestyles.[23]

From its global vantage point, the International Diabetes Federation recently called the clustering of risk factors that lead to diabetes, heart disease, and related chronic health conditions "a time bomb for both individuals with diabetes and the nations faced with the public health burden."[24] Canada is no exception to these risks, as we've seen throughout this report. We are experiencing unprecedented levels of obesity and inactivity, our population is aging, and the

(CONTINUED ON PAGE 56)

With a modest weight loss (about 4 kg, or 9 lb) over three to six years, roughly 60 per cent of people at high risk of diabetes were able to prevent the onset of disease.

DIABETES PREVENTION: WHAT ARE GOVERNMENTS DOING?

Across the country, governments have made commitments that support the prevention of chronic health conditions. Awareness is growing about the need to consider the social and environmental causes of poor health. Here is a snapshot of current commitments and policy initiatives.

What have governments promised?
In February 2003, the prime minister and premiers signed the *First Ministers' Accord on Health Care Renewal,* which made general commitments to a "healthy Canadians" agenda:

"Coordinated approaches are necessary to deal with the issue of obesity, promote physical fitness and improve public and environmental health. First Ministers direct Health Ministers to continue their work on healthy living strategies and other initiatives to reduce disparities in health status."

In September 2004, First Ministers signed the *10-Year Plan to Strengthen Health Care* in which they made further general commitments to advancing "prevention, promotion and public health":

"All governments recognize that public health efforts on health promotion, disease and injury prevention are critical to achieving better health outcomes for Canadians and contributing to the long-term sustainability of medicare by reducing pressure on the health care system. In particular, managing chronic disease more effectively maintains health status for individuals and counters a growing trend of increasing disease burden."

What are governments doing?
The Health Council's February 2007 report – *Health Care Renewal in Canada: Measuring Up?* – updates Canadians on the progress of strategies to promote healthy living and initiatives to reduce inequalities in health. Here we highlight activities that are particularly relevant to the prevention of diabetes and related chronic health conditions.

In 1999, the Government of Canada introduced the **Canadian Diabetes Strategy** to coordinate national efforts to prevent and manage this chronic disease. The Public Health Agency of Canada, through its Centre for Chronic Disease Prevention and Control, now manages this strategy. For 2006/2007, $18 million has been committed for this effort. Activities under the Canadian Diabetes Strategy include:

> developing an integrated and coordinated approach for reducing the impact of diabetes in Canada;
> monitoring diabetes and its complications through the National Diabetes Surveillance System; and
> reducing the duplication of effort between government agencies and other organizations such as the Canadian Diabetes Association.

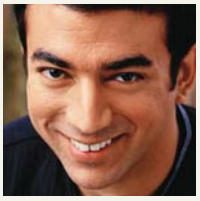
See: *www.phac-aspc.gc.ca/ccdpc-cpcmc/diabetes-diabete/english/strategy/index.html*

Launched in 1999, the **Aboriginal Diabetes Initiative (ADI)** provides care and treatment for First Nations on-reserve and Inuit communities under the umbrella of the Canadian Diabetes Strategy but with distinct funding (currently $190 million for 2005-2010). Program components of the ADI include health promotion, primary prevention, screening and care, capacity building and treatment, research and surveillance, and evaluation and monitoring.

See: *www.phac-aspc.gc.ca/ccdpc-cpcmc/diabetes-diabete/english/strategy/adi.html*

In November 2006, the Government of Canada announced that up to 10 First Nations communities would participate in new two-year pilot projects on **wait-time guarantees for diabetes care**. The projects will evaluate whether diabetes care and prevention services can be provided in Aboriginal communities within specified time frames. For example, adults living on-reserve will be given the opportunity to participate in a diabetes prevention, education and support program within three months of testing positive for pre-diabetes.

See: *www.hc-sc.gc.ca/ahc-asc/media/nr-cp/2006/2006_118_e.html*



In 2005, the federal government announced a commitment of $300 million over five years for activities under the banner of the **Integrated Strategy on Healthy Living and Chronic Disease.** As of early 2007, $26.4 million of this funding has been released. With the **Integrated Pan-Canadian Healthy Living Strategy** also announced in 2005, the federal, provincial and territorial governments committed to goals and targets for improving the health status of Canadians. Targets include a 20 per cent increase by 2015 in the proportion of Canadians who are physically active, eat healthy foods, and achieve a healthy body weight.

See: *www.phac-aspc.gc.ca/hl-vs-strat/index.html*

The Public Health Agency of Canada (Centre for Chronic Disease Prevention and Control) also coordinates the **Canadian Heart Health Initiative** which targets virtually the same risk factors as the Canadian Diabetes Strategy and the Integrated Pan-Canadian Healthy Living Strategy.

See: *www.phac-aspc.gc.ca/ccdpc-cpcmc/cvd-mcv/index_e.html*

Canada is the only non-European partner country in the World Health Organization's **Countrywide Integrated Noncommunicable Diseases Intervention Programme** designed to reduce the burden of risk-factors in participating countries. And Canada is also a partner in the **International Global Prevention Alliance** which is developing a global action plan to reduce obesity and chronic disease.

See: *www.euro.who.int/CINDI*
www.phac-aspc.gc.ca/ccdpc-cpcmc/cindi/index_e.html
www.preventionalliance.net/index.htm

The Chronic Disease Prevention Alliance of Canada includes over 50 public sector and non-government members who agree to "foster and help sustain a coordinated, countrywide movement towards an integrated population health approach for prevention of chronic diseases in Canada through collaborative leadership, advocacy, and capacity building."

See: *www.cdpac.ca*

Research plays a key role in preventing diabetes. In 2005/2006, through the **Canadian Institutes of Health Research,** new funds were committed in this area: $6.6 million for research on type 1 diabetes, $11.4 million for research on type 2 diabetes, and $12.8 million for general research on diabetes and its complications.

See: *www.cihr.ca*

Provincial and territorial initiatives
Every jurisdiction in Canada is making significant investments to promote healthy living through programs that support better nutrition, physical activity and smoking cessation. The Health Council's February 2007 report to Canadians on the progress of health care renewal provides a round-up of activities underway across the country, including:

- a **Healthy Stores Initiative** in the **Northwest Territories,** a healthy eating program that addresses the North's distinctive issues, such as the role of traditional foods in a healthy diet and the difficulty of getting regular access to fresh food at reasonable prices;
- **Ontario's northern fruit and vegetable project,** a $500,000 one-year pilot to supply fresh produce, mostly grown in the province, to children in selected elementary schools in northern Ontario;
- **Saskatchewan *in motion,*** a province-wide program to promote physical activity through partnerships with schools, workplaces, health care providers, and First Nations and northern communities. The Health Council highlights this project in our report, *Their Future Is Now: Healthy Choices for Canada's Children and Youth.*[25]

Canadian mosaic includes increasing numbers of people from high-risk ethnic groups. Without attention and action, these trends will result in soaring numbers of Canadians with chronic health conditions and widening inequalities in health outcomes.

The need for effective, sustained and coordinated public investments in prevention is likewise unprecedented. These investments must embrace change both within health care and beyond, influencing the social systems that affect our lifestyles. They should also be informed, creative, and collective. Aging and migration are trends unlikely to change, but programs to identify people at high risk and connect them with support systems have good potential to stop the progression from risk factors to disease. We should support high-risk people with preventive medication where appropriate, but we should also appreciate the effectiveness of healthier eating and physical activity in slowing the ticking clock of diabetes risk. And we should employ strategies that combine the power of public policy with health promotion campaigns to influence individual and family health.

Fuelled by government initiatives and various kinds of coalitions, a good deal of activity is underway across Canada to address risk factors for diabetes and related chronic health conditions. We don't yet know how effective these investments will be, or whether there are significant gaps or duplications in these endeavours. The level of effort is encouraging but it should be considered just a beginning.

In the next chapter, we look to a number of examples where prevention has been an effective tool in improving health outcomes, along with other programs that have focused on health care system change.

References

1 Leiter LA, Barr A, Belanger A et al. (2001). Diabetes screening in Canada (DIASCAN) study: prevalence of undiagnosed and glucose intolerance in family physician offices. *Diabetes Care;* 24(6): 1038-1043.

2 Young TK and Mustard CA. (2001). Undiagnosed diabetes: does it matter? *CMAJ;* 164(1): 24-8.

3 Engelgau MM, Narayan KM, and Herman WH. (2000). Screening for type 2 diabetes. *Diabetes Care*; 23(10): 1563-1580.

4 Hoerger TJ, Harris R, Hicks KA et al. (2004). Screening for type 2 diabetes mellitus: a cost-effectiveness analysis. *Annals of Internal Medicine;* 140(9): 689-99.

5 Canadian Diabetes Association clinical practice guidelines expert committee. (2003). Clinical practice guidelines for the prevention and management of diabetes in Canada. *Canadian Journal of Diabetes;* 27.S2: S1-S163. *www.diabetes.ca/cpg2003/chapters.aspx*.

6 Feig DS, Palda VA, Lipscombe L. (2005) Screening for type 2 diabetes mellitus to prevent vascular complications: updated recommendations from the Canadian Task Force on Preventive Health Care. *CMAJ*; 172(2): 177-80.

7 Beaulieu MD. (1994). Screening for diabetes mellitus in the non-pregnant adult. In: Canadian Task Force on the Periodic Health Examination. Canadian Guide to Clinical Preventive Health Care. Ottawa: Health Canada. *www.ctfphc.org/Full_Text_printable/Ch50full.htm*.

8 Tuomilehto J, Lindstrom J, Eriksson JG et al. (2001). Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *New England Journal of Medicine;* 344(18): 1343-1350.

9 Diabetes Prevention Program Research Group. (2002). Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *New England Journal of Medicine;* 346(6): 393-403.

10 The DREAM Trial Investigators. (2006). Effect of rosiglitazone on the frequency of diabetes in patients with impaired glucose tolerance or impaired fasting glucose: a randomised controlled trial. *The Lancet;* 368: 1096-1105.

11 Ades PA, Kottke TE, Houston N et al. (2002). Task Force #3 – getting results: who, where, and how? *Journal of the American College of Cardiology;* 40(4): 615-630.

12 Lévesque L, Guilbault G, Delormier T, and Potvin L. (2005). Unpacking the black box: a deconstruction of the programming approach and physical activity interventions implemented in the Kahnawake Schools Diabetes Prevention Project. *Health Promotion Practice;* 6(1): 64-71.

13 Alter DA and Eny K. (2005). The relationship between the supply of fast-food chains and cardiovascular outcomes. *Canadian Journal of Public Health;* 96(3): 173-177.

14 Brown L and Pauktuutit – Inuit Women of Canada. (2006). Inuit Diabetes Awareness Project. Report to 4th Lawson Diabetes Workshop, The Lawson Foundation, Oct 17-18, 2006, Toronto. *www.pauktuutit.ca*.

15 Sport PEI. KidSport. [web page, no date]. *www.sportpei.pe.ca/kidsport.htm*.

16 Government of Northwest Territories. Drop the Pop NWT Challenge 2007. [web page, no date] *www.hlthss.gov.nt.ca/features/Programs_and_Services/drop_the_pop/default.asp*.

17 Pan XR, Li GW, Hu YH et al. (1997). Effects of diet and exercise in preventing NIDDM in people with impaired glucose tolerance: the Da Qing IGT and Diabetes Study. *Diabetes Care;* 20(4): 537-544.

18 Lindstrom J, Ilanne-Parikka P, Peltonen M. (2006). Sustained reduction in the incidence of type 2 diabetes by lifestyle intervention: follow-up of the Finnish Diabetes Prevention Study. *The Lancet ;* 368(9548): 1673-1679.

19 Record JN, Harris DE, Record SS et al. (2000). Mortality impact of an integrated community cardiovascular health program. *American Journal of Preventative Medicine;* 19: 30-38.

20 Ebrahim S and Davey SG. (2006). Multiple risk factor interventions for primary prevention of coronary heart disease. *Cochrane Database of Systematic Reviews;* Issue 4. *www.cochrane.org*.

21 O'Loughlin JL, Paradis G, Gray-Donald K et al. (1999). The impact of a community-based heart disease prevention program in a low-income, inner-city neighborhood. *American Journal of Public Health;* 89(12): 1819-1826.

22 Daniel M, Green LW, Marion SA et al. (1999). Effectiveness of community-directed diabetes prevention and control in a rural Aboriginal population in British Columbia, Canada. *Social Science and Medicine;* 48(6): 815-832.

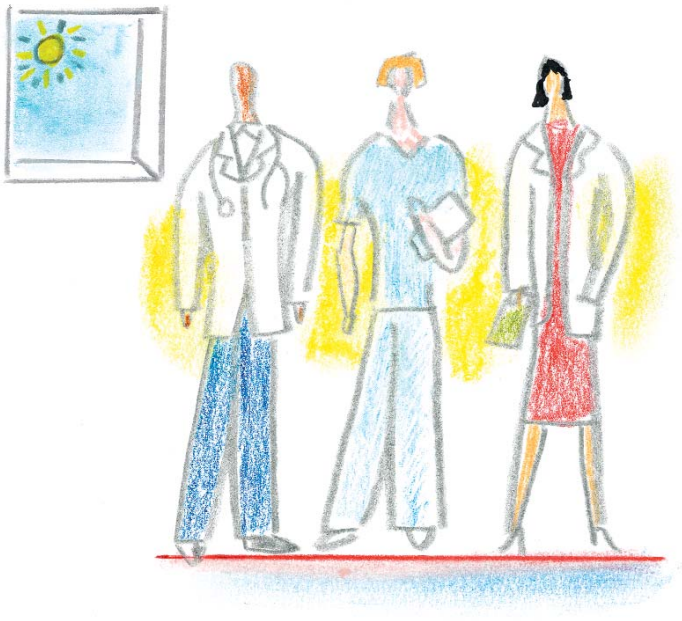
23 World Health Organization. (2003). *Diet, nutrition and the prevention of chronic disease: report of a joint WHO/FAO expert consultation.* Technical Report Series, No. 916. Geneva: WHO.

24 International Diabetes Federation. (2006). *Diabetes Atlas: Executive Summary* (2nd edition). Brussels: IDF. *www.eatlas.idf.org*.

25 Health Council of Canada. (2006). *Their Future Is Now: Healthy Choices for Canada's Children and Youth*. Toronto: Health Council. *www.healthcouncilcanada.ca*.

WHERE ARE WE SUCCEEDING? Some compelling projects demonstrate that the team approach is effective; systemic change can produce radically better results; information is crucial; prevention works; and healthy lifestyles truly make a difference.

5



Across Canada and abroad, efforts both proven and promising are working to deliver improved health outcomes. Some programs focus on prevention and healthy lifestyles, while others are directed at making changes to the health care system in order to provide improved overall care. In this chapter, we present some compelling projects that demonstrate the themes of this report: the team approach is effective; systemic change can radically improve results; information is crucial; prevention works; and healthy lifestyles make a difference.

Collaboratives improve health outcomes

At least three provinces are delivering care for chronic illnesses using a method called *collaboratives.* A collaborative is a process by which teams of health care providers receive external support, and support one another, to adopt best practices and improve outcomes for their patients. The collaborative helps health care providers integrate quality improvement techniques into their daily work.

Aided by a series of tools – and by integrating physicians with other health care professionals – collaboratives help to ensure that providers have the right information about their patients and about their treatment options. This team support and information also enable patients to more fully manage their own chronic health conditions.

One patient describes the results this way: "Collaboratives changed my life. I quit smoking after 40 years. I lost 20 pounds. I eat healthy foods now. I want to live to a ripe old age."[1] According to a British Columbia doctor who has participated in a heart disease collaborative, "It's very rewarding to be involved in this process. First of all, patients love it: they are getting extra attention and they know more about their illness. Secondly, you see results."[1]

In 2003, BC became the first province in Canada to adopt collaboratives as a strategy to improve the quality of care for patients with chronic health conditions. Saskatchewan is in its second year of a collaborative on chronic disease management. Newfoundland and Labrador launched its first diabetes collaborative in 2004. All three provinces have observed some exciting results.

British Columbia

BC physicians participating in collaboratives are supported by leadership, training, financial assistance, and information technology, provided through a partnership of the Ministry of Health, BC Medical Association, and the province's health authorities. Each collaborative defines its own problem statement (such as "poor adherence to diabetes guidelines"), goals (such as improved blood sugar and blood pressure control), and measurements (such as blood sugar levels, blood pressure, and patient satisfaction).

Joining a collaborative gives health care providers access to the Chronic Disease Management (CDM) Toolkit, developed by the BC Ministry of Health. This web-based tool helps to manage and measure care for chronic health conditions. It includes BC's clinical practice guidelines, patient flow sheets (a resource to help patients and providers plan a schedule of care), current patient data, and the ability to compare

A collaborative is a process by which teams of health care providers receive external support to adopt best practices and improve outcomes for their patients.

performance with other providers. Physicians are compensated for their time spent entering data and using the toolkit. And as an added financial incentive, primary health care physicians who provide care according to the expert guidelines receive a bonus of $125 per patient each year.

In one region running a collaborative, the Vancouver Island Health Authority, rates of appropriate testing for patients with diabetes have doubled, appropriate prescribing to manage congestive heart failure tripled (both reaching 70 to 80 per cent), and depression among patients with chronic health conditions is now recognized more often and being treated as part of a plan of care. With just under 20 per cent of the province's primary care providers enrolled in collaboratives, BC is already seeing a drop in diabetes complications – documented by fewer emergency visits and hospital stays for health problems typically related to diabetes. These improvements are paying off financially as well: provincial costs for diabetes care have dropped from an average of $4,400 per patient in 2001/02 to $3,966 in 2004/05.[2]

The province hopes to see a majority of family physicians practicing under the collaborative model within two years. "We have found that doctors are eager to improve care," says Valerie Tregillus, executive director for primary health care in the Medical Services Division of the BC Ministry of Health.

Saskatchewan

The Health Quality Council of Saskatchewan runs a province-wide collaborative on chronic disease management, focusing on coronary artery disease (CAD), diabetes, and improved access to care.

"The early days of collaboratives are a significant amount of work. It's a resource-intensive time," notes Bonnie Brossart, deputy CEO of the Health Quality Council. The Council adapted BC's CDM Toolkit and partnered with health authorities to set up "regional improvement teams." These teams include staff from physician practices and from regional First Nations and Métis health programs (such as diabetes educators, pharmacists, and cardiac rehabilitation therapists) who work together to identify and test ways of improving care.

In their first seven months of operation (March to November 2006), the 33 practices involved in the first wave of the Saskatchewan CDM collaborative (representing close to 16 per cent of family physicians in the province) showed improvements across a number of quality measures related to diabetes and heart disease. For example, these practices achieved:

- a 39 per cent improvement in screening for kidney disease;
- a 26 per cent improvement in appropriate prescribing of anti-platelet medication for diabetes patients to prevent heart attacks and strokes;
- a 16 per cent improvement in appropriate prescribing of medication to lower fat levels in the blood for patients with CAD;
- a six per cent improvement in the proportion of diabetes patients with blood sugar level (A1C) of 7.0 per cent or less (as recommended by expert guidelines); and
- a four per cent improvement in the percentage of CAD patients with reduced blood pressure (better than 140/90).[3]

With support costs of about $8,200 per practice, on average, "collaboratives have gone a long way towards primary health care reform. Practices now feel like they are part of a community and not isolated islands," says Brossart.

Newfoundland and Labrador

"This last year and a half has been the most uniformly positive and energizing experience I've ever been involved in," says Dr. Ann Colbourne, a St. John's physician, about her role in supporting collaboratives. Colbourne is the physician lead for chronic disease prevention and management with the Department of Health and Community Services. With the highest proportion of people with diabetes of any province (close to seven per cent), Newfoundland and Labrador chose diabetes as the focus of its first eight collaboratives.

Built on the province's existing structure of "primary health care team areas," each collaborative has latitude to adopt changes that make sense locally. Several now use community health nurses as case managers or care coordinators. "Prior to this, care was more doctor-driven and more episodic, more ad hoc," Colbourne says. In Bonavista, the nurse practitioner has the primary role in patient contacts, with physicians providing follow-up care, and a community pharmacist is regularly involved in team conferencing for individual patients.

Like Saskatchewan, Newfoundland and Labrador has adapted BC's CDM Toolkit, uses patient flow sheets to move care closer to expert recommended guidelines, and is building an electronic registry that will provide feedback on outcomes of care. Learning sessions for health care providers have increased their skills in helping patients manage their own conditions. One local innovation was a reworking of the guidelines for care to make them more relevant for a team environment that includes many different types of providers. "For example, if we refer a patient to the social worker because she has trouble paying for her seven prescriptions, the social worker (having been trained on the care guidelines) is empowered to communicate and support the patient more effectively," Colbourne explains.

The existing primary health care team areas have enrolled 22 per cent of the province's general population. Six more team areas, both urban and rural, are in development, which is progress towards the province's goal to register 50 per cent of the provincial population with a primary health care team by 2010.[4]

To track the progress of the quality of care for chronic health conditions in Canada, "there is great need for national benchmarks," Colbourne concludes. "What is really achievable, what is realistic, in terms of meeting clinical practice guidelines? One hundred per cent [of patients fully meeting guidelines] is not the right answer. We don't know the answer, and we need to know."

For more information about collaboratives, see: *www.heartbc.ca/pro/collaboratives/dm/dmindex.htm* and *www.hqc.sk.ca,*

US veterans' health agency transforms care, sees results

In the early 1990s, the Veterans Health Administration (VHA) was in crisis: costs were ballooning and care was variable. The VHA is the largest integrated health care system in the United States, providing publicly funded health care for veterans of the United States Armed Forces and, depending on eligibility, their families. It has a $42-billion budget and sees approximately five million patients per year, including a high percentage of poor and homeless people.

When Dr. Kenneth Kizer was Undersecretary for Health in the US Department of Veterans' Affairs, he described the change to the VHA model of care as a transformation from a "disease-oriented, hospital-based, and professional discipline-focused" system to the "new VHA" in which care is "provided by inter-disciplinary teams of physicians and other licensed practitioners who share responsibility and accountability for patient care."[5]

The VHA operated primarily as a hospital system providing inpatient care but largely ignoring the growing demand for outpatient care. The system consisted of independent, competing medical centres, which resulted in duplication of services, variability in care, and under-use of facilities. Veterans and their families were having difficulty getting care.

In 1995, a massive reinvention of the VHA began. A new organizational model was created, and 50 hospitals were reorganized into 24 geographically-based networks. These networks established more than 300 community-based clinics, moving care from inpatient to outpatient settings. A shift in thinking towards quality of care and outcomes led the VHA to develop performance contracts, including measurable targets, with each network.

A system of electronic health records was also created. People can access their health records, look up health information, book appointments, and refill prescriptions using an online portal (My Health eVet). Currently, the VHA spends approximately 6.6 per cent of its budget on information technology. (In comparison, the investment on information technology in Canada is estimated at about 1.5 per cent of total health care spending.[6])

The results of the transition have been impressive:

- To improve access to care, 216 new community-based outpatient clinics were established over a two-year period (1996 to 1998).
- Only 10 per cent of VHA patients were enrolled in primary care prior to the transformation compared to 80 per cent afterwards.
- The cost per patient dropped by 25 per cent; patients improved in their abilities to manage their own conditions; and they were more satisfied with care.
- The quality of health care (e.g. the percentage of patients receiving recommended tests and procedures for diabetes care) in the VHA system was significantly higher than a national sample of patients outside the VHA.[5, 7]

The VHA is now widely recognized as a patient-centred, high-quality, highly valued health care system whose transformation provides lessons for health care renewal in Canada. "We have the tools; the challenge posed by VHA is to re-imagine the job we do with them," writes Sheila Weatherill, president and CEO of Capital Health in Edmonton. "No amount of money that simply pays more providers to work in the same ways we do now will get us where we need to go."[8]

For more information on the Veterans Health Administration, see: *www1.va.gov/health.*

Island Lake dialysis centre becomes a "catalyst for change"

Building a kidney dialysis facility for remote First Nations communities in Manitoba has done much more than keep patients and their families close to home. The facility, part of the Island Lake Regional Renal Health Program, launched in 2005, has become a "catalyst for change" in the prevention, screening and management of kidney disease, says Dr. Bruce Martin, director of the J.A. Hildes Northern Medical Unit of the University of Manitoba, a partner in the innovative project.

People can access their health records, look up health information, book appointments, and refill prescriptions using an online portal (My Health eVet).

Chronic kidney disease, which can lead to dependence on dialysis, is a common complication of diabetes. In the Aboriginal communities of the Island Lake region of northern Manitoba, 80 per cent of dialysis patients have diabetes, type 2 in nearly all cases. This population has the highest proportion of diabetes among all the Aboriginal communities in the province, and local residents who need dialysis tend to start this treatment in their 40s, much younger than the age for Canadians generally (60 to 65 years).[9]

The Island Lake Regional Renal Health Program runs a six-station dialysis centre and focuses on prevention and education in the community through activities such as:

- a dietitian working with local stores to improve the availability of fresh foods appropriate for people with kidney disease;
- integration with a community program that supports the development of home vegetable gardens;
- participation in a region-wide primary prevention strategy funded by the Manitoba Department of Healthy Living; and
- initiation of a school-based screening program to identify children at high risk of developing kidney disease. Half the community population is under age 18, and risk factors, such as having a diabetic mother or a parent with kidney disease, are common among children in the area.

The Island Lake Regional Renal Health Program serves a cluster of four remote First Nations communities with a combined population of less than 6,000 in northeastern Manitoba, about 500 km from Winnipeg. The communities – Garden Hill, Red Sucker Lake, St. Theresa Point, and Wasagamach – are accessible only by air or winter road. Before the program began, patients had to move to Winnipeg for dialysis, which meant that, often, children would have to move too. Some patients would choose not to use dialysis or discontinue because of the need to leave home. Certainly, uprooting patients and their families from their cultural homes and social networks so they can access treatment can have serious health and social consequences.[10]

The cost of providing dialysis in such a remote location is not in itself cost-effective, Martin admits, but adds, "Without this facility, I doubt anyone would have invested in prevention the way we're now seeing. And we are already seeing huge successes in terms of the integration of care." The program also has community development benefits, such as creating new jobs and providing opportunities for training local residents to take on more of the work in future.

Other partners in this ground-breaking collaboration among provincial, federal and First Nations jurisdictions are the Four Arrows Regional Health Authority and Neewin Health Care Inc. (an integrated primary health care centre, currently being developed to serve the Island Lake region), Manitoba Renal Program (run by the Winnipeg Regional Health Authority), Manitoba Health, and Health Canada.

For more information about the Island Lake Regional Renal Health Program, see: *www.umanitoba.ca/faculties/medicine/units/northern_medical_unit/index.php.*

London clinic translates diabetes care for immigrants

Eight years ago, the health professionals at the London InterCommunity Health Centre noticed an increasing incidence of diabetes among their Latin American clients, one of the Ontario city's large newcomer communities. They were also troubled because these clients were not attending diabetes education sessions, which are essential for patients to gain the skills and knowledge to properly manage their disease. A new approach was needed to serve Latin Americans and other ethnic groups known to be at high risk for diabetes.

The Island Lake Regional Renal Health Program runs a six-station dialysis centre and focuses on prevention and education in the community through various activities.

"High-risk populations in London were not being well-served by traditional diabetes approaches," says Michelle Hurtubise, the centre's executive director. "Many newcomers to Canada felt as if they were being blamed for not complying with their doctor's advice, but in reality, many don't have adequate income or they had health care providers who didn't know enough about their culture to communicate effectively in order to appropriately care for their diabetes," she says.

In response, the centre designed the Latin American Diabetes Program to provide diabetes care that recognizes cultural differences. For example, translating educational materials into Spanish was not enough; these materials needed a cultural translation too. This allowed teaching staff to explain to clients how they can modify traditional meals to make them healthier – an empanada with a salad instead of two empanadas – rather than using examples that introduce unfamiliar foods.

The program also addresses the broader social determinants of health (factors such as income and environment) which are critical to patients' ability to effectively manage diabetes. Social workers at the InterCommunity Health Centre help clients apply for housing, income and medication subsidies. To promote physical activity (the clinic is located in downtown London and there is no green space within a 20-minute walk), the program organizes a walking group, donates proper footwear and pedometers to encourage participation, and runs an annual ice skate exchange. "People want to be healthy. We facilitate the removal of barriers to help them achieve their goals," Hurtubise explains.

Another innovation is the program's hiring of foreign-trained health care professionals as lay educators. Physicians, nurses, dietitians, physiotherapists, and other health professionals – unable to use their skills and knowledge here due to lack of Canadian experience and credentials – are able to deliver culturally sensitive and appropriate education in the clients' first language. Often underemployed, these newcomer professionals help people achieve better control of their diabetes and gain important experience in the Canadian health care system.

The Latin American Diabetes Program was awarded the Peter F. Drucker Award for Canadian Nonprofit Innovation in 2002, and the program has since expanded to reach other high-risk ethnic groups in the London area, including South Asian, Vietnamese and Cambodian and African Caribbean residents. Most importantly, these comprehensive efforts have translated into good diabetes control for clients of the InterCommunity Health Centre. Approximately half have blood sugar levels in the range recommended by experts, similar to Canadians in general, which is remarkable given the barriers to good diabetes care in these high-risk populations. Furthermore, the patients at the London centre appear to have better blood sugar control than patients in several family physician practices in southwestern Ontario.[11]

To disseminate the lessons and techniques of the Latin American Diabetes Program, the London clinic ran a project called Global Village from 2003 to 2006. Staff traveled to Ottawa, Kitchener, Saskatoon, Halifax, Vancouver and four other cities and set up diabetes screening sites for high-risk ethno-cultural communities in natural areas of congregation, such as community centres, mosques, and churches. The project revealed high rates of undiagnosed diabetes and pre-diabetes (for their findings, see Chapter 2, page 31). At the

screenings, local foreign-trained health care professionals provided on-the-spot counseling, and local champions (physicians, nurses, dietitians) helped the project staff connect with resources to help people better manage their diabetes. "Screening can happen in a physician's office," Hurtubise says, "but you need the wrap-around of a multidisciplinary team to ensure the best diabetes care."

Prevention slows diabetes trends in Kahnawake

"What we don't know *does* hurt us," says Amelia McGregor, summing up the vital role of research in the long-running diabetes prevention program in her home community of Kahnawake, Quebec, a Mohawk First Nations community near Montreal. Since 1994, the Kahnawake Schools Diabetes Prevention Project (KSDPP) has been building awareness about preventing type 2 diabetes, and studying and communicating the project's results. McGregor has been a member of the project's Community Advisory Board from the start.

The project focuses on the approximately 600 children at the community's two elementary schools and uses a locally-designed curriculum, school policies, and community activities to improve key risk factors (eating habits, body weight and physical activity) among Kahnawake's children, their families and extended families.

Funded by a range of sources over the years (currently by Health Canada's Aboriginal Diabetes Initiative), KSDPP's many projects include:

- a health curriculum for Grades 1-6 developed locally;
- a school nutrition policy, which bans junk food in elementary schools and provides information to parents about healthy alternatives;
- a partnership with local grocery stores to promote healthy food choices;
- a waterside recreation path for casual exercise and community events for all ages, to promote physical activity;
- Racers for Health, an annual end-of-school event in which Kahnawake invites 600 to 700 children from nearby Aboriginal communities for a giant sleepover and day of fun races; and
- a training centre to teach other communities about Kahnawake's successes and challenges and to stimulate them to adapt the program model for local use.

The Kahnawake project is now reaching its second generation of children, and persistence appears to be paying off. Although evaluation studies have returned mixed results, recent research shows that the upward march of diabetes in the community may be changing course. Incidence rates (the number of new cases each year) in Kahnawake are now close to the Canadian average. This is in sharp contrast to the only other Aboriginal incidence study (conducted in Manitoba) where the rate of new cases was found to be dramatically higher than the rate for Canada generally.[12]

Through an active Community Advisory Board, research results are shared with the community to assess and modify program components. For example, recent evaluations show that school children are making better nutrition choices, but their levels of physical activity did not improve significantly and the reductions in children's body fat noted early in the program were not sustained.[13] "This is the advantage of rigorous evaluation. It tells us 'here's the reality' and it leads to a deeper round of discussion," says Dr. Ann Macaulay, a family physician who helped establish KDSPP.

Armed with these results, the project is seeking funds to add a component that would reach children before they start school. "It's too late if we are seeing obesity already in Grade 1," Macaulay says. "In tackling lifestyle issues, we need to learn the lessons of anti-smoking campaigns. Action at the community level can't do it alone," she continues, noting the critical role of government policy in, for example, boosting physical education and supporting safe, walkable environments that encourage physical activity.

The secret to KSDPP's success is that "the program is not static. It's always responding to the needs and knowledge of the community," Macaulay adds. The experience of Kahnawake underscores the importance of routinely collecting local-level data that can track progress and flag when progress is not occurring as expected. This can prompt the researchers, program coordinators, and the community to question why that might be and to make changes to keep the program moving towards its goals.

For more information about the Kahnawake Schools Diabetes Prevention Project, see: *www.ksdpp.org*.

ActNow BC supports healthy lifestyles

British Columbia launched ActNow BC in March 2005, a multi-year initiative to improve the health of British Columbians through integrated action across all provincial ministries and support for community-level initiatives.

ActNow BC hopes to reduce risks for common chronic diseases – type 2 diabetes, cardiovascular disease, hypertension, fetal alcohol spectrum disorder, and some types of cancer – by getting more British Columbians to eat better, exercise more, quit smoking, and avoid alcohol and harmful drugs during pregnancy. Success could yield substantial savings to the provincial economy: the economic burden due to physical inactivity and obesity alone in British Columbia has been estimated at well over $1 billion a year, according to ActNow BC's website.

Two factors distinguish BC's initiative from others: its integration across government departments and its specific targets that mirror those of the Integrated Pan-Canadian Healthy Living Strategy agreed to by health ministers in 2005. By 2010 (to coincide with the Winter Olympic Games in Vancouver), ActNow BC aims to:

- increase by 20 per cent the number of people who are physically active (from 58 per cent to 70 per cent) and who eat five daily servings of fruits and vegetables (from 40 per cent to 48 per cent);
- reduce by 20 per cent the number of people who are overweight or obese (from 42 per cent to 34 per cent);
- reduce by 10 per cent the number of people who smoke tobacco (from 16 per cent to 14 per cent); and
- increase by 50 per cent the number of women counselled about alcohol use during pregnancy. Currently, between 200 and 300 babies are born in BC every year with fetal alcohol spectrum disorder.

The BC Ministry of Health, which initiated the program, knew that it could not achieve these targets working alone. Too many factors that influence people's ability to make healthy choices – such as having access to affordable, healthy food – lie outside the reach of health department activities. To overcome this hurdle, the premier appointed a minister of state for ActNow BC to lead a government-wide approach and coordinate the participation of all provincial ministries.

To further extend its reach, ActNow BC draws on the participation of all sectors, including other levels of government, non-government organizations, communities, schools, and the private sector. More than 70 partners are now delivering ActNow BC programs and services throughout the province. One program, partnering with the BC Dairy Foundation, saw the purchase of 900 refrigerators to help schools store fresh food such as milk, fruits, and vegetables. The BC Ministry of Transportation provides community funding to develop or expand cycling lanes. And the Community Food Systems for Healthy Living program, supported by BC's Ministry of Agriculture and Lands, is introducing community gardens and kitchens in 12 First Nations communities.

ActNow BC hopes to reduce risks for common chronic diseases by getting more British Columbians to eat better, exercise more, quit smoking, and avoid alcohol and harmful drugs during pregnancy.

The World Health Organization has called the "horizontal, partnership-based model" of ActNow BC "a vanguard in development and delivery of successful government programming." In March 2006, the program was awarded the Ron Draper Health Promotion Award by the Canadian Public Health Association.

For more information on ActNow BC, see: *www.actnowbc.gov.bc.ca*

These six stories highlight some shining examples of innovation that have improved health outcomes for people with chronic health conditions, or show great promise.

When pilot projects work, they provide models that should be widely implemented. Governments and health care system managers should move from funding demonstration projects to ensuring that successful approaches become part of the systematic transformation of health care and health protection strategies across Canada.

References

1 HeartBC (Healthy Heart Society of British Columbia). Making big changes. [online video]. *www.heartbc.ca/pro/collaboratives/chf/bigchanges.htm*.

2 Valerie Tregullis, executive director, Primary Health Care, Medical Services Division, BC Ministry of Health, personal communication, October 4, 2006.

3 Bonnie Brossart, deputy CEO, Saskatchewan Health Quality Council, personal communication, December 8, 2006.

4 Ann Colbourne, physician lead for chronic disease prevention and management, Newfoundland and Labrador Department of Health and Community Services, personal communication, December 4, 2006.

5 Kizer K. (1999). The "new VA": a national laboratory for health care quality management. *American Journal of Medical Quality;* 14(1): 3-20.

6 Canada Health Infoway and Health Council of Canada. *Beyond Good Intentions: Accelerating the Electronic Health Record in Canada.* Summary of main themes and insights from a policy conference, June 11-13, 2006, Montebello, Quebec. *www.infoway-inforoute.ca* or *www.healthcouncilcanada.ca*.

7 Asch SM, McGlynn EA, Hogan MM et al. (2004). Comparison of quality of care for patients in the Veterans Health Administration and patients in a national sample. *Annals of Internal Medicine;* 141(12): 938-945.

8 Weatherill S. (2005). The VHA's commitment to accountability: a "third way" for medicare? *Healthcare Papers;* 5(4): 38-42.

9 Fisher J, Martin B, Bohm C et al. (2006). *End-stage renal disease and renal replacement therapy in First Nation Canadians: a descriptive review of a select Manitoba population.* [unpublished]. Department of Community Health Sciences, University of Manitoba.

10 Wilson R, Krefting L, Sutcliffe P and Van Bussel L. (1994). Native Canadians relocating for renal dialysis: psychosocial and cultural issues. *Canadian Family Physician;* 40: 1934-1941.

11 Michelle Hurtubise, executive director, London InterCommunity Health Clinic, personal communication, January 9, 2006.

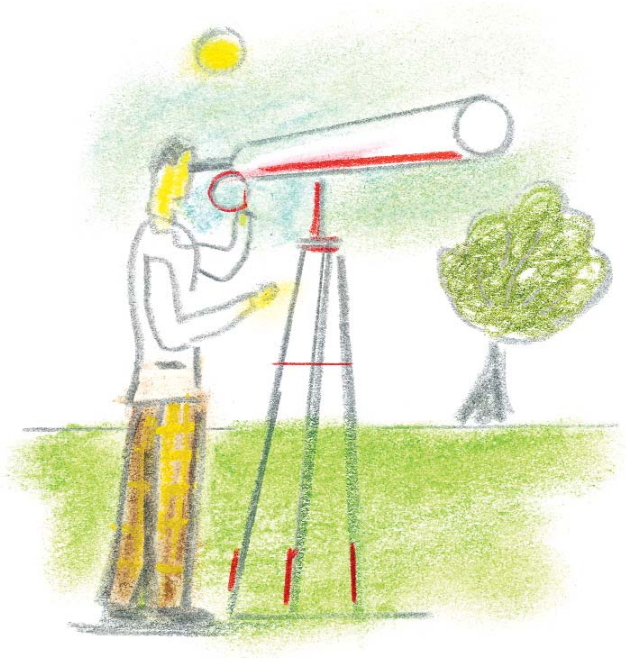
12 Horn OK, Jacobs-Whyte H, Ing A et al. (2005 Oct). Incidence and prevalence of type 2 diabetes among Kanien'kehá:ka of Kahnawake, Quebec, Canada, 1986 to 2003. Presentation to the North American Primary Care Research Group, Quebec City.

13 Paradis G, Lévesque L, Macaulay A et al. (2005). Impact of a diabetes prevention program on body size, physical activity, and diet among Kanien'kehá:ka (Mohwak) Children 6 to 11 years old: 8-year results from the Kahnawake Schools Diabetes Prevention Project. *Pediatrics;* 115: 333-339.

When pilot projects work, they provide models that should be widely implemented – to ensure that successful approaches become part of the systematic transformation of health care and health protection strategies across Canada.

LOOKING AHEAD The vision of First Ministers to renew health care and promote healthy living is in alignment with the needs of Canadians who have – or are at risk of developing – chronic health conditions. It's now time to make that vision a reality.

6



The role of the Health Council in this first in a series of reports was to examine health outcomes as a measure of the effectiveness of our health care system and the speed of health care renewal. We decided to use diabetes as an example of a chronic health condition to illustrate the array of issues that come into play in health care. Diabetes also provided a useful context in which to consider issues related to the prevention and management of chronic health conditions generally.

What we found was concerning – namely that the care that Canadians receive for diabetes does not meet recognized standards and that the nation could clearly benefit from greater use of effective strategies to promote health and prevent chronic disease. Importantly, the vision of the First Ministers to renew health care and promote healthy living is in alignment with these needs. It's now time to make their vision a reality.

The majority of Canadians with diabetes are missing out not only on important lab tests, procedures and medications that experts recommend, but they also are not getting other services and supports they need to manage their own care. At the same time, Canadians who have diabetes often have or develop other chronic health conditions. This complicates their care and compromises their health. It is clear that Canadian primary care providers do not have the tools they need to provide the best possible care to people with chronic health conditions – tools such as electronic health records, case managers, and an interprofessional team environment, which are becoming the norm in other countries.

However, the research compiled for this report also says clearly that small changes in how we provide health care can have a big impact on health outcomes: more teams, more education for patients, more of the recommended tests and procedures to prevent complications, more support for lifestyle changes – these can all make a difference to the health of Canadians. It is also clear that public policy can go a long way to promote healthy living, which is considered the single most important ingredient to stem the tide of the number of Canadians with chronic health conditions and the resulting complications.

This first report on health outcomes relied heavily on scientific evidence regarding the degree to which people receive the types of care that experts recommend. The Health Council's second report in this series will focus on another dimension of quality of care: how Canadians experience health care. For example, how well do health care services enable people to feel prepared to manage their own health? We will report on the results of a large national telephone survey of Canadians with chronic health conditions. The information gleaned directly from patients will provide a different perspective on how we can improve health care in Canada.

The Health Council's second report in this series will focus on another dimension of quality of care: how Canadians experience health care.

ACKNOWLEDGEMENTS

The Health Council of Canada would like to acknowledge the significant efforts made by the many people who collaborated in preparing this report. We received invaluable assistance from our government liaisons and numerous people who work in diabetes prevention and care across Canada.

The project was led by the Council's Health Outcomes Steering Committee, including Councillors and external members:

COUNCILLORS

Dr. M. Ian Bowmer
Chair, Health Outcomes Steering Committee

Mr. Albert Fogarty
Mr. Steven Lewis
Dr. Danielle Martin
Dr. Robert McMurtry
Mr. Bob Nakagawa
Dr. Stanley Vollant

EXTERNAL MEMBERS

Dr. Arlene Bierman, Ontario Women's Health Council Chair in Women's Health, St. Michael's Hospital and University of Toronto

Dr. Jeffrey A. Johnson, Professor and Canada Research Chair in Diabetes Health Outcomes, School of Public Health, University of Alberta

Dr. Shoo Lee, Scientific Director, Integrated Centre for Care Advancement through Research, University of Alberta

Dr. Indra Pulcins, Director, Health Reports and Analysis, Canadian Institute for Health Information

Dr. Claudia Sanmartin, Senior Analyst, Health Analysis and Measurement Group, Statistics Canada

Dr. Sylvie Stachenko, Deputy Chief Public Health Officer, Public Health Agency of Canada

Dr. Gary Teare, Director, Quality Measurement and Analysis, Health Quality Council, Saskatchewan

The Council gratefully acknowledges the contribution of the following people who provided background research and reviewed drafts of the report:

RESEARCH CONTRIBUTORS

Dr. Anne-Marie Broemeling, Faculty, Centre for Health Services & Policy Research, University of British Columbia

Dr. Jeffrey A. Johnson, Professor and Canada Research Chair in Diabetes Health Outcomes, School of Public Health, University of Alberta

Dr. Hans Krueger, H. Krueger & Associates Inc.

Dr. Kue Young, Professor, Department of Public Health Sciences, Faculty of Medicine, University of Toronto

PEER REVIEWERS

Ms. Erica Di Ruggiero, Associate Director, Institute of Population and Public Health, Canadian Institutes of Health Research

Dr. Janet Hux, Interim CEO, Institute for Clinical Evaluative Sciences

Dr. Douglas G. Manuel, Senior Scientist, Institute for Clinical Evaluative Sciences

Mr. Stephen Samis, Director, Health Policy, Heart and Stroke Foundation of Canada

Dr. Karen Philp, Executive Director, Public Policy and Government Relations, Canadian Diabetes Association

In addition, we received information from numerous people in preparing the profiles of innovative programs for this report. Some of these people are quoted in the profiles, others are not. We thank them all.

The Council would also like to thank all members of the secretariat involved in this report, in particular, Lesley Frey, Michael Hillmer, Kira Leeb, Farrah Prebtani, Diane Watson, and Amy Zierler. Lesley Byrne was hired as a writer. Dawn Mooney from the Centre for Health Services and Policy Research, University of British Columbia created the maps and graphs.

The Council also thanks Statistics Canada and the Canadian Institute for Health Information for their collaboration during the development of the report.

The analyses and conclusions of this report do not necessarily reflect those of the external members of the steering committee, the research contributors or peer reviewers, or the organizations they are affiliated with.

CONCEPT & DESIGN: HM&E DESIGN COMMUNICATIONS
ILLUSTRATIONS: JEFF JACKSON

ABOUT THE HEALTH COUNCIL OF CANADA

Canada's First Ministers established the Health Council of Canada in the 2003 Accord on Health Care Renewal and enhanced our role in the 2004 10-Year Plan to Strengthen Health Care. We report on the progress of health care renewal, on the health status of Canadians, and on the health outcomes of our system. Our goal is to provide a system-wide perspective on health care reform for the Canadian public, with particular attention to accountability and transparency.

The participating jurisdictions have named Councillors representing each of their governments and also Councillors with expertise and broad experience in areas such as community care, Aboriginal health, nursing, health education and administration, finance, medicine and pharmacy. Participating jurisdictions include British Columbia, Saskatchewan, Manitoba, Ontario, Prince Edward Island, Nova Scotia, New Brunswick, Newfoundland and Labrador, Yukon, the Northwest Territories, Nunavut and the federal government. Funded by Health Canada, the Health Council operates as an independent non-profit agency, with members of the corporation being the ministers of health of the participating jurisdictions.

THE COUNCIL'S VISION

An informed and healthy Canadian public, confident in the effectiveness, sustainability and capacity of the Canadian health care system to promote their health and meet their health care needs.

THE COUNCIL'S MISSION

The Health Council of Canada fosters accountability and transparency by assessing progress in improving the quality, effectiveness and sustainability of the health care system. Through insightful monitoring, public reporting and facilitating informed discussion, the Council shines a light on what helps or hinders health care renewal and the well-being of Canadians.

COUNCILLORS*

Government Representatives

Mr. John Abbott - Newfoundland and Labrador
Mr. Albert Fogarty - Prince Edward Island
Dr. Alex Gillis - Nova Scotia
Mr. John Greschner - Yukon
Mr. Michel C. Leger - New Brunswick
Ms. Lyn McLeod - Ontario
Mr. Bob Nakagawa - Canada
Mr. Mike Shaw - Saskatchewan
Ms. Elizabeth Snider - Northwest Territories
Ms. Patti Sullivan - Manitoba
Dr. Les Vertesi - British Columbia
Vacancy - Nunavut

Non-Government Representatives

Dr. Jeanne F. Besner - Chair
Dr. M. Ian Bowmer - Vice Chair
Mr. Jean-Guy Finn
Dr. Nuala Kenny
Mr. Jose Amajaq Kusugak
Mr. Steven Lewis
Dr. Danielle Martin
Dr. Robert McMurtry
Mr. George L. Morfitt
Ms. Verda Petry
Dr. Stanley Vollant

* as of January 2007

www.healthcouncilcanada.ca

Health Council of Canada | Conseil canadien de la santé

TAKING THE PULSE