

DIABETES AND SOCIETY

The Cost of Diabetes in Canada: The Economic Tsunami

In 2009, the Canadian Diabetes Association (CDA) commissioned a report to determine the cost of diabetes in Canada, including the impact of lost productivity on the economy as a whole.

Informetrica, who conducted the research and analysis on behalf of the CDA, developed the Canadian Diabetes Cost Model (CDCM) to analyze the cost of diabetes to the healthcare system and the economic impact of the disease in Canada, as well as evaluate the impact of initiatives that have been proven to reduce the incidence and severity of diabetes in Canada.

The research found that the cost of diabetes in Canada will rise from \$6.3 billion annually in 2000 to \$16.9 billion annually by 2020 (1). The rise in cost is driven by a number of factors, including the growth and aging of the Canadian population, and lifestyle changes that Canadians have made that make them more susceptible to developing diabetes.

Canadian Diabetes Cost Model

The CDCM used information from the National Diabetes Surveillance System (NDSS) and Health Canada's Economic Burden of Illness in Canada (EBIC) report to build a model that identifies and measures the direct and indirect costs of diabetes. The report identifies 5 components to the direct costs of diabetes:

1. Direct hospitalization costs
2. Incremental cardiovascular disease hospitalization costs
3. Incremental general practitioner costs
4. Incremental specialist costs
5. Diabetes medication costs (1).

The costs noted above for cardiovascular disease hospitalization, general practitioner visits and specialist visits are only those additional costs borne by the healthcare system as a result of a person suffering from diabetes. (i.e. only those costs to the system over and above those that would be incurred by an average person without diabetes are included). The model also reflects the indirect costs of diabetes, focusing particularly on the lost economic output that would arise from illness and/or premature death that can be attributable to diabetes. Findings using the model have indicated that this measure of opportunity cost accounts for more than 80% of the cost of diabetes in Canada.

Due to 2 key assumptions built into the model, the

CDCM was designed in such a way that it may actually underestimate the economic impact of diabetes. The first of these assumptions is related to diabetes incidence in Canada. From 1998 to 2005, Canada saw an annual average increase in the incidence of diabetes of 1.8%. However, for the purpose of creating the CDCM the presumed rate of increase is 0.75% annually. Secondly, the model assumes that the cost of healthcare services will remain unchanged until 2020 (other than inflation factors that are already taken into account). This assumption was made notwithstanding the fact that healthcare costs in Canada have been rising at rates far exceeding the rate of inflation for the better part of the last decade.

The model also presumes the following conditions that may impact its findings on the cost of diabetes in Canada:

- The Canadian population will grow as predicted by Statistics Canada's medium growth population projection;
- Mortality rates by age and sex are fixed at the average of the last three years of available NDSS data.
- The frequency of use of the healthcare system remains unchanged for both people living with diabetes and the general Canadian population (1).

A Global Pandemic

Canada already endures a significant cost as a result of diabetes, and that cost will continue to grow as the prevalence of the disease grows. The single biggest driver of the dramatic increase in the cost of diabetes that Canada will see in the next decade is the increase in the number of Canadians with diabetes.

According to the CDCM, the number of Canadians living with diabetes will grow from 1.3 million in 2000 to 2.5 million in 2010 and to 3.7 million by 2020 (1). This increase will be driven by three key factors:

- Population increase
- Canada's aging demographic
- Increasing incidence rates.

Statistics Canada projects that the Canadian population will increase by 8 percent between 2010 and 2020. This will account for 9% of the increase in diabetes in Canada over the next decade (1). Canada's aging population will also have a significant impact on the prevalence of diabetes in Canada. Type 2 diabetes, which makes up 90% of diabetes

in Canada, is usually diagnosed in adults over 40 years of age. Since the risk of developing type 2 diabetes increases as a person ages, the prevalence of diabetes also increases as society as a whole ages. The increasing age of the Canadian population will account for 13% of the increase in the number of Canadians with diabetes between now and 2010 (1).

An aging Canadian population contributes to the prevalence of diabetes as it increases sharply around middle age. In 2006, seniors accounted for approximately 14% of the total population (2). In 2031, seniors will account for nearly 24% of the total population. The CDA Clinical Practice Guidelines recommend screening for diabetes every 1–3 years starting at age 40. By the year 2056, the median age of Canadians will increase to 45–50 years and, therefore, over half the population will have at least 1 risk factor (age over 40) and should be screened regularly (2).

It is important to note that diabetes is increasing in all age groups and that the Aboriginal population is the fastest growing population in Canada. Aboriginal Canadians have a 3 to 5 times higher rate of diabetes than the general population (3–7).

The rest of the increase in the number of Canadians with diabetes is explained by the fact that more people are being diagnosed with diabetes each year than die from diabetes. As treatment for people with diabetes improves, the morbidity rate falls, creating a significant increase in the number of Canadians living longer with more advanced stages of the disease (3–7).

The model shows that the effect of these factors when combined with Canada's current demographic makeup will drive the number of Canadians with diabetes from 1.2 million in 2000 to 3.7 million by 2020, or nearly 10% of all Canadians.

The Economic Burden

Given the projected increase in the prevalence of diabetes in Canada, model findings through the model predict the economic impact of the disease in Canada will jump from \$6.3 billion annually in 2000 to \$16.9 billion annually by 2020—a 180% increase (1). Furthermore, this increase is attributable solely to the increase in the number of people with diabetes. Any increase in the cost of services and treatments people living with diabetes receive (beyond the general inflation rate already accounted for in the model) will add to this total (1). Compared to people without diabetes, people with diabetes were hospitalized at higher rates for:

- Stroke
- Hypertension
- Heart attack
- Chronic kidney disease
- Lower limb amputations.

The strain on outpatient resources or in the primary

care setting in Canada means that adults with diabetes have 2 times more visits to their family doctor and specialist for:

- Anxiety
- Depression
- Retinopathy
- Obesity
- Neuropathy
- Erectile dysfunction
- Foot ulcers (1).

Assuming that the costs of treating diabetes remain constant between 2000 to 2020, the direct costs of the disease, including direct treatment costs, and incremental costs of treating secondary complications associated with diabetes will rise from \$1.1 billion annually (already 3.5% of public spending on healthcare) to \$3.1 billion by 2020 (1). In fact, antihyperglycemic drugs were the fastest growing and 8th most commonly prescribed drug class in Canada in 2006.

The largest burden that the Canadian economy will have to bear as a result of the increase in diabetes prevalence will be through premature death caused by the disease. Diabetes shortens life expectancy for all ages. Compared to people without diabetes, people with diabetes have higher mortality rates:

- Age 20 and older: 2 times higher.
- Age 20–44: 4 to 10 times higher.
- Age 45–79: 2 to 3 times higher.

By 2020 it is expected that the Canadian economy will lose \$11 billion annually as a result of the net mortality of diabetes patients, and long-term care costs for diabetes patients are expected to jump from \$1 billion to \$2.7 billion annually over that time period (1).

The Impact of Action on Diabetes

One of the strengths of the CDCM is its ability to measure the economic impact of diabetes prevention and management actions on the cost of diabetes that is born by Canadian society. To the extent that a particular action can be demonstrated to have a specific impact on the incidence of diabetes or the demands people living with diabetes will make on the healthcare system, the CDCM can be used to calculate the economic impact of those changes (1). For instance, if the incidence rate of diabetes fell by 2% per year (relative to the rate used in the current model), and as a result the number of visits to general practitioners and specialists fell 0.5% annually, the cost of diabetes in Canada would fall by \$1.3 billion annually. Of that, there would be a \$300 million reduction in direct costs and a further \$1 billion reduction in indirect costs of the disease. This part of the tool will be particularly valuable for government decision makers who will be able to conduct a proper cost/benefit analysis on program proposals designed to assist Canadians with diabetes.

CONCLUSION

The cost of diabetes to Canadian society is staggering. Although the human cost will always be the greatest of all, understanding the economic cost is critical to the development of policies that can reduce the impact of the disease on the lives of Canadians. Without further action, diabetes will become a \$17 billion annual drag on the Canadian economy. Beyond the human toll of this disease, there is a strong economic argument for concrete action to stem the growth of the disease.

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