



Briefing June 2013

Improving Primary Health Care Through Collaboration

Briefing 3—Measuring the Missed Opportunity

At a Glance

- ◆ Interprofessional primary care (IPC) teams can improve clinical health outcomes for patients with chronic conditions, including adult Type 2 diabetes and depression.
- ◆ Less than half of adult Type 2 diabetes and depression patients have access to IPC teams.
- ◆ Annual health and economic benefits of increasing access to IPC teams include a 15 per cent reduction in Type 2 diabetes complications, an expanded labour force of about 52,000 person-years among depression patients, and almost \$3 billion in direct and indirect cost savings.

INTRODUCTION

An interprofessional primary care (IPC) team is a group of professionals from various disciplines who communicate and work together in a formal arrangement to provide health services, resources, and advice to a patient population within a primary care setting. (See box “What Are Interprofessional Primary Care Teams?”) For more than a decade, IPC teams have been evolving as part of many provincial and territorial health transformation plans to achieve the vision set out by the First Ministers in 2000 to provide “the most appropriate care, by the most appropriate providers in the most appropriate settings.”¹ Attaining this vision was one of the main

¹ Goldman and others, “Interprofessional Collaboration.”



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objectives of the Primary Health Care Transition Fund (PHCTF). The PHCTF was established by the federal government as a policy framework guiding the investment of \$800 million over six years to support various primary health care renewal initiatives across the country.²

According to a study on the impact of primary health care teams on processes and outcomes of care, respondents of the Canadian Survey of Experiences With Primary Health Care (CSE-PHC) who had access to an IPC team—particularly those respondents with chronic conditions—were more likely to receive health promotion, disease prevention, and better coordination of care.³ The same study also reported that IPC teams are linked to a higher quality of health care. In 2004, the First Ministers' 10-Year Plan to Strengthen Health Care set a target for 50 per cent of the general population having access to 24/7 IPC in 2011. However, for those conditions that are shown to be more effectively managed by an IPC team versus a solo health provider, it could be argued that the target should be 100 per cent access.⁴

The existing and future health care needs of the Canadian population are largely about managing chronic conditions, which has shifted the focus of health care to prevention and patient self-management. The primary health care system, more than the acute system, is where chronic diseases can be better managed. The World Health Organization (WHO) describes *chronic conditions* as expanding beyond traditional non-communicable diseases, such as diabetes, heart disease, and cancer, to include certain communicable diseases, mental disorders (such as depression), and physical impairments.⁵ Such conditions require long-term management. IPC teams have the potential to be the standard model of care for patients with chronic conditions because they can include multiple health and social service providers with complementary skills and expertise who can effectively address the complexities of these conditions.

2 Health Canada, *Objectives of the PHCTF*.

3 Statistics Canada, *Primary Health Care Teams*.

4 Health Canada, *First Ministers' Meeting*.

5 World Health Organization, *Innovative Care*.

What Are Interprofessional Primary Care Teams?

The vision for interprofessional collaboration in patient-centred practice is “partnership between a team of health providers and a client in a participatory, collaborative and coordinated approach to shared decision-making around health and social issues.”¹

An **interprofessional primary care team** (IPC) is a group of professionals from different disciplines who communicate and work together in a formal arrangement to care for a patient. Health Canada describes an IPC team as “designed to promote the active participation of each discipline in patient care. It enhances patient- and family-centred goals and values, provides mechanisms for continuous communication among caregivers, enhances staff participation in clinical decision-making within and across disciplines and fosters respect for disciplinary contributions of all professionals.”² Team members can include physicians, nurses, dietitians or nutritionists, social workers, mental health professionals, pharmacists, physiotherapists, physician assistants, and others. Other essential members of a team include administrative personnel, as well as the patient, who plays an important role in their own health and well-being.

Primary health care “is linked to and often provides a referring or coordinating function for other specialized health care sectors as well as community services.”³ Primary care, a component of primary health care, is the medical model of response to illness and is defined as “a service at the entry to the health care system.”⁴ Primary care is essential for patients, as it is their first and most common point of contact with the health care system.

1 Canadian Interprofessional Health Collaborative, *A National Interprofessional Competency Framework*.

2 Health Canada, *2003 First Ministers' Accord*.

3 Mable and Marriott, *Sharing the Learning*.

4 Accreditation Canada, *Primary Care Services Standards*.

Better management of patients with chronic conditions in the primary care system can reduce the burden of these conditions in the more costly acute or hospital care system. If the enhanced use of IPC teams can be shown to be cost-effective, they should become the preferred model of care and, therefore, should be expanded and strengthened in all provinces and territories. The objective of this briefing is to assess, from a health system's

and societal perspective, whether IPC teams could become a central component of a health care services delivery strategy in improving the effectiveness and efficiency of care for chronic conditions. It provides the results of an analysis of the impact of interprofessional primary care teams on the health and economic burden of Type 2 diabetes and depression.

This is the third briefing of the report series “Improving Primary Health Care Through Collaboration.” The first two briefings reviewed the current status of IPC teams in Canada and the barriers to effective interprofessional collaboration. The upcoming fourth briefing aims to provide recommendations on how to move forward with IPC teams, including ways to overcome the existing barriers to enhancing interdisciplinary collaborative care.

With their multiple health and social services providers, IPC teams have the potential to be the standard model of care for patients with chronic conditions.

IPC teams are a potentially cost-effective way to deliver primary health care that focuses on health promotion, disease prevention, and the management of chronic conditions, including adult Type 2 diabetes and depression. We selected these two conditions for our analysis based on the high quantity and quality of empirical research showing significant effectiveness of IPC teams on clinical benefits. The prevalence of diabetes (types 1 and 2) in Canadians aged 12 years and older in 2011 was estimated at almost 1.8 million, up 11 per cent since 2007.⁶ It was estimated that in 2008–09, there were more than 200,000 new cases of types 1 and 2 diabetes (6.3 cases per 1,000 individuals) in Canada.⁷ In 2010, diabetes (types 1 and 2) costs⁸ were calculated at about \$5 billion

in Canada, more than double the estimate in 2000.⁹ This figure is considered conservative as it does not include the costs associated with diabetes complications, which include heart attack, stroke, vision problems, kidney problems, and even leg amputation. The cost of Type 2 diabetes alone is expected to be much higher when taking into account these complications, which are associated with both suboptimal management of diabetes and increasing disease prevalence. Most recent estimates by The Conference Board of Canada show that in 2012 mental illness cost the Canadian economy \$20.7 billion in terms of the cost of lost labour market participation due to depression and other mental health conditions.¹⁰

When IPC teams are enhanced and the barriers to accessing them are removed, the health of population groups that can benefit from them the most improves. Better health and economic outcomes are achieved through a reduction in complications and deaths and increased productivity. Addressing the barriers to IPC team enhancement can improve access and health outcomes at a cost savings to the broader health system and to society. A return on investment (ROI) could be estimated if we had both the detailed costs of IPC teams and their total health and economic benefits. In this third briefing we conducted an empirical analysis to estimate the potential health and economic impacts from increasing access to enhanced¹¹ IPC teams on two conditions—Type 2 diabetes and depression in Canada.

If our analysis was able to show benefits resulting from scaling up IPC in the management of Type 2 diabetes and depression, a strong business case could be made for enhancing IPC teams as an approach to transforming the Canadian health care system, given our aging population and the impending increased burden of chronic conditions.

6 Statistics Canada, *Body Mass Index*.

7 Public Health Agency of Canada, *Diabetes in Canada*.

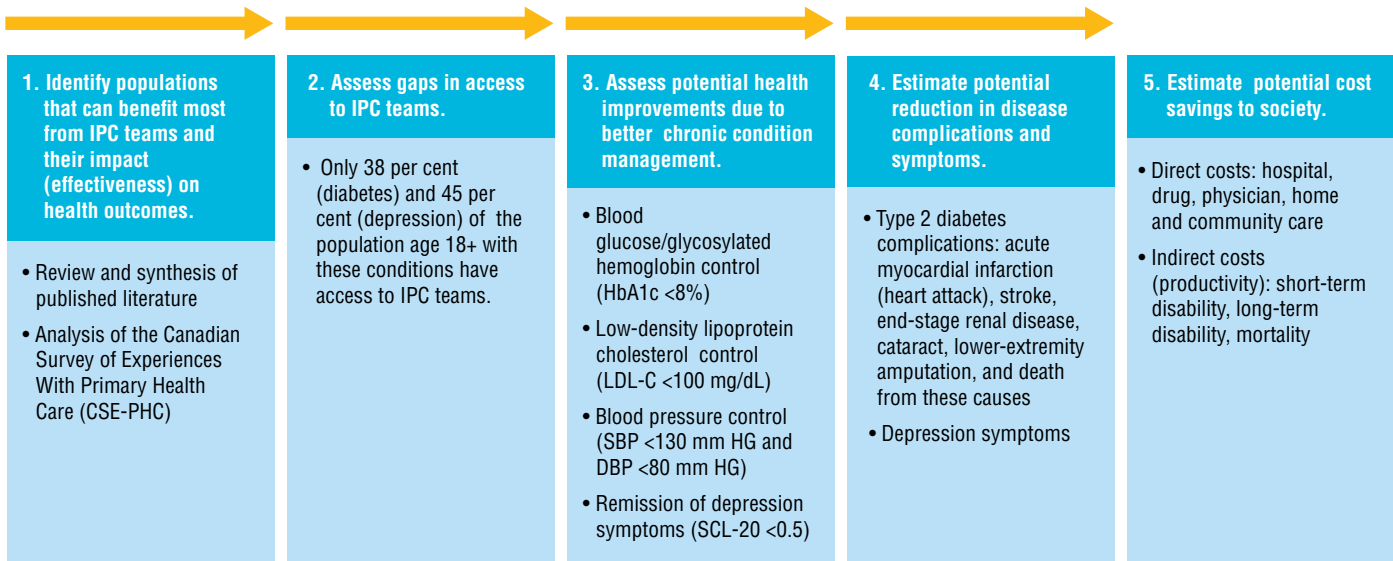
8 The costs captured in the Public Health Agency of Canada’s Economic Burden of Illness estimates include direct health care system costs, including the cost of drugs, physicians, and hospitals; and indirect costs related to short- and long-term disability and to mortality.

9 The Conference Board of Canada, *Health Matters*.

10 The Conference Board of Canada, *Mental Health Issues*.

11 To enhance IPC teams is to make the most effective use of opportunities and resources in order to provide better care and obtain better health outcomes. This involves using teams composed of multiple multidisciplinary care providers who each work to their full scope of practice and collaboratively with other members of the team to provide the most effective and efficient care to patients who can benefit the most. (See box “What Does an Enhanced IPC Team Look Like?”)

Exhibit 1
Estimating the Impact of IPC Teams on the Economic Burden of Type 2 Diabetes and Depression



Sources: The Conference Board of Canada; Canadian Survey of Experiences With Primary Health Care, 2007 and 2008.

Exhibit 1 is a conceptual model that provides a simplified description of the approach to the research. Details of the methodology used and the results of the analysis are presented in the subsequent sections of this briefing.

CURRENT ACCESS TO INTERPROFESSIONAL PRIMARY CARE TEAMS BY TYPE 2 DIABETES AND DEPRESSION PATIENTS

Access to IPC teams in 2011 by adult patients with Type 2 diabetes or depression was estimated from self-reported data from the 2008 Canadian Survey of Experiences with Primary Health Care (CSE-PHC).¹² We assumed that the level of access in 2011 was similar to 2008. According to the data, only 38 per cent of the adult diabetic population¹³ and 44 per cent of the population with depression

had access to a nurse or other health professional where they get their primary health care, compared with 41 per cent of the general population.¹⁴ (See Chart 1.)

To estimate the number of people who have access to IPC, we applied the estimated level of access to IPC from the CSE-PHC to the prevalence of self-identified Type 2 diabetes, depression, and total number of people in the general population from the Canadian Community Health Survey (CCHS).¹⁵ In absolute numbers, we estimated that over 600,000 Type 2 diabetes patients had access to IPC and over 1,000,000 Type 2 diabetics did

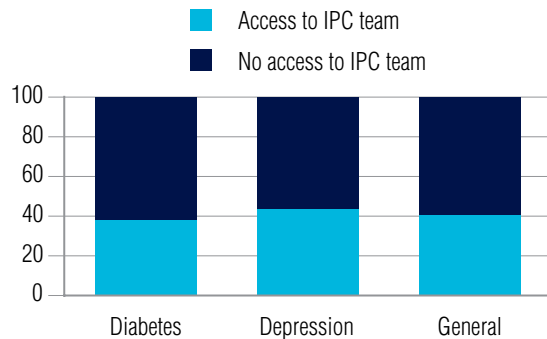
12 Statistics Canada, Canadian Survey of Experiences.

13 The CSE-PHC does not distinguish between Type 1 and Type 2 diabetes. Over 96 per cent of all cases of adult diabetes are Type 2.

14 Reported on the CSE-PHC to experience a nurse regularly involved in their health care and/or other health professional where they get health care.

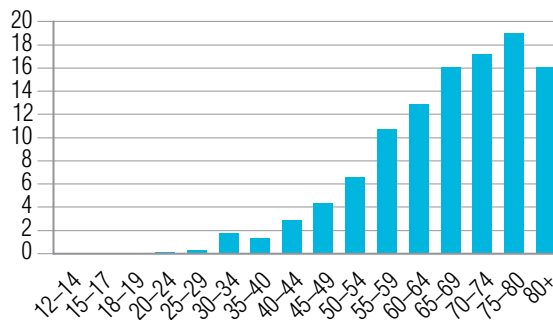
15 Prevalence of Type 2 diabetes was estimated from the 2011 CCHS questionnaire responses to having diabetes, age at which diabetes was diagnosed, whether diabetes was diagnosed during pregnancy, whether insulin was taken and time when insulin was started, whether pills were being taken to control blood sugar, and current age. Prevalence of depression was estimated from the 2011 CCHS questionnaire responses of respondents saying they have been diagnosed with a mood disorder such as depression, bipolar disorder, mania, or dysthymia that is expected to last or has already lasted six months or more.

Chart 1
Low Access to IPC Teams by Patients 18 years and Older With Diabetes or Depression, 2011 (per cent)



Sources: The Conference Board of Canada; Canadian Survey of Experiences With Primary Health Care 2008.

Chart 2
Prevalence of Type 2 Diabetes by Age Group, 2010 (per cent)



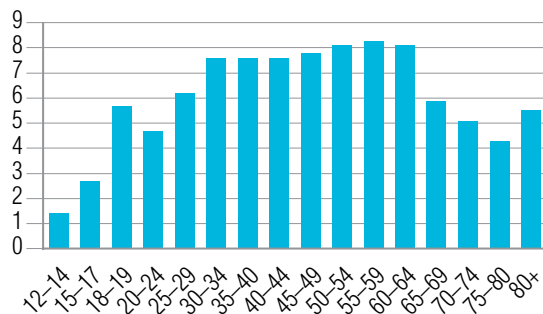
Note: Prevalence by age data was publicly available only from the 2010 Canadian Community Health Survey.
Sources: The Conference Board of Canada; 2010 Canadian Community Health Survey.

not have access; and that almost 900,000 patients diagnosed with depression had access to IPC, while more than 1.1 million did not have access.

According to the CCHS, the prevalence of Type 2 diabetes increases with age, with the risk of disease increasing substantially after age 50. (See Chart 2.) In part due to increasing obesity and aging (risk factors for Type 2 diabetes), the prevalence of Type 2 diabetes has grown significantly compared with other chronic conditions in Canada.¹⁶

The CCHS measures the self-reported prevalence of mood disorder, a broad category of mental health problems of which the most prevalent is depression.¹⁷ In comparison with other chronic conditions, mood disorder is much more prevalent among younger ages. (See Chart 3.) This could be due, in part, to increased awareness and diagnosis over time. Based on the relatively young age distribution of illness, it is expected that there is a substantial impact on labour force productivity due to depression.

Chart 3
Prevalence of Mood Disorder by Age Group, 2010 (per cent)



Note: Prevalence by age data was publicly available only from the 2010 Canadian Community Health Survey.
Sources: The Conference Board of Canada; 2010 Canadian Community Health Survey.

EFFECTIVENESS OF INTERPROFESSIONAL PRIMARY CARE TEAMS IN CHRONIC DISEASE MANAGEMENT

Our literature review identified measures of IPC team effectiveness in improving or controlling clinical outcomes that could be used in estimating economic impact. Based on this review, we found evidence of the clinical effectiveness of IPC teams to be most compelling for

16 The Conference Board of Canada, *Health Matters*.

17 Question CCC_Q280 on the Canadian Community Health Survey, 2010: "Do you have a mood disorder such as depression, bipolar disorder, mania or dysthymia?"

Economic Analysis Methodology

We describe here the general analytic approach to estimating the one-year health economic impact of increasing access to IPC teams in the management of chronic conditions.

The first stage of this analysis involved identifying the chronic conditions for which IPC teams were most effective through a review of the published literature of empirical research on the clinical effectiveness of interprofessional collaboration in primary care. We found that IPC teams appeared to be most effective in managing the clinical and symptomatic outcomes of Type 2 diabetes and depression in adults. We therefore selected these two conditions to focus the subsequent stages of the analysis. We also used the literature review process to determine the relative clinical and health impact of IPC teams on Type 2 diabetes and depression, and the relative economic (direct and indirect) impact of improvements of these clinical and health impacts.

The second stage of this analysis involved estimating the proportion of this population and the number of people who could potentially benefit from IPC. We defined this population using the Canadian Survey of Experiences with Primary Health Care (CSE-PHC) as adults diagnosed with diabetes or depression who have a primary care provider but do not have access to an IPC team. We used the Canadian Community Health Survey (CCHS) to determine the total number of people who are diagnosed with Type 2 diabetes or depression. We proposed that if all Type 2 diabetes and depression patients who currently have a primary care provider had their condition managed by an IPC team, incremental health and economic benefits would result, even within the short term (one year).

The third and fourth stages of this analysis involved determining the health benefits of improving access to IPC teams for this patient population. For adults with Type 2 diabetes, we found in the literature that compared with being managed by a primary care physician working in a solo practice, IPC teams were more effective in controlling blood glucose, bad (LDL) cholesterol, and blood pressure. This in turn results in a lower risk of disease complications, including stroke, heart attack, end-stage renal disease, cataract, lower-extremity amputation, and death from these complications. For adults diagnosed with depression, we found that IPC teams were more effective than a primary care physician working in a solo practice in controlling symptoms of depression, which in turn improves the

affected population's labour force productivity. Assuming that all Type 2 diabetes and depression patients who did not currently have access to an IPC team now had access, we measured the reduction in the number of Type 2 diabetes complications and deaths using estimates of effectiveness from several randomized controlled trials,¹ and the increase in productivity of depression patients using estimates of effectiveness from a randomized controlled trial² and a Conference Board of Canada study.³

The fifth stage of this analysis involved determining the economic impact of increasing access to IPC teams by adults with Type 2 diabetes and depression by estimating the one-year cost savings to the health care system (direct cost savings) and society (indirect cost savings) attributable to a reduction in disease complications, symptoms, and deaths in two ways: a) the impact from increasing access in the Type 2 diabetes population from 38 per cent to 100 per cent and increasing access in the depressed population from 44 per cent to 100 per cent; and b) the impact of an incremental increase of 1 per cent in the Type 2 diabetes and depressed population. The direct cost savings for Type 2 diabetes were estimated using the costs per complication for each type from a prospective, health data linkage study⁴ and then applying these costs to the predicted number of reduced or avoided complications. The indirect cost savings for Type 2 diabetes were estimated using the indirect costs of morbidity and mortality of the disease complications,⁵ while the indirect cost savings for depression were estimated using the indirect costs of morbidity.⁶

1 Ishani and others, "Effect of Nurse Case Management"; Se Won Oh and others, "Glycated Haemoglobin"; Stratton and others, "Association of Glycaemia"; Adler and others, "Association of Systolic Blood Pressure"; Wilson and others, "Prediction of Coronary Heart Disease"; Psaty and others, "The Association Between Lipid Levels."

2 Dietrich and others, "Re-Engineering Systems."

3 The Conference Board of Canada, *Mental Health Issues*.

4 O'Brien, Patrick, and Caro, "Cost of Managing Complications."

5 Health Canada, *Economic Burden of Illness in Canada 1998*; Zelmer, "The Economic Burden."

6 Health Canada, *Economic Burden of Illness in Canada 1998*.

adult Type 2 diabetes and depression. IPC team effectiveness in terms of measure of clinical control is described in the [online technical appendix](#).

For Type 2 diabetes, several studies reported improvements in blood sugar or glycosylated hemoglobin (HbA1c); blood pressure (BP); and bad cholesterol, known as low-density lipoprotein cholesterol (LDL-C).

However, in order to model the relationship between clinical improvements and reductions in disease complications or severity, only a few studies were selected. These studies needed to report health improvements as either controlled or uncontrolled disease according to a clinically meaningful threshold as described in the medical literature. Better management of Type 2 diabetes was assumed to be defined as having controlled risks,

What Does an Enhanced IPC Team Look Like?

The traits of an enhanced or successful IPC team include having health professionals with complementary skills and competencies who each understand both their own and others' roles and responsibilities on the team and who each practise to their full scope. The team has a shared understanding of collaboration, vision, and goals. Also important are strong competencies in leadership, from the executive to the employee levels. The Leadership Framework of the U.K. National Health Service (NHS) states that "leadership is not restricted to people who hold designated management and traditional leader roles, but in fact is most successful wherever there is a shared responsibility for the success of the organisation, services or care being delivered."¹

The success of an IPC team is related to barriers and enabling factors that are essential in creating a supporting environment that promotes and sustains collaboration. In the second briefing of this research series we identified individual team barriers, including lack of role clarity and trust and hierarchical roles and relationships. We identified practice-level barriers, including lack of strong governance structure and leadership to manage complex practices; difficulties in establishing appropriate skills mix and team size; and insufficient space, time, and tools to promote effective communication and collaboration. System-level barriers included inadequate interprofessional education and training, sub-optimal funding models to support IPC, and lack of appropriate and consistent monitoring and evaluation to inform change. Additional factors that could play a role in enabling successful IPC include regulatory policies that facilitate interprofessional collaboration, enhanced use of electronic health records, and mechanisms for improved patient engagement.² It is expected that addressing the barriers and promoting the enablers of IPC would lead to improvements in patient health benefits and a strengthened, more sustainable health care system.

1 NHS Leadership Academy, *Leadership Framework*.

2 Dinh, *Improving Primary Health Care Through Collaboration. Briefing 2*.

including hyperglycemia (high blood sugar), hypertension (high blood pressure), and dyslipidemia (high bad cholesterol). The clinical effectiveness of IPC teams on these risks was estimated from the literature.¹⁸

18 Ishani and others, "Effect of Nurse Case Management."

For depression, most studies reported improvements in depression symptoms (remission) associated with IPC team management of disease. These studies, although less abundant than the studies for diabetes, showed modest improvements in the control of depression symptoms.¹⁹

The intermediate steps taken to link clinical improvements attributable to the IPC team interventions to potential direct and indirect cost savings to society involved a review of the clinical research literature to estimate the quantitative relationship between different clinical control thresholds and health outcomes or disease events. Several studies were used to estimate the association between three Type 2 diabetes clinical control thresholds and the occurrence of complications. (See [online technical appendix](#).)²⁰

The relationship between depression symptom scores and ability to participate in the labour force was estimated using results from a Conference Board of Canada report on the cost of mental illness.²¹ Please [see this report](#) for details on the methodology used.

SCALING UP THE HEALTH BENEFITS OF IPC TEAMS

To estimate the potential health benefits of increased access to IPC teams, we imposed the estimated benefits of IPC teams on the population of patients with Type 2 diabetes or depression who did not currently have access to an IPC team.

TYPE 2 DIABETES COMPLICATIONS

Major complications from uncontrolled diabetes include stroke, heart attack, end-stage renal disease, lower-extremity amputation, and cataracts. Blood glucose level has been linked to these complications,

19 Dietrich and others, "Re-Engineering Systems," 602.

20 Se Won Oh and others, "Glycated Haemoglobin"; Stratton and others, "Association of Glycaemia"; Adler and others, "Association of Systolic Blood Pressure"; Wilson and others, "Prediction of Coronary Heart Disease"; Psaty and others, "The Association Between Lipid Levels."

21 The Conference Board of Canada, *Mental Health Issues*.

Nurse Case Management on Controlling Risk Factors in Patients With Type 2 Diabetes

The study by Ishani and others evaluated the effectiveness of an enhanced IPC intervention that involved the use of a nurse case manager working with adult Type 2 diabetes patients in concert with the patients' usual primary care provider (physician) over a 12-month period, compared with the patients' usual care (primary care provider only).¹ Diabetic patients, in collaboration with their nurse manager, developed lifestyle modification goals (e.g., changes in physical activity and/or diet, smoking cessation, etc.) and personal action plans. In addition, patients in the intervention group were provided with a home blood pressure (BP) monitor and user instructions. The case manager reviewed the patient's medications for Type 2 diabetes, BP, and cholesterol and made adjustments, as necessary, according to established protocols. Any medication adjustments were communicated to the patient's primary care provider via an electronic medical record or a letter. Initially, case managers contacted patients by telephone every two weeks until home BP goals were achieved, at which time frequency of contact decreased. When patients were

contacted, the case managers reviewed the self-monitoring values for difficulties in measuring home blood glucose or BP. Comparison group patients were asked to continue managing their Type 2 diabetes, BP, and cholesterol under the care of their physician. All patients were asked to return for a final study visit at the end of the study to review medications and receive a number of tests, including formal blood glucose (glycosylated hemoglobin [HbA1c]); low-density lipoprotein cholesterol (LDL-C), or bad cholesterol; and BP measurements.

The study showed that as a result of the case management intervention, a significantly larger number of patients achieved blood glucose, LDL-cholesterol, and pressure control compared with usual care patients (21.9 per cent versus 10.1 per cent). As well, significantly more patients in the intervention group, compared with the usual care group, achieved individual treatment goals² for blood glucose (73.7 versus 65.8 per cent) and BP (45.0 versus 25.4 per cent), but not for high LDL-C.

1 Ishani and others, "Effect of Nurse Case Management."

2 Specific goals are HbA1c \leq 8.0 per cent, BP \leq 130/80 mm HG, and LDL-C $<$ 100 mg/dL.

as high blood glucose can impede blood circulation. Excess glucose in the blood interacts with proteins in the blood vessels, resulting in changes to the structure of the blood vessels: they become thicker and less elastic, making it difficult for blood to circulate throughout the body. As a result, high blood glucose is related to hypertension (high blood pressure), which can result from the narrowing of the blood vessels. Because the risk of cardiovascular events among diabetics with high LDL-C is the same for people with cardiovascular diseases, the LDL-C threshold for diabetics is quite low. In addition, combined with the changes in blood vessel structure due to hyperglycemia, having high LDL-C increases the risk of cardiac events such as stroke and heart attack. Diabetic patients who are managed by an IPC team are more likely to be better supported in making significant and sustainable lifestyle changes, such as improvements in diet and exercise, as well as better medication adherence. These can all substantially help control blood glucose (almost two times more than usual care), blood pressure (almost three times more than usual care),

and LDL-C (50 per cent more than usual care), thus reducing the chances of complications and premature death from these complications.

The estimated impacts of blood glucose level (HbA1c), blood pressure, and bad cholesterol (LDL-C) control as individual and combined risks of complications are summarized in the [online technical appendix](#). Based on the ability to control these clinical risk factors, we estimated that in 2011, increasing access to IPC teams from 38 per cent to 100 per cent could have reduced Type 2 diabetes complications by about 15 per cent—or over 9,000 complications, including strokes, heart attacks, cases of end-stage renal disease, cases of lower-extremity amputation, and cataracts. IPC could also have reduced deaths due to these complications by about 17 per cent, or almost 2,000 deaths. (See Table 1.) We estimated that every 1 per cent increase in IPC coverage—about 16,500 more diabetes patients shifting from usual care to an IPC team—could have resulted in about 145 (15 per cent) fewer complications and 30 (17 per cent) fewer deaths due to these complications.

Table 1
Estimated Avoidable Complications and Deaths Attributable to Increased Access to IPC Teams for Patients With Type 2 Diabetes, 2011

	Percentage of all avoidable complications (n = 9,000)	Percentage of all avoidable deaths (n = 2,000)
Stroke	35	69
Heart attack	16	29
End-stage renal disease	4	2
Lower-extremity amputation	7	–
Cataracts	39	–

Source: The Conference Board of Canada.

DEPRESSION SYMPTOMS

Patients experiencing symptoms of unmanaged depression often have problems that include the inability to work. Depression seriously affects the ability to function cognitively, socially, and physically.²² IPC teams can control debilitating symptoms of depression and restore a person’s ability to work or increase their productivity. By incorporating mental health professionals and case management in a primary care team, depression symptoms can be better controlled.²³ The Conference Board of Canada estimated the amount of labour market participation lost due to mental illness in a survey of mental health clinicians’ opinions on the impact of depression on the ability to work among this patient population. In this study, the extent to which people with depression are unable to work; able to work part time; able to work, but with reduced functioning; and fully able to function at work was measured. Using these data and the knowledge that IPC could increase the probability of remission of depressive symptoms by approximately 40 per cent,²⁴ we estimated the potential

22 Pincus and Pettit, “The Societal Costs.”

23 Dietrich and others, “Re-Engineering Systems.”

24 Ibid.

Management of Depression With Care Managers and Psychiatrists in Primary Care

The study by Dietrich and others evaluated the effectiveness of an intervention that is described as a systematic approach to the assessment and management of depression by the physician, a centrally based care manager providing telephone support, and psychiatrists.¹ Most of the care managers in the study had a background in mental health nursing or primary care. Part of the intervention involved the use of a health questionnaire² during the initial visit to help diagnose disease and to monitor and guide changes in treatment. One week after the initial visit, the care manager gave a follow-up telephone call to the patient, with subsequent monthly or as-needed follow-up calls until remission. The calls included a re-administration of the health questionnaire. The care manager’s role was to assist patients to adhere to the treatment and to support self-management, such as engaging in exercise or social activities. The care manager relayed information back to the clinician in the form of a report and the questionnaire scores. Psychiatrists were used to supervise the care managers through weekly telephone consultations to discuss new patients and the patients’ questionnaire scores. The psychiatrist could suggest changes to treatment either through the care manager or by directly contacting the primary care clinician. Clinicians were also able to consult with the psychiatrists for informal telephone advice at any time. The clinicians in both the intervention group and usual care group received training on the diagnosis of depression, assessment of suicidal thoughts, management on the basis of questionnaire responses, and medication management with the goal of achieving remission. The care managers received four to eight hours of training and pharmacists received one hour of training.

The study results showed that at six months, 13 per cent more patients responded to the intervention compared with patients in the usual care group (60 versus 47 per cent), and 10 per cent more patients showed remission (37 versus 27 per cent). Self-rated depression was also rated significantly higher among intervention patients compared with usual care patients.

1 Dietrich and others, “Re-Engineering Systems.”

2 The Patient Health Questionnaire-9 (PHQ-9) is a validated, 90-item depression scale used to assist primary care clinicians in diagnosing depression as well as in selecting and monitoring treatment. The PHQ-9 is used to assess symptoms and functional impairment and derives a severity score to assist in selecting and monitoring treatment.

Source: Spitzer, Kroenke, and Williams, “Validation and Utility of a Self-Report Version of PRIME-MD.”

improvement in labour force participation as a result of increased functionality of the current patient population with depression.

We estimated that in one year, increasing current coverage of IPC in depression patients from 44 per cent to 100 per cent could shift:

- ◆ more than 81,000 more people from the “unable to work” category to the “part-time work” category;
- ◆ more than 56,000 people from the “part-time work” category to the “full-time, reduced functioning” category;
- ◆ more than 71,000 people from the “full-time, reduced functioning” category to the “full-time, fully functioning” category.

For patients with depression, increased IPC access was associated with increased annual labour force participation of almost 52,000 more full-time, fully functional person-years of employment—an 8 per cent reduction in the total productivity loss due to depression. (See Chart 4.) In other terms, every percentage point increase in IPC coverage of IPC in depression patients could have increased annual labour force participation by over 900 person-years.

These health outcomes clearly illustrate that from a patient perspective, IPC teams can help reduce modifiable disease risk factors and disease severity compared with usual standard care (usually care that is provided by a single primary care provider, generally a physician). Since the usual standard of care provided for patients with Type 2 diabetes and depression currently generates health benefits, we are showing considerably high potential incremental benefits resulting from care by IPC teams.

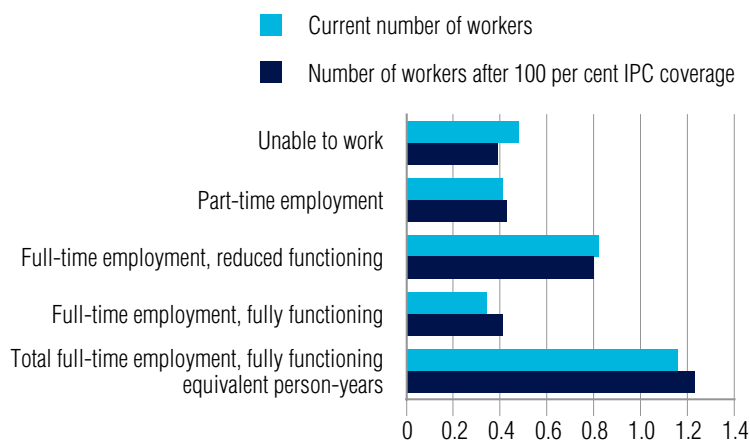
ECONOMIC BENEFITS OF IMPROVED DISEASE MANAGEMENT WITH IPC TEAMS

The potential economic benefits of enhanced IPC teams in the management of Type 2 diabetes include both direct and indirect cost savings due to reductions in disease complications and symptoms. Direct costs comprise those related to health care associated with the complications or exacerbation of the disease as a result of sub-optimal management: physician, drug, hospital, and home and community care costs. Indirect costs are those related to labour force participation (paid employment). As such, the economic burden of disease analysis goes beyond the direct health care cost impact, as it includes the societal perspective or foregone Canadian income due to disease. This economic impact is also considered a productivity loss for the Canadian economy.

TYPE 2 DIABETES

The cost estimates were built using Canadian sources of data²⁵ and consist of event and state costs. Event costs involve costs related to resource use specific to defining the clinical event and include both acute care (initial management in an inpatient or outpatient setting) and event-related health care delivered subsequently in the first year. This care may comprise sub-acute inpatient care, including rehabilitation in hospitals, nursing home facilitates, home health care, outpatient therapy, physician visits, day care, and diagnostic and therapeutic procedures, depending on the complication addressed. A complication event often leads to the patient experiencing a new health state that incurs management costs that persist after the event. The state costs included in

Chart 4
Improvements in Labour Force Participation Attributed to Better Depression Management With IPC Teams, 2011
(number of workers with depression, millions)



Source: The Conference Board of Canada.

25 O'Brien, Patrick, and Caro, "Cost of Managing Complications," 7; Goeree and others, "Prevalence, Total and Excess Costs."

the direct costs reflect the typical utilization of health care services for the ongoing management of the given health state. Some complications, such as end-stage renal disease, have state costs but negligible event costs. Others, such as cataracts, do not have a permanent effect on a person’s health state, are potentially reversible, or are episodic events that can occur more than once. These complications often do not incur important state costs. The costs per Type 2 diabetes complication in 2011 are shown in Table 2.

To estimate the avoidable indirect (productivity) cost of enhanced management of Type 2 diabetes with IPC teams, the morbidity (long-term disability) and premature mortality cost per Type 2 diabetes complication case was based on data from the Economic Burden of Illness in Canada for stroke and heart attack.²⁶ Zelmer’s study was used to estimate the indirect cost per case of end-stage renal disease.²⁷ The cost per case for stroke, heart attack, and end-stage renal disease was inflated to 2011 Canadian dollars and applied to the number of avoided cases attributable to IPC teams in the management of Type 2 diabetes. (See Table 3.) Avoidable indirect costs were assumed to be negligible for lower-extremity amputation, as these complications most often occur at advanced age (average age of 68 to 86 years) when there is very little to no labour force participation.²⁸ Assuming all patients with cataracts receive surgical intervention, the productivity losses associated with cataracts is also assumed to be negligible due to the high likelihood of restored vision translating to quality-of-life benefits in these patients.²⁹ In other words, we did not include productivity gain in the reduction of complications due to lower-extremity amputation and cataracts in the estimate of total indirect cost savings attributable to IPC team management of Type 2 diabetes.

In 2011, the total estimated annual costs of avoidable Type 2 diabetes complications due to increased coverage (38 to 100 per cent) of IPC by diabetes patients was

26 Public Health Agency of Canada, Economic Burden of Illness in Canada, 2000.

27 Zelmer, “The Economic Burden.”

28 Johannesson and others, “Incidence of Lower-Limb Amputation.”

29 Lamoureux and others, “The Impact of Cataract Surgery.”

Table 2
Estimated Direct Cost per Type 2 Diabetes Complication, 2011 (C\$)

	Cost per complication
Stroke	50,733
Heart attack	23,937
End-stage renal disease	76,109
Lower-extremity amputation	30,908
Cataract	6,421

Sources: O'Brien, Patrick, and Caro, “Cost of Managing Complications”; Goeree and others, “Prevalence, Total and Excess Costs”; The Conference Board of Canada.

Table 3
Estimated Indirect Cost per Type 2 Diabetes Complication Case and Death, 2011 (C\$)

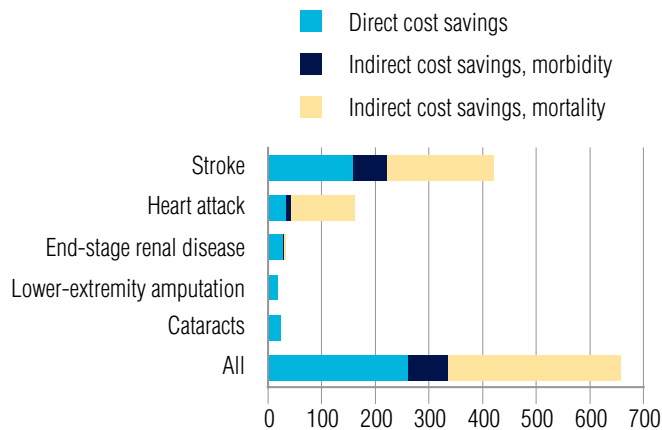
	Cost per case (morbidity)	Cost per premature death (mortality)
Stroke	19,457	146,661
Heart attack	7,271	211,250
End-stage renal disease	5,504	59,851

Source: The Conference Board of Canada.

almost \$657 million. The total estimated incremental direct and indirect cost savings are about \$263 million and \$394 million, respectively. (See Chart 5.) In other words, every 1 per cent increase in IPC coverage for diabetes patients could have resulted in potential direct cost savings of more than \$4 million and potential indirect cost savings of more than \$6 million.

The potential direct cost savings was highest for stroke because the cost per stroke over a year was significantly high (\$50,733) and because the number of potential avoidable stroke cases and deaths was also high compared with the other types of complications. (See Table 1.) The potential indirect cost savings from Type 2 diabetes complications was highest for stroke and heart attack because they affect the most people

Chart 5
Potential Cost Savings Attributed to Avoidable Type 2 Diabetes Complications, 2011
(C\$ millions)



Sources: The Conference Board of Canada; 2010 Canadian Community Health Survey.

who are of working age. The potential indirect cost savings associated with premature mortality from Type 2 diabetes complications was considerably higher than the indirect costs associated with morbidity. This may be explained by the exclusion of short-term disability in the morbidity cost estimate reported in the Economic Burden of Illness in Canada study. The estimated mortality cost per death due to Type 2 diabetes complications—stroke, heart attack, and end-stage renal disease—compared with morbidity cost per case was almost 8-, 29-, and 11-times higher, respectively. (See Table 3.) Mortality costs attributable to stroke and heart attack are significantly high, as they affect relatively younger populations resulting in a substantial potential loss of future income. The overall potential cost savings from avoiding cases of and premature death from Type 2 diabetes complications is also influenced by the measured effectiveness of IPC teams on these health outcomes.

DEPRESSION

Only indirect cost savings associated with increased labour force participation was estimated for depression. According to the study by van Steenberg-Weijnenburg

and others, the direct cost savings, such as reduced hospital costs, attributable to better management of depression in primary care only partially offsets the added health care delivery and medication costs that tend to be a result of enhanced disease management (greater monitoring and increased medication adherence).³⁰

The combined direct and indirect cost savings of improved coverage of IPC teams in the management of Type 2 diabetes and depression was nearly \$3 billion.

In our study, the gain to be made by employing IPC teams in the management of depression is in the indirect cost savings from increased labour force participation due to remission of depression symptoms. Access to better care through IPC teams increases the size of the labour force by allowing many depression patients to work or by enhancing the productivity of those already in the labour force. We estimate that using IPC teams to manage all depression patients would increase the size of the labour force by the equivalent of nearly 52,000 full-time workers. As labour, along with capital, is one of the two main factors of production in any economy, an increase in the size of the labour force leads to an expansion in the productive capacity of the economy, and to an increase in gross domestic product (GDP), employment, and total income. The foregone production due to depression is thus considered an indirect cost to society, and reducing it results in cost savings. Using The Conference Board of Canada's model of the economy, we estimated that the gain in the size of the labour force associated with increasing coverage of IPC to depression patients from 44 per cent to 100 per cent could have led to annual indirect cost savings of almost \$2.3 billion.³¹ In other words, every percentage point increase in coverage to IPC could have led to annual indirect cost savings of more than \$40 million.

30 van Steenberg-Weijnenburg and others, "Cost-Effectiveness of Collaborative Care," 19.

31 This is measured using the human capital approach of calculating indirect costs, as implemented in the Public Health Agency of Canada's Economic Burden of Illness study.

Table 4

Estimated Potential Cost Savings of Increasing Access to IPC Teams for Management of Type 2 Diabetes and Depression, 2011

	Total Estimated Cost Savings (C\$)		Relative cost savings
	Increase coverage to 100 per cent	Increase coverage by 1 per cent	
Type 2 diabetes	262.7 million (direct) 393.8 million (indirect)	4.2 million (direct) 6.3 million (indirect)	19 per cent of direct costs and 16 per cent of indirect costs associated with Type 2 diabetes complications and deaths
Depression	2.3 billion (indirect)	40 million (indirect)	8 per cent of indirect cost of depression

Source: The Conference Board of Canada.

In total, we saw that the combined direct and indirect cost savings of improved coverage of IPC teams in the management of Type 2 diabetes and depression was nearly \$3 billion. (See Table 4.) This figure represents a potential 19 and 16 per cent reduction, respectively, in the total direct and indirect cost of Type 2 diabetes complications and a potential 8 per cent reduction in total cost of productivity loss due to mental illness, attributable to enhanced disease management with IPC teams. Our analysis focused on the potential incremental health and economic benefits for only two conditions among several that could be optimally managed by an IPC team.

COST OF IPC TEAMS AND RETURN ON INVESTMENT

One of the key challenges in the implementation of effective and efficient IPC teams is ensuring that they are at least cost-effective (produce benefit at an extra cost that is acceptable to the payer or to society); and at best that they produce a return on investment (incur a net benefit). The cost of delivering care by IPC teams varies across provinces and territories. Having detailed knowledge of the cost of delivering care by IPC teams coupled with the estimated health and economic benefits would enable an estimation of the return on investment and potentially provide a strong business case for investing in collaborative, interdisciplinary primary care. Our review of the IPC team models in Canada indicates

inadequate or no reporting of detailed cost of primary care delivery by an IPC team³² and, as a result, we could not conduct a comprehensive ROI analysis. The costs of delivering care across practices varies according to the size and type of population serviced; the types and quantity of services and programs provided; the cost of facilities and overhead; and how personnel, including care providers, are paid. The measured benefits of an ROI may include costs related to reductions in health care utilization (e.g., hospitals, physicians, and drugs) and increased labour force participation due to reductions in disease complications and deaths and improved quality of life. These benefits would be measured for all possible diseases, conditions, or health problems that can be improved with IPC teams, not just Type 2 diabetes and depression. Other IPC benefits could include the benefits of better controlled hypertension, cardiovascular diseases, chronic pain, and chronic kidney disease.

It should be noted that increasing access to IPC teams may not necessarily mean putting more money into the system to create teams; rather, it could mean restructuring the current system to change the way health professionals work together and how they deliver care to patients. Thus, an ROI model to measure the economic impact of IPC would not change the fact that beyond health benefits, these teams can also generate significant economic benefits.

32 Dinh, *Improving Primary Health Care Through Collaboration. Briefing 1.*

CONCLUSIONS

This research demonstrates that there are significant potential health benefits and cost savings from enhanced interdisciplinary and collaborative primary care in the management of adult Type 2 diabetes and depression. In one year, we estimated that IPC teams could potentially have reduced 15 per cent of major Type 2 diabetes complications, including cataracts, strokes, attacks, lower-extremity amputations, and cases of end-stage renal disease. IPC teams could also have increased the level of productivity in the patient population with depression by about 8 per cent—an increase of nearly 52,000 person-years in the labour force. These are incremental health benefits of having Type 2 diabetes and depression patients whose conditions are managed by an IPC team instead of standard primary care (solo health practitioner, usually a primary care physician).

There are major potential health benefits and cost savings from enhanced interdisciplinary primary care in the management of adult Type 2 diabetes and depression.

Our analysis shows the potential for significant cost savings to the health care system and society. In one year we estimated that IPC teams could have saved over \$262 million in direct health care costs and over \$393 million in productivity loss due to Type 2 diabetes complications. This is a 17 per cent reduction in direct health care and societal costs. Enhanced management of depression by an IPC team could have resulted in a cost savings of \$2.3 billion in societal costs. We estimated that in 2011, if only these two conditions had been exclusively managed within IPC teams, there would have been combined one-year cost savings to the tune of over \$262 million in direct health care costs and almost \$2.7 billion in productivity gains. There are greater potential health benefits and cost savings from IPC teams when taking into account their effectiveness in the management of other chronic and complex conditions, including cardiovascular diseases, chronic pain, respiratory diseases, and chronic kidney disease. The results of this study show that the incremental health

Research Limitations

The level of certainty in the results of the analyses is subject to several methodological assumptions and limitations, which are summarized here. The results of our analyses should therefore be interpreted with caution. These limitations are further discussed in the [online technical appendix](#).

ACCESS TO IPC BY TYPE 2 DIABETES AND DEPRESSION PATIENTS

Due to the lack of data on the true level of access to IPC in Canada, we relied on the use of self-reported survey data. The vagueness of the survey questions used to estimate access to IPC teams may not have accurately captured true IPC. We believe that we may have overestimated the true level of IPC access.

CLASSIFICATION OF DISEASE

Data in our analyses came from several cross-sectional surveys and studies that used administrative datasets. There is a certain level of inaccuracy when using self-reported data as well as administrative data, as responses and coding may be subject to certain biases that may result in misclassification of disease.

ESTIMATING IPC EFFECTIVENESS

We used the examples of case management for Type 2 diabetes and depression in evaluating the potential impact of IPC teams based on the availability of effectiveness data in the published literature. We are hesitant to recommend scaling up the example interventions to these patients across Canada in light of other types of IPC teams that may have similar or better effectiveness but for which appropriate effectiveness data were unavailable.

ESTIMATING THE COST OF TYPE 2 DIABETES COMPLICATIONS AND DEPRESSION SYMPTOMS

The costing data used to estimate the cost of Type 2 diabetes complications assumed a standard process of care and level of health services use and access for all Type 2 diabetes patients. This type of proxy data may either over- or underestimate the true types and amounts of resources used to care for these complications.

Since the data used to estimate the indirect costs related to morbidity and mortality for Type 2 diabetes complications are quite outdated (2000), we had to apply an approach to estimate more current values, which assumes that each complication case or death in the population incurs the same indirect cost. The indirect costs related to depression were estimated using The Conference Board of Canada's production function of the Canadian economy. The robustness of these estimated costs relies on the accuracy of the model's estimates of the relationship between labour and potential output in the Canadian economy.

and economic benefits of IPC teams compared with standard primary care for just two categories of chronic conditions are substantial.

Our review of the literature found no ROI analyses for IPC teams nor any on the impact of IPC teams on the economic burden of illnesses in Canada. As we have shown, these types of analyses can and should be done to demonstrate the trade-offs between costs and benefits of innovations in the health care system and whether such changes can contribute to a more sustainable health system.

This briefing is the first of its kind to establish a relationship between chronic disease management in and out of an interprofessional primary care environment and the potential health and economic benefits in Canada. It makes the point that from a health and economic perspective, a truly interdisciplinary and collaborative model of primary care is more effective than traditional care by a sole primary care provider. The results of this briefing show significant potential cost savings to society through the enhanced management of adult Type 2 diabetes and depression and provide a rationale for scaling up IPC teams for these two conditions, and potentially for the management of other chronic diseases. An ROI analysis would be required to provide an even stronger rationale. There is a strong case for a larger role for IPC teams in the transformation of the health care system, as the need for enhanced management of chronic conditions will increase given our aging population. The fourth and final briefing of this report series will provide recommendations on how we can overcome the barriers to IPC team development, uptake, and sustainability that were identified in Briefing 2 in order to deliver health care that is most efficient and effective for the people who need it the most.

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Acknowledgements

This document has been prepared for The Conference Board of Canada's Canadian Alliance for Sustainable Health Care (CASHC) under the direction of Louis Thériault, Director, Health Economics. It was researched and written by Thy Dinh, Senior Research Associate, and Fares Bounajm, Economist, Health Economics.

Funding was provided by CASHC investors.

We would like to thank the external reviewers of this document: Dr. Vivien Runnels (Population Health Improvement Research Network, University of Ottawa); Dr. Dale Dauphinee (Clinical and Health Informatics Research Group, McGill University); and Dr. Sharon Wood-Dauphinee (School of Physical and Occupational Therapy, McGill University). Thank you as well to Dr. Joseph Haimowitz, The Conference Board of Canada, who was the internal reviewer of the document.

We are grateful to the members of the report series' advisory committee: Dr. Judy Beamish (Sun Life Financial); Dr. Pierre-Alexandre Landry (Pfizer Canada); Wendy Nicklin (Accreditation Canada); Jonathan Mitchell (Accreditation Canada); and Dr. Peter Sargious (Alberta Health Services).

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