

Access to primary care and other health care use among Western Canadians with chronic conditions: a population-based survey

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Competing Interests

All of the authors declare no conflicts of interest.

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Abstract

Background

For adults with chronic conditions, access to primary care, including multidisciplinary care, is associated with better outcomes, although few studies have assessed barriers to such care. We sought to describe barriers to accessing primary care, including allied health care professionals, for adults with chronic conditions.

Methods

We surveyed 1849 Western Canadians aged 40 years or older who had hypertension, diabetes, heart disease or stroke regarding access to primary care and other health care use. Using log binomial regression, we determined the association between socio-demographic variables and several indicators of access to primary care and allied health care professionals.

Results

While most (95.1%) respondents had a regular medical doctor, two-thirds (68.1%) did not have after-hours access to them. Only 6.1% indicated that allied health professionals were involved in their care, although most respondents (87.3%) indicated they would be willing to see a nurse practitioner if their primary care physician were not available. Respondents who were obese or less than 65 years of age were less likely to have a regular medical doctor, while individuals with diabetes, who lived in a rural area, who were residents of Alberta, or who had poorer health were more likely to have allied health professionals involved in their care.

Interpretation

Our results suggest opportunities for improving access to primary care for people with chronic conditions, including greater involvement by allied health care professionals such as nurse practitioners.

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2 232 words
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7 **Keywords:** primary care, chronic disease, health services accessibility, multidisciplinary care,
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9 interdisciplinary care
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Confidential

Introduction

Individuals with chronic conditions such as diabetes and hypertension often follow complex treatment regimens including medications, regular monitoring and adherence to lifestyle changes (1). Access to primary care is a critical first step in care for management of chronic conditions, and has been shown to be inversely related to the rate of preventable hospitalizations in this population (2). In addition to access and availability of a primary care physician, multidisciplinary care involving allied health care professionals, such as nurses and dietitians, may lead to improved outcomes for people with chronic conditions (3-5).

Not all patients with chronic conditions have reasonable access to primary care and associated allied health professionals, and few studies have directly assessed the frequency and types of barriers to accessing primary care. To better understand potentially modifiable barriers to care for those with cardiovascular-related chronic conditions, and barriers to the self-management of these conditions, Statistics Canada, in collaboration with the Interdisciplinary Chronic Disease Collaboration (www.ICDC.ca), conducted the *Barriers to Care for People with Chronic Health Conditions* survey. This was a population-based survey of individuals aged 40 years and older in Western Canada with one or more of diabetes, hypertension, heart disease or stroke. The objectives were to describe access to primary care and other health care use in adults with chronic conditions, to describe the extent to which allied health care professionals are involved in such care, and to identify potentially modifiable barriers to care.

Methods

Data sources

We analyzed data from the 2012 *Barriers to Care for People with Chronic Health Conditions* survey. Adults aged 40 or older residing in the four western Canadian provinces who responded to the 2011 *Canadian Community Health Survey* (CCHS) and who indicated they had been diagnosed by a health professional as having diabetes, heart disease, hypertension or a prior stroke, were eligible for inclusion in the survey. Members of the Canadian Forces, First Nations people living on reserves, and people in institutions are not eligible for the CCHS, and thus were not eligible for this survey. Computer-assisted telephone interviews were conducted by Statistics Canada in February and March 2012, and of the 2,316 individuals selected for inclusion, 1,849 (80%) completed the survey. With permission, the responses of these individuals were linked to their 2011 CCHS responses, which provided detailed demographic, lifestyle and related information.

Key Variables

Access to primary care

Respondents were asked whether they had a regular medical doctor; if not, where they received their health care; and how often they were seen by the same medical doctor or nurse. They were also asked whether their regular medical doctor provided after-hours access (where patients could be seen outside of typical office hours). In addition, respondents were asked if there were other health professionals (such as nurse practitioners or nutritionists) working in the same office as their primary care physicians, and if so, whether they were involved in their care. They were also asked how many contacts they had had with a nurse in the past 12 months about their chronic condition, excluding hospitalizations. Finally, respondents were asked if they would be willing to see a nurse practitioner if their regular doctor was not available.

Other health care use

Survey respondents were asked how often in the past 12 months they had seen a specialist for their chronic condition, and the number of different physicians involved in their care. Those who had not seen a specialist were asked why not. Finally, respondents were asked if they had been admitted to hospital, or used an emergency department, for their chronic condition specifically in the prior 12 months. Those who had visited an emergency department for their chronic condition were asked whether they thought this could have been avoided had their regular provider been available.

Other variables

We categorized respondents by their chronic condition(s) and by whether they reported being diagnosed with one vs. more than one of the four chronic conditions. We obtained socio-demographic variables from the CCHS, including age, sex, education level, household income, race (white/Aboriginal/other), rural/urban residence and Canadian-born vs. immigrant. We calculated BMI category from self-reported weight and height, using an adjustment for self-reported data (6).

Analysis

Frequency weights for the survey were calculated by Statistics Canada based on the weights from the 2011 CCHS, to account for complex sampling and to reflect the adult population aged 40 years and older with the chronic conditions in the four western provinces. Variance estimates were calculated using 500 bootstrap survey weights. We conducted all analysis with these frequency and bootstrap weights using STATA 11.2.

We stratified variables related to access to primary care and other health care use by the number and type of chronic condition. We also fit multivariable log binomial regression models to determine the prevalence rate ratios for characteristics associated with: not having a regular

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2 medical doctor; receiving care from other professionals in the primary care physician's office;
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4 having seen or talked to a nurse about the chronic condition; and reporting an avoidable
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6 emergency department visit. If the log binomial models did not converge, logistic models were
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8 used. Ethics approval was provided by the Conjoint Health Research Ethics Board of the
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10 University of Calgary and the Health Research Ethics Board of the University of Alberta.
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13 **Results**

14 *Demographic and baseline characteristics*

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19 Of the 1849 individuals who completed the survey, approximately half were 65 years of
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21 age or older (51.2%), with an equal proportion of males and females (Table 1). Most respondents
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23 (76.8%) were overweight or obese, and 36.8% reported their health as excellent or very good,
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25 despite having at least one chronic condition. Median household income was \$55,000 among all
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27 respondents – \$80,000 among those under 65 years of age and \$40,000 among those aged 65 and
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29 over. Most respondents had hypertension (82.1%), while 26.3% had diabetes (Table 1a), with
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31 32.2% having more than one of the chronic conditions.
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35 *Access to and use of primary care resources*

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38 Most (95.1%) respondents reported that they had a regular medical doctor, and the
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40 majority (78.0%) indicated they always received care from the same primary care physician or
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42 nurse (Table 2). Approximately two-thirds of individuals (68.1%) indicated they did not have
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44 after-hours access to their regular medical doctor or place of care, with this proportion being
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46 slightly higher among those with more than one chronic condition. While nearly one-quarter of
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48 respondents (24.2%) indicated that other health professionals such as nurse practitioners or
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50 nutritionists worked in the same office as their primary care physician, only 6.1% indicated that
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52 these other professionals were involved in their care (9.9% among those with more than one
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54 chronic condition). Approximately 1 in 7 (14.5%) had seen or talked to a nurse about their
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2 chronic condition in the past year. Finally, the majority of respondents (87.3%) indicated that
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4 they would be willing to see a nurse practitioner if their primary care physician was not
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6 available.
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8 9 *Other health care use*

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11 Only 20.4% of respondents had seen a specialist about their chronic condition in the prior
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13 12 months, although this proportion was significantly greater among those with more than one
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15 chronic condition (32.8%) than among those with only one (14.5%) (Table 3). Most respondents
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17 who had not seen a specialist indicated this was either because they did not need to, or their
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19 primary care physician did not recommend it (96.1%). A total of 4.8% of respondents reported
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21 being admitted to hospital for their chronic condition in the previous 12 months, while 8.1%
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23 reported an emergency department visit specifically for their chronic condition. The proportions
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25 of chronic-disease related hospitalization and emergency department visits were higher in
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27 patients with two or more chronic conditions (11.1% and 13.9%) compared to one (1.8% and
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29 5.4%). Finally, of the respondents who reported an emergency department visit, approximately
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31 one-third (i.e., 2.9% of the 8.1% respondents who had used an emergency department in the prior
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33 year) indicated that their last visit could have been avoided if their regular primary care
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35 physician had been available.
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42 *Aspects of health care use*

43 44 *No regular medical doctor*

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46 In a multivariable log binomial model, variables significantly associated with not having
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48 a regular medical doctor were obesity and age less than 65 years (Table 4). Compared to those
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50 who were not obese, obese respondents were 3 times as likely to not have a regular medical
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52 doctor, while respondents less than 65 years of age were more than twice as likely to not have a
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54 regular medical doctor as those 65 years of age or older.
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Other health care professionals involved in care

Individuals with diabetes (RR 3.5, 95% CI 2.2–5.7), those who lived in a rural area (RR 1.7, 95% CI 1.1–2.8), those who perceived their health to be good, fair or poor (RR 1.8, 95% CI 1.1–2.9), and residents of Alberta (RR 2.8, 95% CI 1.2–6.3 when compared with residents of Manitoba, which had the lowest rate) were significantly more likely to have other health care professionals involved in their care within their primary care physician’s office (Table 4).

Contact with a nurse in the last 12 months

None of the socio-demographic factors were associated specifically with nurse involvement in management of individuals’ chronic conditions. However, individuals with diabetes (RR 3.2, 95% CI 2.2–4.7) and those with heart disease (RR 1.5, 95% CI 1.0–2.1) were significantly more likely to have had a contact with a nurse about their chronic condition in the past 12 months, compared to those without diabetes and heart disease, respectively (Table 4).

Avoidable Emergency Department visit

Respondents with household income <\$30,000 (OR 3.6, 95% CI 1.5 to 8.4), no regular medical doctor (OR 6.8, 95% CI 1.2 to 37), heart disease (OR 2.7, 95% CI 1.2 to 6.2) or a prior stroke (OR 4.3, 95% CI 1.3 to 15) were more likely to report that they had an emergency department visit that could have been avoided had their regular provider been available (Table 4).

Interpretation

In this population-based survey of adults with one or more chronic conditions we found that the majority of respondents had a regular medical doctor, although two-thirds did not have after-hours access to appointments outside traditional office hours. This is relevant as about one-third of individuals who had visited an emergency department for their chronic condition indicated the visit could have been avoided if their regular physician had been available.

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2 Importantly, respondents were willing to see other health care professionals, with the majority
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4 willing to see a nurse practitioner if their primary care physician was not available. Respondents
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6 who were rural residents, had diabetes or who lived in Alberta were more likely to have other
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8 health care professionals involved in their care.
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11 Our finding that most people with chronic conditions have a regular medical doctor is
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13 similar to two recent surveys of Canadians with at least one chronic condition, which reported
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15 that 96% had a regular doctor or place of care (7, 8). We also found that younger or obese
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17 respondents were less likely to have a regular medical doctor and that males were almost twice
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19 as likely to not have a regular doctor, although this was not statistically significant. While prior
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21 studies have reported that Canadians who were younger and male were less likely to have a
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23 regular physician (9), the association between obesity and not having a regular physician has not
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25 previously been reported. It is, however, consistent with studies that have found that obese
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27 individuals are less likely to obtain appropriate preventive care, independent of factors such as
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29 less education and lower income (10, 11). Obese individuals may delay or avoid preventive care
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31 because of embarrassment and discomfort (11), anticipation of being told to lose weight (12),
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33 and negative attitudes from providers (13). Given the numerous medical conditions associated
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35 with obesity, reduced access to primary care for these individuals is concerning.
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42 Our study, as well as an earlier survey of Canadians with chronic conditions (7), found
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44 that two-thirds of respondents did not have access to after-hours appointments with their regular
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46 primary care physician. In addition, an international survey of adults with chronic disease in
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48 eight countries found that Canada had the lowest rate of after-hours access, and among the
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50 highest rates of emergency department use (14). Since after-hours access to a regular primary
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52 care physician has been associated with lower emergency department use for non-urgent
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2 problems (15), it is possible that some of the emergency department use perceived as avoidable
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4 by this population could be prevented through improving access to after-hours primary care.
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7 Given that multidisciplinary care has previously been shown to be associated with
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9 positive outcomes in patients with chronic conditions (3-5), it is surprising that only 6% of
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11 patients reported allied health care professionals were involved in the care of their chronic
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13 condition, lower than in previous studies (14, 16, 17). The higher rate of such involvement in
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15 Alberta may have been because of Alberta's Primary Care Networks, which have provided
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17 additional funds for chronic disease management (18). Further, since most patients indicated they
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19 would be willing to see a nurse practitioner if their regular primary care physician were not
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21 available, and given that nurse practitioner-led clinics have been shown to be effective for
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23 chronic disease management (19-21), greater utilization of nurse practitioners in primary care
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25 practices may be an option to improve access to primary care and outcomes for these patients.
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27 However, the role that nurse practitioners will play in primary care remains a controversial topic
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33 (22).
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35 *Limitations*

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37 Our study had several limitations. First, there are inherent limitations related to self-
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39 reported survey data, although these were minimized by Statistics Canada's rigorous
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41 methodology and expertise. Respondents' perceptions of whether an emergency department visit
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43 was avoidable may have been affected by response bias, and our lack of detailed clinical data
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45 limited our ability to adjust for illness severity in our regression models. Finally, our estimates of
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47 the prevalence of allied health care involvement with patients may not be directly comparable to
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49 those obtained in other surveys because of differences in question wording.
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53 *Conclusion*

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2 This study of Western Canadians with selected chronic conditions identified key
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4 characteristics associated with barriers to primary care including being obese, a population at
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6 higher risk for poor outcomes. Importantly, we identified an opportunity for greater involvement
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8 by allied health care professionals in these patients' care—in the primary care physician's office,
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10 and in nurse practitioner-led clinics—that could help to address service gaps such as lack of
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12 after-hours access. Identifying and overcoming these barriers to care are key steps toward
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14 improving care and outcomes for patients with chronic disease.
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19 (2409 words)
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Table 1. Demographic and baseline characteristics of survey respondents, by number of chronic conditions

	Total (n=1849) % (95% CI) [†]	Number of Chronic Conditions*	
		1 Condition % (95% CI) [†] 67.8% (64.8% – 70.8%)	2+ Conditions % (95% CI) [†] 32.2% (29.2 – 35.2%)
Sex			
Male	49.9 (46.0 – 53.8)	47.9 (43.1 – 52.7)	54.2 (48.0 – 60.4)
Female	50.1 (46.2 – 54.0)	52.1 (47.3 – 56.9)	45.8 (39.6 – 52.0)
Age category (yrs)			
40–64 yrs	48.8 (45.7 – 52.1)	54.4 (50.3 – 58.5)	37.2 (31.1 – 43.4)
65–74 yrs	26.9 (23.9 – 29.8)	25.4 (21.7 – 29.0)	30.0 (24.7 – 35.4)
75+ yrs	24.3 (21.5 – 27.0)	20.2 (16.9 – 23.6)	32.7 (27.0 – 38.4)
Region			
Urban	82.5 (79.5 – 85.4)	82.9 (79.1 – 86.6)	81.7 (77.5 – 85.9)
Rural	17.5 (14.6 – 20.5)	17.1 (13.4 – 20.9)	18.3 (14.1 – 22.5)
Household income			
<\$30,000	21.8 (18.9 – 24.7)	18.5 (15.2 – 21.8)	28.6 (23.1 – 34.1)
\$30–54,999	27.4 (24.3 – 30.4)	23.8 (20.2 – 27.3)	34.9 (29.5 – 40.4)
\$55–94,999	24.9 (21.5 – 28.4)	27.0 (22.4 – 31.6)	20.6 (15.7 – 25.4)
\$95,000+	26.0 (22.3 – 29.6)	30.7 (25.8 – 35.6)	15.9 (11.4 – 20.4)
Median household income	\$55,000	\$63,000	\$43,000
Marital status			
Married / Common-law	66.9 (63.2 – 70.6)	69.2 (64.7 – 73.7)	62.2 (56.6 – 67.8)
Widowed/Sep/Div/Single	33.1 (29.4 – 36.8)	30.8 (26.3 – 35.3)	37.8 (32.2 – 43.4)
Level of education			
< High school grad	21.3 (18.6 – 24.1)	18.7 (15.5 – 21.9)	26.8 (21.6 – 32.0)
HS grad/Some Post-sec	22.0 (18.9 – 25.1)	22.3 (18.3 – 26.2)	21.5 (16.2 – 26.8)
Post-sec grad (< Bachelors)	37.7 (33.9 – 41.5)	37.1 (32.2 – 42.0)	38.8 (33.0 – 44.6)
Bachelor's degree or higher	19.0 (15.6 – 22.4)	21.9 (17.3 – 26.5)	12.9 (9.1 – 16.7)
BMI category[‡]			
Normal / Underweight	23.3 (19.8 – 26.7)	24.7 (20.3 – 29.2)	20.0 (14.7 – 25.4)
Overweight	36.7 (32.5 – 40.8)	38.0 (32.9 – 43.2)	33.7 (27.6 – 29.9)
Obese	40.1 (36.2 – 44.0)	37.2 (32.2 – 42.3)	46.2 (40.1 – 52.3)
Mean BMI, kg/m ²	29.4 (29.1 – 29.6)	28.9 (28.6 – 29.2)	30.3 (29.8 – 30.8)
Province of residence			
British Columbia	44.5 (41.3 – 47.7)	43.8 (39.2 – 48.4)	46.0 (40.7 – 51.3)
Alberta	31.7 (28.8 – 34.6)	33.9 (29.8 – 37.9)	27.0 (22.5 – 31.6)
Saskatchewan	10.8 (9.4 – 12.1)	9.7 (8.0 – 11.5)	13.0 (9.7 – 16.2)
Manitoba	13.0 (11.1 – 15.0)	12.6 (9.9 – 15.4)	14.0 (10.1 – 17.9)
Race/Ethnicity			
White	86.7 (83.5 – 89.9)	87.3 (83.2 – 91.4)	85.4 (80.6 – 90.1)
Aboriginal	4.2 (2.9 – 5.5)	3.3 (1.8 – 4.9)	6.0 (3.3 – 8.7)
Other	9.1 (6.0 – 12.2)	9.4 (5.3 – 13.4)	8.7 (4.6 – 12.7)
Self-perceived health			
Excellent/ Very Good	36.8 (33.0 – 40.6)	43.8 (38.7 – 48.9)	22.1 (17.1 – 27.1)
Good	40.2 (36.1 – 44.2)	41.1 (35.7 – 46.4)	38.3 (32.1 – 44.5)
Fair / Poor	23.0 (20.1 – 25.9)	15.1 (12.0 – 18.3)	39.6 (33.5 – 45.6)

BMI=Body Mass Index; CI=confidence interval; Div=divorced; HS=High School; Grad=Graduate; Post-sec=Post-Secondary; Sep=separated

*The chronic conditions included were diabetes, hypertension, heart disease and stroke.

[†]All proportions (%) and 95% CIs were weighted and bootstrapped as per Statistics Canada guidelines. N's for subgroups are therefore not meaningful and have been excluded.

[‡]BMI was corrected for self-report bias (6)

Table 1a. Frequency of chronic conditions of interest, by number of chronic conditions

Type of chronic condition	Total (n = 1849) % (95% CI)*	1 condition: % of those with the chronic condition (95% CI)*	2+ conditions: % of those with the chronic condition (95% CI)*
Hypertension	82.1 (79.3 – 84.8)	63.5 (60.0 – 67.0)	36.5 (33.0 – 40.0)
Diabetes	26.3 (23.7 – 28.9)	33.4 (27.0 – 39.7)	66.6 (60.3 – 73.0)
Heart disease	21.5 (18.7 – 24.3)	29.6 (23.0 – 36.2)	70.4 (63.8 – 77.0)
Stroke	8.0 (6.4 – 9.6)	9.0 (3.0 – 15.1)	91.0 (84.9 – 97.0)

*All proportions and 95% CIs are weighted and bootstrapped as per Statistics Canada guidelines. The percentages in the final two columns reflect the proportion of individuals with that chronic condition who had one or more than one of the chronic conditions.

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Table 2. Access to and use of primary care resources, by number of chronic conditions

	Total % (95% CI)*	Number of Chronic Conditions	
		1 Condition % (95% CI)*	2+ Conditions % (95% CI)*
Have a regular medical doctor:			
Yes	95.1 (93.2 – 97.1)	94.2 (91.4 – 96.9)	97.2 ((95.2 – 99.2)
No	4.9 (2.9 – 6.8)	5.8 (3.1 – 8.6)	2.8 (0.8 – 4.8)
Frequency of care by the same physician or nurse:			
Always	78.0 (74.5 – 81.5)	76.4 (71.8 – 81.1)	81.3 (76.4 – 86.2)
Often, Sometimes, Rarely, or Never	22.0 (18.5 – 25.5)	23.6 (18.9 – 28.2)	18.7 (13.8 – 23.5)
Availability of after-hours access to primary care physician:			
Yes	31.9 (27.9 – 36.0)	34.1 (28.6 – 39.5)	27.6 (22.5 – 32.8)
No	68.1 (64.0 – 72.1)	65.9 (60.5 – 71.4)	72.4 (67.2 – 77.5)
Other health professionals (such as nurse practitioners or nutritionists) in the primary care physician's office:			
Yes	24.2 (20.9 – 27.4)	22.9 (18.9 – 26.9)	26.8 (21.1 – 32.5)
No	75.8 (72.6 – 79.1)	77.1 (73.1 – 81.1)	73.2 (67.5 – 78.9)
Other professionals involved in care in past 12 months:			
Yes	6.1 (4.6 – 7.6)	4.3 (2.8 – 5.8)	9.9 (6.6 – 13.2)
No	93.9 (92.4 – 95.4)	95.7 (94.2 – 97.2)	90.1 (86.8 – 93.4)
Contact with a nurse in the prior 12 months, for care or advice about chronic condition:			
Never	85.5 (82.5 – 88.5)	87.2 (83.6 – 90.9)	81.9 (77.0 – 86.8)
1 or more times	14.5 (11.5 – 17.5)	12.8 (9.1 – 16.4)	18.1 (13.2 – 23.0)
Willing to see a nurse practitioner if primary care physician not available:			
Yes	87.3 (84.7 – 90.0)	87.8 (84.5 – 91.1)	86.3 (82.0 – 90.6)
No	12.7 (10.0 – 15.3)	12.2 (8.9 – 15.5)	13.7 (9.4 – 18.0)

*All proportions and 95% CIs are weighted and bootstrapped as per Statistics Canada guidelines

Table 3. Other health care use, by number of chronic conditions

	Total % (95% CI)*	Number of Chronic Conditions	
		1 Condition % (95% CI)*	2+ Conditions % (95% CI)*
Contact with a specialist regarding the chronic condition in the prior 12 months:	Mean = 1.03 (0.1 – 2.1)	Mean = 0.4 (0.2 – 0.6)	Mean = 2.3 (0 – 5.3)
No contact	79.6 (76.4 – 82.8)	85.5 (81.9 – 89.1)	67.2 (61.1 – 73.4)
1 or more contacts	20.4 (17.2 – 23.6)	14.5 (10.9 – 18.1)	32.8 (26.6 – 38.9)
			RR = 2.3 (1.7 – 3.1)
Reasons for not seeing a specialist:			
Not required	70.5 (66.5 – 74.5)	72.5 (67.7 – 77.5)	64.9 (58.4 – 71.3)
Doctor did not recommend it	28.9 (24.8 – 32.9)	28.3 (23.4 – 33.3)	30.3 (23.9 – 36.8)
Other reason	4.4 (2.8 – 6.0)	2.5 (1.3 – 3.6)	9.5 (4.7 – 14.3)
1 or 2 above	96.1 (94.6 – 97.7)	98.1 (97.1 – 99.1)	91.0 (86.2 – 95.7)
Number of different physicians and specialists seen in the prior 12 months:			
0 or 1	75.9 (72.3 – 79.6)	80.2 (75.6 – 84.7)	66.9 (71.2 – 72.7)
More than 1	24.1 (20.4 – 27.7)	19.8 (15.3 – 24.4)	33.1 (27.3 – 38.8)
Number of emergency department visits in the prior 12 months:			
0	91.9 (89.9 – 93.9)	94.6 (92.4 – 96.8)	86.1 (81.9 – 90.3)
1 or more	8.1 (6.1 – 10.1)	5.4 (3.2 – 7.6)	13.9 (9.7 – 18.1)
Emergency department visit could have been avoided if regular care provider was available:			
No	97.1 (95.8 – 98.3)	98.0 (97.0 – 99.0)	95.0 (91.7 – 98.3)
Yes	2.9 (1.7 – 4.2)	2.0 (1.0 – 3.0)	5.0 (1.7 – 8.3)
Admission to hospital in prior 12 months for chronic condition:			
No	95.2 (93.7 – 96.7)	98.2 (96.9 – 99.4)	88.9 (84.9 – 93.0)
Yes	4.8 (3.3 – 6.3)	1.8 (0.6 – 3.1)	11.1 (7.0 – 15.1)

*All proportions and 95% CIs are weighted and bootstrapped as per Statistics Canada guidelines

Table 4. Association between baseline characteristics and aspects of health care delivery

Outcome*	RR or OR (95% CI) [†]	P value
No regular medical doctor	RR	
Obese	3.0 (1.6 – 6.0)	0.001
Under 65	2.5 (1.4 – 4.7)	0.003
Male	1.8 (0.9 – 3.8)	0.087
Other health care professionals in primary care physician's office involved in care	RR	
Diabetes	3.5 (2.2 – 5.7)	<0.001
Rural residence	1.7 (1.1 – 2.8)	0.022
Poorer self-perceived health	1.9 (1.1 – 3.1)	0.017
Province of residence:		
British Columbia	1.3 (0.6 – 2.8)	0.54
Alberta	2.8 (1.2 – 6.3)	0.016
Saskatchewan	2.3 (1.0 – 5.7)	0.059
Manitoba (reference)	1.0	
Contact with a nurse about chronic condition in prior 12 months	RR	
Diabetes	3.2 (2.2 – 4.7)	<0.001
Heart disease	1.4 (1.0 – 2.1)	0.06
Last emergency department visit avoidable if regular provider was available:	OR	
Household income < \$30,000	3.6 (1.5 – 8.4)	0.003
No regular doctor	6.8 (1.2 – 37)	0.027
Heart disease	2.7 (1.2 – 6.2)	0.016
Stroke	4.3 (1.3 – 15)	0.002

* Each outcome was modelled in a separate multivariable model, consisting only of the variables listed for that model.

[†] All proportions and 95% CIs are weighted and bootstrapped as per Statistics Canada guidelines