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by Philippe Finès

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# Sociodemographic and endogenous factors associated with access to eye care in Canada, 2016 to 2019

by *Philippe Finès*

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## ABSTRACT

### Context

Eye care is important, but it is not always promoted as much as other aspects of health. A visit to an eye care professional is made when need, stimulus, access and availability exist.

### Data and methods

Data from cycles 5 and 6 (2016 to 2019) of the Canadian Health Measures Survey were used. Analyzed variables were related to sociodemographic characteristics, general health, behaviour and eye health. Estimates were obtained using survey weights, and 95% confidence intervals were obtained with bootstrap weights.

### Results

From 2016 to 2019, 75% of people diagnosed with diabetes visited an eye care professional during the previous year. For people not diagnosed with diabetes, the rate varied, at 57% for those aged 6 to 18 years, 40% for those aged 19 to 64, and 63% for those aged 65 to 79. For those aged 6 to 64, wearing glasses and having access to a family doctor were the main factors associated with a visit to an eye care professional in the previous year. For those aged 65 to 79, cataracts, sex, marital status and self-perceived quality of life were the most significant factors.

### Interpretation

Although wearing glasses or having eye diseases was associated with a visit to an eye care professional, this study revealed additional emerging associated factors: access to a family doctor for people aged 6 to 64, and an excellent or very good self-perceived quality of life for those aged 65 to 79.

### Keywords

Access to a family doctor; Canadian Health Measures Survey; Glasses; Diabetes; Eye health; Quality of life

## AUTHORS

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### What is already known on this subject?

- Access to eye care is essential, but it is not always promoted properly.
- Diabetes is an important determinant for eye care needs.
- Recommendations for a visit to an eye care professional vary by age and presence or absence of diabetes

### What does this study add?

- From 2016 to 2019, 75% of people diagnosed with diabetes had visited an eye care professional in the previous year, and this percentage does not vary by age, sex or any other variable.
- Wearing glasses was associated with having visited an eye care professional in the previous year.
- For people aged 6 to 64 who were not diagnosed with diabetes, having access to a family doctor was associated with having visited an eye care professional in the previous year.
- For people aged 65 to 79 who were not diagnosed with diabetes, presence of age-related macular degeneration and cataracts, and self-perceived quality of life were associated with having visited an eye care professional in the previous year.

Eye health is an indicator of health in general, and of quality of life in particular.<sup>1</sup> A comprehensive eye exam, with the advantage of being non-invasive, may detect potential diseases that might later be confirmed through a more specific exam. Generally, vision problems or eye diseases increase the need for eye care. The eye care professional is thus an important health care provider. Most guidelines recommend having an eye exam once a year for people aged 6 to 18 or 65 years and older, as well as for those with diabetes or an eye disease. For healthy people aged 19 to 64, one visit per two years is considered sufficient.

However, eye care is not always promoted. For Hayden, “[p]romotion of eye health is compared unfavourably with other areas of public health/health promotion, such as healthy eating, exercise and oral health by community members.”<sup>2</sup> Moreover, for this author, “[t]he generally low awareness of eye health means that most individuals do not attend eye examinations as a preventative measure; attendance is driven predominately by symptom-led demand.”

People visit an eye care professional when two sets of factors are met

#### 1. Endogenous factors, i.e., related to the person’s health

- Persons with diabetes need to visit an eye care professional regularly. In 2019, the Canadian Community Health Survey (CCHS) estimated that 7.8% of the population aged 15 years and older had diabetes. This condition is a risk factor for vision degeneracy,<sup>3</sup> which should therefore be an important incentive to visit an eye care professional. This is why a diagnosis of diabetes has been taken into account in previous studies on eye health.<sup>4,5</sup>
- Persons with eye diseases also need to visit an eye care professional regularly. For example, the

Canadian Health Survey on Seniors (CHSS) showed that in 2020, 17% of persons aged 65 and older had cataracts, 6% had glaucoma, 8% had diabetic retinopathy and 7% had age-related macular degeneration.

- Anyone may be encouraged to visit an eye care professional regularly—even in the absence of any indication—by their family doctor. Indeed, the probability of seeing an eye care professional may depend on having imperfect vision, on comorbidities, or on risky behaviours such as smoking, which are related to vision loss.<sup>6</sup>
2. Exogenous factors, i.e., related to the accessibility of the eye care professional. Accessibility is attained when eye care professionals are present in the neighbourhood and impose a relatively short waiting time and an affordable cost.
    - Demand for eye care professionals was expected to increase from 2007. It was estimated that “between 2000 and 2010 there would be a 13% increase in the number of patients with cataract needing surgery.”<sup>7</sup> Also, “subsequent epidemiologic projections indicate that the number of patients with chronic eye conditions, such as glaucoma, will increase by 50% by 2020.”
    - “[T]here is significant regional variation in the number of eye care providers suggesting that Canadians’ ability to see an eye care provider depends on where they live [which] is contradictory to the *Canadian Health Act*.”<sup>8</sup> As a consequence, availability is not uniform across Canada. For example, living in a remote area where the eye care professional is not always present but comes to visit

may hinder access to eye care; this is particularly true for remote Indigenous communities.<sup>9</sup> Also, long-term care facilities do not always provide access to eye care.<sup>10</sup>

- Timeliness is essential for eye care. An Australian study showed that in a new protocol, the median wait time between referral and first appointment was reduced from 118 to 53 days.<sup>11</sup> Of particular interest is the waiting time for cataract surgery.<sup>12</sup>
- Regarding affordability, it must be mentioned that eye care is not covered universally by provincial health insurance programs. According to van Staden, “[w]hile all provinces provide insurance coverage for ‘medically necessary’ eye care services, the coverage for routine eye examinations is usually restricted to designated groups.”<sup>13</sup> In short, eye health is important, but eye care access is not universally available. Therefore, for people living in provinces where access to eye care is not covered by a provincial health insurance program, access to (private) health insurance could play a role.

Recent surveys about eye health are rare and limited to some populations or specific examinations. For example, the 2019 Canadian Health Survey on Children and Youth asked if children and youth aged 1 to 17 years required or received services from an optometrist as opposed to visiting an eye care specialist. In the CCHS, a subsample of respondents reporting diabetes were asked if they had an eye exam with their pupils dilated. In addition, the CHSS asked about specific eye conditions, but not about eye care. Only the Canadian Health Measures Survey (CHMS) asked recently about visits to an eye care specialist among the population aged 6 to 79 years.

Although endogenous and exogenous factors are both important for eye care, the objective of this study using cycles 5 and 6 of the CHMS was to determine which endogenous and sociodemographic factors were associated with visiting an eye care specialist in the previous year.

## Data and methods

### The Canadian Health Measures Survey

The CHMS is an ongoing cross-sectional survey that samples households from five regions across Canada (Atlantic, Quebec, Ontario, Prairies and British Columbia). Participants provide demographic, socioeconomic, health and lifestyle information through an in-person, computer-assisted household interview, followed by direct physical measurements collected at a mobile examination centre. The CHMS excludes full-time members of the Canadian Armed Forces; residents of the three territories, First Nations reserves and other Indigenous settlements, and certain remote regions; and residents of institutions such as nursing homes. Altogether, these exclusions represent approximately 4% of the target population. This study was done

using data from cycle 5 (2016 to 2017) and cycle 6 (2018 to 2019).

The analyzed outcome was whether the respondent visited an eye care professional—that is, an ophthalmologist or an optometrist—during the previous year. Ophthalmologists are medical doctors trained to diagnose and treat eye disease with medication, laser or surgery; optometrists are not medical doctors, but they are trained to diagnose common eye diseases and are allowed to prescribe some medications. Potentially explanatory variables of the outcome may be grouped in three sets: sociodemographic variables, general health and behaviours, and eye health—the latter two include the endogenous factors described in the introduction. Cycle is also to be considered.

### Sociodemographic variables

Sex was reported as male or female. Age strata were, in years: 6 to 11, 12 to 18, 19 to 26, 27 to 35, 36 to 44, 45 to 54, 55 to 64, and 65 to 79. Analyses were separated by age because variables were not collected for all ages, guidelines were not the same for all ages, and eye health decreases with age.<sup>14</sup> Therefore, the population was divided into three age groups: 6 to 18, 19 to 64 and 65 to 79.

Marital status contains three categories: married or living common-law; widowed, separated or divorced; and single, never married. However, the category “widowed, separated or divorced” was not reported by those aged 6 to 18. The highest level of education in the household contains four categories: less than high school, high school diploma, postsecondary, and a “missing” category. Household income was categorized into four categories: less than \$60,000; \$60,000 to less than \$100,000; \$100,000 to less than \$150,000; and \$150,000 or more. The number of categories was then reduced in some models of logistic regression (see further).

Because of limited sample size, population belonging to a racialized group was dichotomized as racialized population, or non-racialized and non-Indigenous population; Indigenous identity was dichotomized as Indigenous (those who reported they were an Aboriginal person—that is, First Nations people living off reserve, Métis or Inuk or Inuit) or not; immigrant status was dichotomized as non-immigrant (born in Canada) or immigrant (not born in Canada).

### General health and behaviour

Respondents were asked “Do you have diabetes?” with the preamble “Remember, we’re interested in conditions diagnosed by a health professional.” Those who answered “Yes” were considered to have diabetes, as opposed to having measured blood level of glycated hemoglobin A1c above a certain threshold, since only those who are aware of a condition can follow recommendations associated with it.

Information about having a family doctor (yes or no) was collected. Three variables that capture the concept of general health were collected. They were self-reported, but contrary to

the other variables in this study, they cannot be validated or verified with other sources. These variables were self-perceived quality of life, self-rated health and self-rated mental health. They were all classified as excellent or very good; good; fair or poor. Among these three variables, only self-rated health was collected among children aged 6 to 11 years, and only self-perceived quality of life was used in the logistic regression models (see further).

Two behaviours were collected. Smoking had three categories: daily, occasional, or non-smoker. Drinking had four categories:

regular drinker (at least once a month), occasional drinker (less than once a month), former drinker or never drank.

**Eye health**

All respondents were asked: “Do you wear eyeglasses or contacts?” Valid answers to this question on correcting glasses were “yes” or “no.”

For people aged 65 to 79 years, four self-reported variables related to eye diseases—glaucoma, diabetic retinopathy, age-

**Table 1**  
**Visiting an eye care professional in the previous 12 months, by selected characteristics, household population aged 6 to 79 diagnosed with diabetes, Canada excluding territories, 2016 to 2019**

Characteristics	Percentage who visited an eye care professional in the previous 12 months		
	%	95% confidence interval	
		from	to
<b>Total</b>	74.5	69.8	78.7
<b>Cycle</b>			
5	75.1	68.3	80.9
6	73.8	66.9	79.7
<b>Sociodemographic variables</b>			
<b>Sex</b>			
Males	74.5	68.9	79.5
Females	74.5	65.5	81.8
<b>Age</b>			
6 to 18 years	76.9 <sup>E</sup>	21.2	97.6
19 to 64 years	72.4	65.1	78.6
65 to 79 years	77.8	71.3	83.2
<b>Marital status</b>			
Married or living common-law	77.9	71.4	83.3
Widowed, separated or divorced	66.6	52.7	78.0
Single, never married <sup>†</sup>	68.2	49.0	82.8
<b>Highest level of education in the household</b>			
Less than high school	68.6 <sup>E</sup>	43.5	86.1
High school graduation	65.1	53.8	74.9
Postsecondary	79.8	74.1	84.5
Missing	F	...	...
<b>Household income</b>			
Less than \$60,000	64.8	55.7	72.9
\$60,000 to less than \$100,000	77.8	65.8	86.5
\$100,000 to less than \$150,000	78.6	64.8	88.0
\$150,000 or more	88.7	78.0	94.5
<b>Population who belong to a racialized group</b>			
Racialized population	78.3	64.1	88.0
Non-racialized and non-Indigenous population	72.8	66.6	78.3
Missing	80.4	51.3	94.1
<b>Indigenous identity</b>			
Indigenous <sup>‡</sup>	80.4	51.3	94.1
Non-Indigenous	74.3	69.9	78.2
<b>Immigrant status</b>			
Immigrant	76.4	64.1	85.5
Non-immigrant	73.4	67.7	78.4

... not applicable

E use with caution

F too unreliable to be published

<sup>†</sup> Reference category

<sup>‡</sup> Indigenous identity refers to First Nations people living off-reserve, Métis and Inuit

**Note:** The concept of racialized population is measured with the 'visible minority' variable in this release.

'Visible minority' refers to whether or not a person belongs to one of the visible minority groups defined by the Employment Equity Act. The Employment Equity Act defines visible minorities as "persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour".

**Source:** Canadian Health Measures Survey cycles 5 and 6.

**Table 1**  
**Visiting an eye care professional in the previous 12 months, by selected characteristics, household population aged 6 to 79 diagnosed with diabetes, Canada excluding territories, 2016 to 2019 (continued)**

Characteristics	%	Percentage who visited an eye care professional in the previous 12 months	
		95% confidence interval	
		from	to
<b>General health and behaviour</b>			
<b>Having a family doctor</b>			
Yes	75.2	70.6	79.3
No	62.1 <sup>E</sup>	27.7	87.5
<b>Self-perceived quality of life</b>			
Excellent / very good	81.3	73.9	87.0
Good	69.3	60.3	77.0
Fair / Poor	58.7 <sup>E</sup>	34.7	79.2
Missing	79.5 <sup>E</sup>	19.0	98.5
<b>Self-rated health</b>			
Excellent / very good	79.0	63.5	89.1
Good	75.5	66.5	82.8
Fair / Poor	69.2	56.2	79.7
<b>Self-rated mental health</b>			
Excellent / very good	79.5	73.2	84.7
Good	70.9	51.6	84.7
Fair / Poor	62.1 <sup>E</sup>	39.8	80.2
Missing	79.5 <sup>E</sup>	19.0	98.5
<b>Smoking</b>			
Daily	64.3	45.5	79.6
Occasional	89.8 <sup>E</sup>	1.9	100.0
Non-smoker	75.8	70.3	80.6
Missing	F	...	...
<b>Drinking</b>			
Regular	71.3	63.7	77.9
Occasional	81.8	68.2	90.4
Former	67.9	53.4	79.5
Never drank	86.7	50.7	97.6
Missing	F	...	...
<b>Eye health</b>			
<b>Wears glasses or contacts</b>			
Yes	76.8	70.8	81.9
No	60.4	43.8	74.9

... not applicable

<sup>E</sup> use with caution

<sup>F</sup> too unreliable to be published

<sup>†</sup> Reference category

<sup>‡</sup> Indigenous identity refers to First Nations people living off-reserve, Métis and Inuit

**Note:** The concept of racialized population is measured with the 'visible minority' variable in this release.

'Visible minority' refers to whether or not a person belongs to one of the visible minority groups defined by the Employment Equity Act. The Employment Equity Act defines visible minorities as "persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour".

**Source:** Canadian Health Measures Survey cycles 5 and 6.

related macular degeneration (AMD) and cataracts—were collected; their categories were: yes (if the person ever had the disease) or no (otherwise).

## Methods

Analyses were performed for four groups. All respondents diagnosed with diabetes were included in one group; those not diagnosed with diabetes were divided by the three age strata mentioned above: 6 to 18 years, 19 to 64 years and 65 to 79 years. Cross tabulations of the outcome with each of the predictor variables were produced. A variable was deemed statistically significant when the 95% confidence intervals (CIs)

of its categories did not overlap. Logistic regression models were then run to determine which variables were associated with the outcome. A specific condition for CHMS requires that no model may contain more than 22 degrees of freedom (11 per cycle, so 22 in total). Consequently, some of the categories were regrouped for some of the models. A category was considered statistically significant if the CI of its odds ratio (OR) did not contain the value 1.

All results were produced with SAS software (release 9.4) and SAS-executable SUDAAN procedures. All the estimates were computed using survey weights and their CIs were obtained using bootstrap weights. All survey and bootstrap weights were divided by two, because two cycles of the survey were used.

**Table 2**  
**Visiting an eye care professional in the previous 12 months, by other eye diseases and having diabetes or not, household population aged 65 to 79, Canada excluding territories, 2016 to 2019**

Eye disease	Have diabetes				Do not have diabetes			
	Percentage with eye disease	Percentage who visited an eye care professional in the previous 12 months	95% confidence interval		Percentage with eye disease	Percentage who visited an eye care professional in the previous 12 months	95% confidence interval	
			from	to			from	to
	%	%			%	%		
<b>Glaucoma</b>								
Yes	5.2	96.5	66.5	99.7	4.9	84.9	65.6	94.3
No	94.8	76.8	69.9	82.5	95.1	61.5	56.8	65.9
<b>Diabetic retinopathy</b>								
Yes	6.7	100.0	100.0	100.0				
No	93.3	76.2	69.7	81.7	100.0	62.6	57.9	67.1
<b>Age-related macular degeneration</b>								
Yes	7.2	100.0	100.0	100.0	3.3	89.4	77.2	95.4
No	92.8	76.1	68.9	82.0	96.7	61.7	56.8	66.3
<b>Cataracts</b>								
Yes	50.8	90.3	77.5	96.2	36.3	79.0	71.3	85.0
No	49.2	64.8	54.1	74.3	63.7	53.3	46.1	60.3

Source: Canadian Health Measures Survey cycles 5 and 6.

Estimates for which coefficient of variation (CV) was higher than 16.6% not exceeding 33.3% were annotated “E” (“Use with caution”); those with CV higher than 33.3% were not presented, but annotated “F” (“Too unreliable to be published”).

## Results

### Population diagnosed with diabetes

According to the survey, from 2016 to 2019 an estimated 1.9 million Canadians reported having been diagnosed with diabetes, which represents 5.8% of the Canadian population aged 6 to 79, at 0.5% among those aged 6 to 18, 5.0% among those aged 19 to 64 and 16.6% among those aged 65 to 79. Among this population, 75% reported visiting an eye care professional in the previous year; this percentage did not vary by cycle, sex or age (see Table 1).

There is a gradient by household income of the percentage who visited an eye care professional, from 65% for those with a household income of less than \$60,000 to 89% for those with a household income of \$150,000 or more. A higher percentage of people who belong to a racialized population, Indigenous people (First Nations people living off reserve, Métis and Inuit) and immigrants visited an eye care professional than their counterparts, but the differences were not significant. For each of the three variables on general health, there was a positive gradient (albeit not always significant) for the percentage of people having had a visit.

The percentage of people aged 65 to 79 who had been diagnosed with diabetes and who had visited an eye care professional during the previous year was higher among those with an eye disease, compared with those without one. The differences were significant for diabetic retinopathy (100% for people with the disease and 76% for those without it), AMD (100% for people with the disease and 76% for those without it) and cataracts (90% for people with the disease and 65% for those without it)

(Table 2). None of the variables included in the logistic regression model were significantly associated with the outcome of interest (not shown).

### Population without a diabetes diagnosis

#### Population aged 6 to 18 years

According to the survey, from 2016 to 2019 about 5.0 million Canadians aged 6 to 18 did not report a diabetes diagnosis. In this population, 57% had visited an eye care professional (Table 3). The percentage was significantly higher for girls (61%, CI= (57, 66%)) compared with boys (52%, CI= (48, 57%)). Having a family doctor was significantly associated with the outcome (59%, CI= (56, 62%)), compared with 39% CI= (30, 48%)) for those without a family doctor). Wearing glasses was also significant (80%, CI= (73, 85%)), compared with 47%, CI= (43, 51%) for those without glasses).

In the logistic regression model, wearing glasses (OR= 5.63, p<0.001), having a family doctor (OR=2.10, p<0.001) and living in a household with an income of \$150,000 or more (OR= 1.95, p=0.01) were the three most important factors associated with the outcome (Table 4). Being female (OR= 1.35, p=0.02) and living in a household with a postsecondary level of education (OR= 2.23, p=0.02) were also significantly associated with the outcome. Having excellent or very good (OR=0.25; p<0.05) or good (OR=0.20; p=0.02) self-perceived quality of life was significantly associated with lower odds of the outcome.

#### Population aged 19 to 64 years

According to the survey, about 21.6 million Canadians aged 19 to 64 did not report a diabetes diagnosis. In this population, the percentage of people who had visited an eye care professional was 40% (Table 3). Having a family doctor was significantly associated with visiting an eye care professional (44%, CI= (41, 47%)) compared with 26%, CI= (22, 32%) for those without a



family doctor). Wearing glasses was also significant (52%, CI= (48, 55%) compared with 22%, CI= (19, 26%) for those without corrective glasses).

In the logistic regression model, wearing glasses (OR= 3.49, p<0.001) and having a family doctor (OR=1.75, p<0.001) were the two most important associated factors (Table 5). Living in a household with an income of at least \$100,000 was also

positively associated with the outcome (OR=1.26, p=0.02). Reporting an Indigenous identity (OR= 0.47, p=0.01) or being an immigrant (OR=0.65, p=0.04) was negatively associated with the outcome.

**Table 3**  
**Visiting an eye care professional in the previous 12 months, by selected characteristics and age group, household population aged 6 to 79 not diagnosed with diabetes, Canada excluding territories, 2016 to 2019**

Characteristics	Percentage who visited an eye care professional in the previous 12 months								
	6 to 18 years			19 to 64 years			65 to 79 years		
	%	95% confidence interval		%	95% confidence interval		%	95% confidence interval	
	from	to	from	to	from	to	from	to	
<b>Total</b>	56.9	53.6	60.0	40.3	37.5	43.2	62.6	57.9	67.1
<b>Cycle</b>									
5	58.6	53.8	63.3	40.3	36.0	44.8	69.4	65.5	73.0
6	55.1	50.3	59.9	40.3	36.6	44.2	57.2	49.9	64.2
<b>Sociodemographic variables</b>									
<b>Sex</b>									
Males	52.5	48.3	56.6	37.0	33.4	40.7	52.2	45.6	58.8
Females	61.3	56.7	65.8	43.6	39.3	48.0	71.2	64.8	76.7
<b>Age</b>									
6 to 11 years	59.5	55.3	63.5	...	...	...	...	...	...
12 to 18 years	54.6	51.2	58.0	...	...	...	...	...	...
19 to 26 years	...	...	...	30.6	25.2	36.7	...	...	...
27 to 35 years	...	...	...	31.2	26.6	36.2	...	...	...
36 to 44 years	...	...	...	38.0	33.9	42.2	...	...	...
45 to 54 years	...	...	...	48.6	42.8	54.5	...	...	...
55 to 64 years	...	...	...	50.4	43.3	57.6	...	...	...
<b>Marital status</b>									
Married or living common-law	100.0	100.0	100.0	43.5	39.9	47.3	60.5	54.0	66.7
Widowed, separated or divorced	...	...	...	45.9	38.1	54.0	73.2	65.5	79.8
Single, never married	56.7	53.4	59.9	32.0	27.4	36.9	41.6 <sup>E</sup>	25.5	59.6
<b>Highest level of education in the household</b>									
Less than high school	27.5 <sup>E</sup>	14.0	46.7	25.5 <sup>E</sup>	14.4	41.1	59.7	47.7	70.7
High school graduation	51.3	42.5	60.0	31.5	25.5	38.1	62.8	47.0	76.2
Post-secondary	58.0	54.4	61.6	41.6	38.0	45.3	62.7	57.9	67.2
Missing	65.8	45.3	81.7	53.2 <sup>E</sup>	29.8	75.3	65.0 <sup>E</sup>	31.2	88.4
<b>Household income</b>									
Less than \$60,000	47.2	40.7	53.8	35.4	31.1	40.0	56.7	48.2	64.8
\$60,000 to less than \$100,000	54.4	48.0	60.6	34.6	30.3	39.3	69.4	61.5	76.2
\$100,000 to less than \$150,000	59.6	52.7	66.3	45.2	39.8	50.7	70.6	59.8	79.5
\$150,000 or more	64.6	59.7	69.3	47.5	42.2	52.9	60.8	43.0	76.1
<b>Population who belong to a racialized group</b>									
Racialized population	55.3	48.6	61.9	39.2	33.7	44.9	63.3	49.6	75.2
Non-racialized and non-Indigenous population	58.2	54.5	61.8	41.5	38.1	45.0	63.4	58.3	68.3
Missing	50.2	39.4	61.1	29.0 <sup>E</sup>	17.9	43.3	F	...	...
<b>Indigenous identity</b>									
Indigenous <sup>‡</sup>	50.0	39.1	61.0	28.9 <sup>E</sup>	17.8	43.3	F	...	...
Non-Indigenous	57.2	54.0	60.3	40.8	37.9	43.7	63.4	58.7	67.8
<b>Immigrant status</b>									
Immigrant	50.6	41.8	59.3	36.9	32.4	41.6	62.7	53.7	70.8
Non-immigrant	58.1	54.6	61.5	42.0	38.7	45.3	62.6	56.6	68.2

... not applicable

E Use with caution

F too unreliable to be published

<sup>‡</sup> Indigenous identity refers to First Nations people living off-reserve, Métis and Inuit

**Note:** The concept of racialized population is measured with the 'visible minority' variable in this release. 'Visible minority' refers to whether or not a person belongs to one of the visible minority groups defined by the Employment Equity Act. The Employment Equity Act defines visible minorities as "persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour".

**Source:** Canadian Health Measures Survey cycles 5 and 6.

**Table 3**  
**Visiting an eye care professional in the previous 12 months, by selected characteristics and age group, household population aged 6 to 79 not diagnosed with diabetes, Canada excluding territories, 2016 to 2019 (continued)**

Characteristics	Percentage who visited an eye care professional in the previous 12 months								
	6 to 18 years			19 to 64 years			65 to 79 years		
	%	95% confidence interval		%	95% confidence interval		%	95% confidence interval	
	from	to	from	to	from	to	from	to	
<b>General health and behaviour</b>									
<b>Having a family doctor</b>									
Yes	59.0	55.6	62.3	43.6	40.6	46.7	63.7	58.5	68.6
No	38.6	30.0	48.0	26.4	21.5	32.0	46.4 <sup>E</sup>	24.2	70.2
<b>Self-perceived quality of life</b>									
Excellent / very good	55.0	51.8	58.2	43.0	39.1	47.0	66.9	60.8	72.5
Good	52.4	41.1	63.5	35.3	30.5	40.5	56.6	49.0	64.0
Fair / Poor	75.9	49.4	91.1	33.1	24.2	43.5	37.2 <sup>E</sup>	20.0	58.5
Missing	...	...	...	F	...	...	F	...	...
<b>Self-rated health</b>									
Excellent / very good	58.3	54.9	61.7	42.8	39.2	46.6	62.5	56.7	67.9
Good	52.0	45.6	58.4	37.4	33.7	41.3	67.5	59.5	74.6
Fair / Poor	54.4	39.8	68.2	36.1	29.0	44.0	51.1	38.2	63.9
<b>Self-rated mental health</b>									
Excellent / very good	55.8	52.6	58.9	42.2	38.4	46.2	63.9	57.5	69.8
Good	52.0	43.2	60.7	35.3	29.9	41.1	63.8	55.7	71.2
Fair / Poor	58.1	42.9	71.9	41.1	33.7	48.9	51.4 <sup>E</sup>	32.1	70.3
Missing	58.9	54.6	63.0	F	...	...	F	...	...
<b>Smoking</b>									
Daily	42.4 <sup>E</sup>	20.1	68.3	32.1	26.5	38.4	51.8	40.6	62.8
Occasional	49.4 <sup>E</sup>	28.3	70.7	26.6 <sup>E</sup>	18.1	37.3	89.6	41.6	99.1
Non-smoker	55.0	51.4	58.6	42.2	39.1	45.4	63.3	58.2	68.2
Missing	59.4	55.3	63.5	...	...	...	...	...	...
<b>Drinking</b>									
Regular	51.8	43.2	60.3	41.3	37.8	44.9	62.8	55.8	69.3
Occasional	55.2	46.6	63.5	38.6	32.2	45.5	64.1	51.2	75.3
Former	58.6 <sup>E</sup>	38.3	76.3	35.7	25.6	47.1	60.4	48.5	71.2
Never drank	55.2	50.2	60.1	38.9	30.5	48.0	63.0	42.6	79.6
Missing	59.3	55.1	63.3	F	...	...	...	...	...
<b>Eye health</b>									
<b>Wears glasses or contacts</b>									
Yes	79.7	73.1	85.0	51.6	47.7	55.4	63.8	59.3	68.1
No	47.2	43.4	51.0	21.9	18.5	25.6	49.6	34.1	65.1

... not applicable

<sup>E</sup> Use with caution

<sup>F</sup> too unreliable to be published

<sup>‡</sup> Indigenous identity refers to First Nations people living off-reserve, Métis and Inuit

**Note:** The concept of racialized population is measured with the 'visible minority' variable in this release. 'Visible minority' refers to whether or not a person belongs to one of the visible minority groups defined by the Employment Equity Act. The Employment Equity Act defines visible minorities as "persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour".

**Source:** Canadian Health Measures Survey cycles 5 and 6.

### Population aged 65 to 79 years

According to the survey, about 3.6 million Canadians aged 65 to 79 did not report a diabetes diagnosis. In this population, the percentage of people who had visited an eye care professional was 63% (Table 3). The proportion was significantly lower for cycle 6 (57%, CI= (50, 64%)) compared with cycle 5 (69%, CI= (65, 73%)) and significantly higher for females (71%, CI= (65, 77%)), compared with males (52%, CI= (46, 59%)). The percentage of people who had visited an eye care professional was significantly lower (61%, CI= (54, 67%)) for those who were married or living common-law in this population than for those who were widowed, separated or divorced (73%, CI= (65, 80%)).

Having a family doctor had a positive association with the outcome, but contrary to the other age groups, it was no longer significant; the estimate for not having a family doctor must be used with caution. The percentage of people not diagnosed with diabetes in this age group who had visited an eye care professional was higher among those with an eye disease, compared with those without one. The differences were significant for AMD (89%, CI= (77, 95%)) for people with the disease and 62%, CI= (57, 66%) for those without the disease) and cataracts (79%, CI= (71, 85%)) for persons with the disease and 53%, CI= (46, 60%) for those without the disease) (Table 2).

In the logistic regression model, cycle 6 had a significant negative association with the outcome (OR=0.58, p=.005) (Table 6). Being a female (OR=1.66, p=.01) compared with

being a male, and being widowed, separated or divorced (OR=3.47, p=0.005) compared with being single were both significantly associated with the outcome. Having an excellent or very good (compared with fair or poor) self-perceived quality of life has a significant positive association with the outcome (OR=4.37, p=0.01). Wearing glasses had a positive association with the outcome (OR=1.53), but it was no longer significant. Glaucoma, AMD and cataracts all had a significant positive association with the outcome (OR=respectively 3.35, 4.08, 3.17).

## Discussion

A visit to an eye care professional during the previous year is related to endogenous and exogenous factors. The analyses done in this study were related only to the endogenous factors and select sociodemographic variables.

For the population aged 6 to 64 without a diabetes diagnosis, the main variable associated with the outcome was wearing glasses. Still, one in five people aged 6 to 18 who wore glasses and almost half the population aged 19 to 64 who wore glasses did not visit an eye care specialist in the previous 12 months.

**Table 4**  
**Logistic regression models of probability of visiting an eye care professional in the previous 12 months, household population aged 6 to 18 years not diagnosed with diabetes, Canada excluding territories, 2016 to 2019**

Characteristics	Adjusted odds ratio of probability of visiting an eye care professional in the previous 12 months			p-value
	Adjusted odds ratio	95% confidence interval		
		from	to	
<b>Sociodemographic variables</b>				
<b>Sex</b>				
Males <sup>†</sup>	1.00	...	...	...
Females	1.35	1.04	1.74	0.02
<b>Highest level of education in the household</b>				
Less than high school <sup>†</sup>	1.00	...	...	...
High school graduation	2.00	0.84	4.76	NS
Postsecondary	2.23	1.12	4.44	0.02
Missing	3.38	1.09	10.45	0.03
<b>Household income</b>				
Less than \$60,000 <sup>†</sup>	1.00	...	...	...
\$60,000 to less than \$100,000	1.17	0.84	1.61	NS
\$100,000 to less than \$150,000	1.54	0.93	2.54	NS
\$150,000 or more	1.95	1.19	3.22	0.01
<b>Indigenous identity</b>				
Indigenous <sup>‡</sup>	0.88	0.54	1.45	NS
Non-Indigenous <sup>†</sup>	1.00	...	...	...
<b>Immigrant status</b>				
Immigrant	0.88	0.54	1.43	NS
Non-immigrant <sup>†</sup>	1.00	...	...	...
<b>General health and behaviour</b>				
<b>Having a family doctor</b>				
Yes	2.10	1.36	3.24	<.001
No <sup>†</sup>	1.00	...	...	...
<b>Self-perceived quality of life</b>				
Excellent / very good	0.25	0.06	0.99	<0.05
Good	0.20	0.05	0.81	0.02
Fair / Poor <sup>†</sup>	1.00	...	...	...
Missing	0.13	0.02	0.97	0.05
<b>Drinking</b>				
Regular	0.63	0.37	1.08	NS
Occasional or former	0.96	0.59	1.57	NS
Never drank <sup>†</sup>	1.00	...	...	...
Missing	2.95	0.77	11.23	NS
<b>Eye health</b>				
<b>Wears glasses or contacts</b>				
Yes	5.63	3.65	8.70	<.001
No <sup>†</sup>	1.00	...	...	...

... not applicable

<sup>†</sup> Reference category

<sup>‡</sup> Indigenous identity refers to First Nations people living off-reserve, Métis and Inuit

Note: NS = not significant.

Source: Canadian Health Measures Survey cycles 5 and 6.

**Table 5**  
**Logistic regression models of probability of visiting an eye care professional in the previous 12 months, household population aged 19 to 64 years not diagnosed with diabetes, Canada excluding territories, 2016 to 2019**

Characteristics	Adjusted odds ratio of probability of visiting an eye care professional in the previous 12 months			
	Adjusted odds ratio	95% confidence interval		p-value
		from	to	
<b>Sociodemographic variables</b>				
<b>Sex</b>				
Males <sup>†</sup>	1.00	...	...	...
Females	1.03	0.80	1.33	NS
<b>Age</b>				
19 to 44 years <sup>†</sup>	1.00	...	...	...
45 to 64 years	1.18	0.90	1.53	NS
<b>Marital status</b>				
Married or living common-law	1.20	0.97	1.49	NS
Widowed, separated or divorced	1.42	0.92	2.17	NS
Single, never married <sup>†</sup>	1.00	...	...	...
Missing	0.11	0.01	1.76	NS
<b>Highest level of education in the household grouped</b>				
Less than postsecondary <sup>†</sup>	1.00	...	...	...
Postsecondary	1.14	0.76	1.71	NS
<b>Household income grouped</b>				
Less than \$100,000 <sup>†</sup>	1.00	...	...	...
\$100,000 or more	1.26	1.04	1.52	0.02
<b>Indigenous identity</b>				
Indigenous <sup>‡</sup>	0.47	0.27	0.82	0.01
Non-Indigenous <sup>†</sup>	1.00	...	...	...
<b>Immigrant status</b>				
Immigrant	0.65	0.43	0.99	0.04
Non-immigrant <sup>†</sup>	1.00	...	...	...
<b>General health and behaviour</b>				
<b>Having a family doctor</b>				
Yes	1.75	1.36	2.25	<.001
No <sup>†</sup>	1.00	...	...	...
<b>Self-perceived quality of life</b>				
Excellent / very good	1.16	0.71	1.90	NS
Good	0.88	0.50	1.56	NS
Fair / Poor <sup>†</sup>	1.00	...	...	...
Missing	0.88	0.05	13.96	NS
<b>Smoking</b>				
Daily	0.81	0.60	1.09	NS
Occasional	0.68	0.45	1.03	NS
Non-smoker <sup>†</sup>	1.00	...	...	...
<b>Drinking</b>				
Regular	0.90	0.54	1.49	NS
Occasional or former	0.78	0.44	1.39	NS
Never drank <sup>†</sup>	1.00	...	...	...
Missing	0.66	0.04	11.07	NS
<b>Eye health</b>				
<b>Wears glasses or contacts</b>				
Yes	3.49	2.80	4.35	<.001
No <sup>†</sup>	1.00	...	...	...

... not applicable

<sup>†</sup> Reference category

<sup>‡</sup> Indigenous identity refers to First Nations people living off-reserve, Métis and Inuit

Note: NS = not significant.

Source: Canadian Health Measures Survey cycles 5 and 6.

For persons aged 6 to 64, a higher household income is associated to the outcome. In addition to the reasons a visit to an eye care professional is necessary (diabetes, eye disease, risky behaviours), the role of the family doctor is to promote eye care for all—that is, to encourage patients to visit an eye care professional for prevention. The results observed in this

study confirm the role of the family doctor regarding eye health for persons aged 6 to 64. For this group, the second most important variable associated with the outcome besides wearing glasses was having access to a family doctor. The fact that this variable and wearing glasses were no longer significant for people aged 65 to 79 (but are still related positively with the

**Table 6**  
**Logistic regression models of probability of visiting an eye care professional in the previous 12 months, household population aged 65 to 79 not diagnosed with diabetes, Canada excluding territories, 2016 to 2019**

Characteristics	Adjusted odds ratio of probability of visiting an eye care professional in the previous 12 months			
	Adjusted odds ratio	95% confidence interval		p-value
		from	to	
<b>Cycle</b>				
5 <sup>†</sup>	1.00	...	...	...
6	0.58	0.40	0.85	0.005
<b>Sociodemographic variables</b>				
<b>Sex</b>				
Males <sup>†</sup>	1.00	...	...	...
Females	1.66	1.13	2.44	0.01
<b>Marital status</b>				
Married or living common-law	1.79	0.71	4.51	NS
Widowed, separated or divorced	3.47	1.47	8.23	0.005
Single, never married <sup>†</sup>	1.00	...	...	...
<b>Highest level of education in the household grouped</b>				
Less than postsecondary <sup>†</sup>	1.00	...	...	...
Postsecondary	1.05	0.55	2.02	NS
<b>Household income grouped</b>				
Less than \$100,000 <sup>†</sup>	1.00	...	...	...
\$100,000 or more	1.26	0.77	2.07	NS
<b>General health and behaviour</b>				
<b>Having a family doctor</b>				
Yes	1.35	0.48	3.79	NS
No <sup>†</sup>	1.00	...	...	...
<b>Self-perceived quality of life</b>				
Excellent / very good	4.37	1.56	12.22	0.01
Good	2.56	0.92	7.10	NS
Fair / Poor <sup>†</sup>	1.00	...	...	...
Missing	0.66	0.03	15.27	NS
<b>Smoking</b>				
Daily	0.61	0.30	1.26	NS
Occasional	6.36	0.74	54.60	NS
Non-smoker <sup>†</sup>	1.00	...	...	...
<b>Drinking</b>				
Regular	0.93	0.33	2.63	NS
Occasional or former	1.05	0.39	2.79	NS
Never drank <sup>†</sup>	1.00	...	...	...
<b>Eye health</b>				
<b>Wears glasses or contacts</b>				
Yes	1.53	0.82	2.84	NS
No <sup>†</sup>	1.00	...	...	...
<b>Has glaucoma</b>				
Yes	3.35	1.02	11.03	0.05
No <sup>†</sup>	1.00	...	...	...
<b>Has age-related macular degeneration</b>				
Yes	4.08	1.22	13.62	0.02
No <sup>†</sup>	1.00	...	...	...
<b>Has cataracts</b>				
Yes	3.17	1.60	6.27	<.001
No <sup>†</sup>	1.00	...	...	...

... not applicable

<sup>†</sup> Reference category

Note: NS = not significant.

Source: Canadian Health Measures Survey cycles 5 and 6.

outcome) means that other variables in the model had a greater importance. The main variables associated with the outcome for this population were being female, widowed, separated or divorced, and having a high level of self-perceived quality of life. Interestingly, the association of excellent and very good quality of life with the outcome varied with age among those not diagnosed with diabetes—it was negative for those aged 6

to 18, not significant for those aged 19 to 64 and positive for those aged 65 to 79.

Although the need for better access to eye care is obvious for persons of all ages, this was particularly true for the oldest age group. Only 65% of people aged 65 to 79 (weighted sum of 78% with a diabetes diagnosis and 63% without) complied with the recommendation to visit an eye care professional in the previous

year. Jin and Trope reported that for their study, 41% of respondents in the 2005 CCHS did not visit an eye care professional.<sup>4</sup> Their findings align with those reported here, even though they used a different survey. Kergoat et al. pointed to the fact that access to eye care in long-term care facilities (LTCFs) in Quebec may not always be adequate, especially for the elderly with cognitive problems or those who cannot visit an eye care professional.<sup>10</sup> They suggested having eye care professionals visit the LTCFs, instead of the reverse. For Bergman and Sjöstrand, “the number of old people with impaired vision will increase. [Elderly people] should have regular eye-screening in order to preserve vision and present conditions of living. Cataract surgery and low vision rehabilitation should be offered when the subject can still benefit from it.”<sup>15</sup> Although drawn from a Swedish survey, these conclusions were also relevant for Canada.

For persons diagnosed with diabetes, the percentage of those who had visited an eye care professional did not vary by sex or age. In fact, no endogenous or sociodemographic variable was found to be significantly associated with the outcome. The small number of persons diagnosed with diabetes in the CHMS could explain the lack of power of prediction models to detect any variables associated with the outcome.

## Limitations

Since the CHMS excludes those aged 80 years and older and those who live in institutions such as nursing homes, nothing can be inferred about the excluded populations. In particular, it is not possible to compare the results of this study with those of Kergoat et al.<sup>10</sup>

No exogenous factor was used in the CHMS. In particular, distance to the closest eye care professional was not available. By consequence, it was not possible to confirm with this study whether people living in remote areas have reduced access to eye care professionals. It was also not possible to determine whether the exogenous variables could explain why the compliance was not 100% among people diagnosed with diabetes.

In the CHMS, there is no question on the number of visits to an eye care professional in the previous year, which could be useful, especially for those in the oldest age group. As Lee et al. mention, regarding the United States, “visit rates are traditionally higher for elderly persons, with nearly 50% of those aged 65 years and older having at least one eye visit in any given year in Medicare”<sup>16</sup> and the same may be expected in Canada. Likewise, a question asking how many visits there were in the past five years would have helped determine whether the respondent complied regularly with the recommendations. The questionnaire also does not ask how long respondents had to wait before their most recent visit.

The question about wearing glasses may lack accompanying questions, such as the percentage of time the person wears them or their reason for doing so. Finally, all the data used in this

survey were self-reported, which could have an impact on the responses, although there is likely no acceptability bias for questions related to this study.

## Conclusion

This study uses four years (two cycles) of data on respondents who are representative of the Canadian population. In three different populations defined by the age of people without a diabetes diagnosis, it presents the most important factors associated with a visit to an eye care professional in the previous year. Among factors positively associated with the outcome, having access to a family doctor (for people aged 6 to 64) and enjoying a good quality of life (for people aged 65 to 79) are worth mentioning. Further work including variables related to promotion, affordability and access to eye care would reveal a more comprehensive portrait of the situation.

# References

1. Cumberland PM, Rahi JS (2016). Visual Function, Social Position, and Health and Life Chances – The UK Biobank Study. *JAMA Ophthalmol.* 134(9): 959-966. doi:10.1001/jamaophthalmol.2016.1778
2. Hayden C (2012). The barriers and enablers that affect access to primary and secondary eye care services across England, Wales, Scotland and Northern Ireland. A report to RNIB by Shared Intelligence RNIB Community Engagement Projects. Final Report. January 2012
3. Négi A, Vernon SA (2003). An overview of the eye in diabetes. *Journal of the Royal Society of Medicine*, Volume 96, p.266–272
4. Jin Y, Trope G (2011). Eye care utilization in Canada: disparity in the publicly funded healthcare system. *Canadian Journal of Ophthalmology*, 46(2), 133–138
5. Moss SE, Klein R, Klein BEK (1995). Factors Associated With Having Eye Examinations in Persons With Diabetes. *Arch. Fam. Med.*, Vol. 4, June 1995, p. 529-534
6. CDC, National Center for Chronic Disease Prevention and Health Promotion, Division of Diabetes Translation (n.d.), The State of Vision, Aging, and Public Health in America, CDC's Vision Health Initiative Web Site. <http://www.cdc.gov/visionhealth>, Not dated but not earlier than 2009.
7. Lee PP, Hoskins HD, Parke DW III (2007). Access to Care – Eye Care Provider Workforce Considerations in 2020, (REPRINTED) *ARCH OPHTHALMOL/VOL* 125, MAR 2007, p. 406-410, WWW.ARCHOPHTHALMOL.COM
8. Buys YM (2016) For Canadians access to eye care depends on where you live, March 5, 2016, <https://atlasofscience.org/for-canadians-access-to-eye-care-depends-on-where-you-live>, Accessed on 2021-04-27
9. Brise LS, de Leeuw S (2015). Seeing Clearly: A Community-Based Inquiry Into Vision Care Access For a Rural Northern First Nation. *Canadian Journal of Optometry, Revue Canadienne d'Optométrie* 77(2). <https://doi.org/10.15353/cjo.77.508>
10. Kergoat H, Boisjoly H, Freeman EE et al (2014). The Perceived Needs and Availability of Eye Care Services for Older Adults in Long-term Care Facilities, *CANADIAN GERIATRICS JOURNAL*, VOLUME 17, ISSUE 3, SEPTEMBER 2014
11. Tahhan N, Ford BK, Angell B et al. (2020). Evaluation the cost and wait-times of a task-sharing model of care for diabetic eye care: a case study from Australia. *BMJ Open* 2020; 10:e036842. Doi:10.1136/BMJOPEN-2020-036842.
12. Conner-Spady B, Sanmartin C, Sanmugasunderam S et al. (2007). A systematic literature review of the evidence on benchmarks for cataract surgery waiting time 1, 2. *Canadian Journal of Ophthalmology*, Volume 42, Issue 4, August 2007, Pages 543-551.
13. Van Staden D (2020). The universal eye health imperative for Canada: an inescapable reality of unmet need, *Canadian Journal of Public Health* (2020) 111:627–630. <https://doi.org/10.17269/s41997-020-00307-4>
14. Finès P (2022). Self-reported eye health in Canada: 20 years of data. *Health Reports*, 2022, Statistics Canada, under press.
15. Bergman B, Sjöstrand J [2002]. A longitudinal study of visual acuity and visual rehabilitation needs in an urban Swedish population followed from the ages of 70 to 97 years of age, *Acta Ophthalmol. Scand.* 2002; 80: 598–607.
16. Lee PP, Hoskins HD, Smith RE et al (2007). Access to Eye Care – Response of the American Academy of Ophthalmology and Its Members to Societal Needs Now and in the Future. (REPRINTED) *ARCH OPHTHALMOL/VOL* 125, MAR 2007, p. 403-405. WWW.ARCHOPHTHALMOL.COM