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ABSTRACT

Background

Although the lack of vision insurance coverage has been linked to adverse vision outcomes, Canada still has a patchwork system that provides poor or no coverage to many of its residents.

Data and methods

We used data from the Canadian Community Health Survey (2005, 2008, 2013-2014) and logistic regressions to describe the extent to which Ontario residents reported insurance coverage for corrective eyewear after the delisting of routine eye examinations for healthy adults in 2004; and, to examine associations between socioeconomic and demographic characteristics, self-reported health and insurance coverage for corrective eyewear.

Results

We found important socioeconomic differences in the reporting of corrective eyewear insurance. Lower-SES adults were more likely to have reported public corrective eyewear coverage, whereas higher-SES adults and older adults were more likely to have reported private coverage. Overall, lower-SES adults and older adults were substantially less likely to have reported any corrective eyewear coverage. Adults and older adults in poorer health had lower odds of having reported private coverage for corrective eyewear. Relative to 2005, adults had higher odds of having reported public coverage, while older adults had lower odds of having reported public coverage for corrective eyewear in 2013 and 2014.

Interpretation: Our findings reinforce the limits of the current patchwork insurance system for eye care and eyewear in Ontario. The substantial socioeconomic differences in the reporting of corrective eyewear insurance, as well as the low coverage in older adults, particularly among the poor and unhealthy, are of concern.

What is already known on this subject?

- The lack of vision insurance coverage has been linked to adverse vision outcomes.
- Inequities in supplementary health insurance have been documented in Canada for prescription drugs and dental care as well as for insurance that covers corrective eyewear.
- Public coverage for routine eye examinations and corrective eyewear varies by province and is in part the result of the partial or full delisting of services across Canadian provinces since the 1990s.

What does this study add?

- There were consistent and important socioeconomic differences in the reporting of corrective eyewear insurance in Ontario after the delisting of routine eye examinations for healthy adults in 2004.
- Ontario residents of lower socioeconomic status (SES) were more likely to have reported public corrective eyewear coverage, whereas higher-SES adults and older adults were both more likely to have reported private coverage. Overall, lower-SES adults and older adults were substantially less likely to have reported any (public or private) corrective eyewear coverage.
- There was a clear gradient in self-reported health in private coverage in adults and older adults; those in poorer health had lower odds of having reported private coverage.

INTRODUCTION

The maintenance of optimal visual function and the treatment of eye disorders is a vital aspect of healthcare. A 2018 survey conducted by the Canadian Ophthalmological Society (COS) revealed that 27% of Canadians faced problems seeing at night, 25% had difficulty reading up close, 22% had blurry vision, and 6% reported double vision; many of these symptoms resulted directly from serious eye diseases. The COS also found that although 59% of Canadians reported experiencing symptoms of potential eye diseases, yet only 54% reported having consulted a health professional.[1]

In Canada, public coverage for routine eye examinations and corrective eyewear varies by province. In Ontario, such examinations are covered for youth and young adults (< 20 years), older adults (≥ 65 years), and adults (20-64 years) with specified medical conditions (e.g., diabetes, glaucoma), and restrictions to similar groups are common in other provinces.

Individuals on social assistance (Ontario Works) and those who receive income support from the Ontario Disability Support Program are eligible for eye examinations every 24 months and may be eligible for financial assistance to cover the costs of prescription eyeglasses. The current patchwork system is in part the result of the partial or full delisting of these services across Canadian provinces since the 1990s.[2,3]

The seminal RAND Health Insurance Experiment found that free care caused an increase in eye examinations and lens purchases, and ultimately improved vision.[4] Additionally, visual acuity outcomes for low-income individuals were adversely and differentially affected by cost-sharing.

[4] In Canada, the lack of government-insured routine eye examinations has been linked to higher incidence of self-reported glaucoma, cataracts and vision loss, and rates of non-refractive vision problems.[5,6] In particular, the 2004 delisting of routine eye examinations for healthy adults in Ontario has resulted in a decrease in the use of eye care services, particularly among

lower-income individuals.[2,3,7] Moreover, the 2004 Ontario delisting had unintended consequences. Although public insurance remained for eye examinations among those with diabetes, the 2004 delisting was associated with a decrease in eye examinations among middle-aged (40–65 years) Ontario residents with diabetes.[8]

Inequities in supplementary health insurance have been documented in Canada for prescription drugs and dental care as well as for insurance that covers corrective eyewear.[9-12] A recent analysis of the 2003 Canadian Community and Health Survey found important disparities in supplementary insurance that covered at least some of the costs of eyeglasses or contact lenses. [11]

Our objective was two-fold. First, we described the extent to which Ontario residents reported supplementary insurance coverage (public or private) for corrective eyewear after the delisting of routine eye examinations for healthy adults in 2004. Second, we examined associations between socioeconomic and demographic characteristics, self-reported health and self-reported insurance coverage for corrective eyewear.

METHODS

We used data from four cycles of Canada's largest health survey, Statistics Canada's Canadian Community Health Survey (CCHS). CCHS is an annual cross-sectional survey that collects data from Canadian residents (≥ 12 years) living in private dwellings. Excluded from the sampling frame are individuals living on Indian Reserves and on Crown Lands, institutional residents, full-time members of the Canadian Forces, and residents of certain remote regions. CCHS is voluntary and data are collected using computer-assisted telephone interviewing. CCHS collects self-reported data on health status, healthcare utilization, and health determinants; this includes information related to vision health and vision care insurance. We used data from Ontario,

Canada's largest province, which 'bought into' the optional vision insurance coverage module on multiple occasion since it delisted routine eye examinations in 2004. Using data from the 2005, 2008, 2013, and 2014 CCHS cycles allowed us to examine differences in the reporting of insurance coverage over nearly a decade.

As outcome measures we used responses to the questions: Do you have insurance that covers all or part of the cost of eyeglasses or contact lenses? Is it a government-sponsored plan; an employer sponsored plan; a private plan? Although the question does not specifically ask about eye examinations, it is most often the case that coverage for corrective eyewear also includes eye examinations. As nearly all respondents who reported having private coverage reported having an employer sponsored plan, we categorized both responses (employer sponsored and private) into a single 'private' category.

We used household income (in deciles, the ratio of household income to the low-income cut-off for the relevant household size and community size at the province-level) and education (high school or less, some post-secondary below the bachelor's level, bachelor's degree or above) as measures of socioeconomic status. We also included a binary indicator when income was imputed by Statistics Canada. We included a measure of self-reported health (In general, would you say your health is excellent, very good, good, fair, or poor?), measures of self-reported chronic diseases (1. hypertension; 2. diabetes; and, 3. any of heart disease, cancer, joint pain or arthritis, chronic lung problems, or mental health problems), and a measure of cigarette smoking. Lastly, we adjusted for age, sex/ gender, linguistic identity (English, French, English and French, other), employment, urban/ rural, and the survey cycle.

We used logistic regressions and report relative (odds ratios [OR]) and absolute (predicted probabilities [Pr]) estimates of associations. Predicted probabilities were calculated by setting

each of the other covariates to their respective sample observed relative frequencies. Estimated ORs should be compared between alternative models with caution as they were obtained using different samples.[13] Because Ontario's eye care insurance public programmes are age-based, we examined adults and older adults separately. We excluded youth and young adults (12–24 years old) because they are generally covered by their parents' supplementary health insurance plans. Insurance coverage figures include respondents with missing data in the denominators. All regressions were estimated using Stata/SE 16.1 with CCHS micro-data Master files, bootstrap weights, and listwise deletion.

RESULTS

We used responses from 57,440 adult and 25,268 older adult Ontario residents surveyed between 2005 and 2014 representing about 28.8 million adults and 7.1 million older adults. In 2005, 2008, 2013 and 2014, about 60% and 30% of Ontario adult and older adult residents reported having a private insurance that covered all or part of the cost of eyeglasses or contact lenses, while just 5% and 8% reported a similar public insurance. Tables 1 and 2 present characteristics of the samples for each CCHS cycles.

Socioeconomic status. From 2005 to 2014, lower-SES Ontario residents consistently reported having less private and overall corrective eyewear insurance coverage (Tables 3 and 4, Figures 1 and 2). For example, adults and older adults ranked in the 10th income decile had odds of reporting corrective eyewear insurance coverage that were more than six and four times higher than respondents in the lowest decile (OR 6.2, 95%CI 5.3, 7.4; OR 4.4, 95%CI 3.2, 6.0). Similar gradient were observed for private coverage, although much steeper among adults. Adults in the highest three household income deciles had odds of having reported private insurance coverage for corrective eyewear that were more than ten times higher than those in the lowest income decile (OR 10.4, 95%CI 10.5, 16.0; OR 14.5, 95%CI 11.8, 17.9; OR 13.8, 95%CI 11.3, 16.0).

For public coverage among adults, we found a similar socioeconomic gradient, but in the opposite direction. Relative to adults in the first income decile, those in the 2nd income decile had 0.5 times the odds of reporting public coverage (OR 0.50, 95%CI 0.41 to 0.62) while those in the 10th decile had 0.26 times the odds of reporting public coverage (OR 0.26, 95%CI 0.20 to 0.33). Among older Ontario residents, we did not find any meaningful or statistically significant socioeconomic differences in the reporting of public insurance coverage for corrective eyewear.

The predicted probability of adult Ontarians in the lowest income decile reporting any corrective eyewear coverage (public or private) was 41% (95%CI 38.3, 44.8) (Figure 2). The same predicted probabilities for the top three income deciles were higher than 80% (Pr 80.2, 95%CI 78.4, 82.0; Pr 82.0, 95%CI 80.3, 83.6; Pr 81.6, 95%CI 80.1, 83.1). The predicted probability of adult Ontarians reporting any corrective eyewear public coverage were low, even for those in the lowest income deciles (Pr 10.8, 95%CI 9.4, 12.3). The predicted probabilities for older adults were substantially lower than those for adults. For example, older adults in the lowest income decile had a predicted probability of having reported any corrective eyewear coverage of less than 20% (Pr 19.4, 95%CI 16.0, 22.8) while older adults in the top decile had a predicted probability of about 50% (Pr 51.5, 95%CI 46.2, 56.8).

Even after adjusting for household income, we found that adults and older adults with lower education attainment had lower odds of having reported corrective eyewear coverage. Adults and older adults with at least a bachelor's degree had 1.16 (95%CI 1.04, 1.29) and 1.41 (95%CI 1.22, 1.64) higher odds than those without any post-secondary education of having reported private and/or public coverage.

Health and health behaviour. Among adult Ontario residents, we found that those who reported fair or poor health had generally higher odds of having reported public corrective eyewear

coverage but lower odds of having reported private coverage. Among older adults, we found no difference in the reporting of public coverage but found a clear gradient in private coverage. Older adults in good, fair or poor health had 0.88 (95%CI 0.78, 0.98), 0.84 (95%CI 0.72, 0.99) and 0.69 (95%CI 0.56, 0.84) lower odds of having reported private coverage than those who reported being in very good or excellent health.

We did not find clear associations between having reported high blood pressure and/or diabetes and corrective eyewear coverage. On the whole, however, our results suggest that adults and older adults who reported having high blood pressure and/or diabetes had higher odds of reporting public coverage. We found that adults and older adults who reported having been diagnosed with at least one of five chronic diseases (heart disease, cancer, joint pain or arthritis, chronic lung problems, and mental health problem) had higher odds of having reported overall coverage (OR 1.20, 95%CI 1.10, 1.30; OR 1.11, 95%CI 1.00, 1.22). These findings were, however, driven by public coverage for adults (OR 1.79, 95%CI 1.55, 2.1) and private coverage for older adults (OR 1.11, 95%CI 1.00, 1.24). Lastly, former and current smokers had generally higher odds of having reported public coverage for corrective eyewear.

Sex/gender. We found no clear associations between sex/gender and public coverage for corrective eyewear in either adults or older adults. We found, however, differences in private coverage: adult males had lower odds of having reported corrective eyewear while older adult males had higher odds (OR 0.86, 95%CI 0.80, 0.92; OR 1.12, 95%CI 1.02, 1.24).

Temporal changes. We found that adult Ontario residents had higher odds of having reported public coverage for corrective eyewear in 2013 and 2014, relative to 2005 (OR 1.23, 95%CI 1.04, 1.45; OR 1.16, 95%CI 0.98, 1.37) but that older Ontario residents had lower odds of having reported public coverage in 2013 and 2014 (OR 0.79, 95%CI 0.65, 0.95; OR 0.74, 95%CI 0.62, 0.89).

On the whole, our findings provide no indication that year of survey was positively or negatively associated with private coverage for corrective eyewear among adults or older adults.

DISCUSSION

Main findings. We found important socioeconomic differences in the reporting of corrective eyewear insurance coverage in 2005, 2008, 2013, and 2014. Lower-SES adults were more likely to have reported public corrective eyewear coverage, whereas higher-SES adults and older adults were both more likely to have reported private coverage. Overall, lower-SES adults and older adults were substantially less likely to have reported any (public or private) corrective eyewear coverage. For example, adult Ontarians in the lowest income decile had a predicted probability of reporting any corrective eyewear coverage that was about 40 percentage points lower than those in the top three income deciles. We also found that, among older adults, the predicted probabilities of reporting any corrective eyewear coverage were substantially lower than those for adults (only about 20% for those in the bottom two income deciles and about 50% for older adults in the top two income deciles). Our results are generally in keeping with an analysis of the 2003 cycle of CCHS that found that Canadians in the lower or middle income bracket were less likely to have reported insurance coverage (public or private) than those in the upper-middle or higher income bracket.[11]

We found a clear gradient in self-reported health in private coverage in adults and older adults; those in poorer health had lower odds of having reported private coverage. We did not find that those who reported having been diagnosed with hypertension or diabetes had different odds of reporting corrective eyewear coverage, with one exception. Older diabetic adults were less likely to have reported private coverage. Over the years analyzed, the data suggest no meaningful change in overall or private coverage, but an increase in public coverage among adults and a

decrease in public coverage among older adults.

Limitations. First, all estimates presented were based on self-reported responses. A recent national and Ontario examination of drug insurance coverage using six cycles of the CCHS found evidence that reports of drug insurance coverage systematically deviated from actual coverage in Ontario and Québec.[12] Second, the cross-sectional nature of the data prevents any causal inference. As such, we are unable to comment on issues of risk selection by individuals or private insurers. Third, as pointed out by others,[11] the CCHS question does not specifically ask about eye examinations. Although likely, it is not certain that coverage for corrective eyewear included eye examinations.

Implications for research and policy. Given the importance of eye health and the associations between insurance, eye care and eye health, a more regular and broader national examination of vision insurance coverage is warranted.[4,5,14] Additionally, the possible biases and misreporting of insurance coverage in survey data calls for a qualitative examination of survey methodology. The World Health Organization and the Lancet Global Health Commission on Global Eye Health urged countries to consider eye care as an essential service within universal health coverage.[14,15] Our findings reinforce the limits of the current patchwork insurance system for eye care and eyewear in Ontario. The substantial socioeconomic differences in the reporting of corrective eyewear insurance, as well as the low coverage in older adults, particularly among the poor and unhealthy, are of concern.

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Table 1. Characteristics of study sample, Ontario, 2005, 2008, 2013-2014, 25-64 years old

Cycle	2005			2008			2013			2014		
	No.	%	95%CI	No.	%	95%CI	No.	%	95%CI	No.	%	95%CI
Corrective lens insurance coverage												
Public	316,015	0.05	(0.04, 0.05)	320,806	0.04	(0.04, 0.05)	431,736	0.06	(0.05, 0.07)	421,742	0.06	(0.05, 0.07)
Private	4,058,906	0.60	(0.59, 0.61)	4,248,971	0.60	(0.58, 0.61)	4,512,301	0.60	(0.59, 0.62)	4,343,328	0.59	(0.57, 0.61)
None	2,128,405	0.31	(0.30, 0.32)	2,347,656	0.33	(0.31, 0.35)	2,252,917	0.30	(0.29, 0.32)	2,322,603	0.31	(0.30, 0.33)
Household income												
1st decile	581,022	0.09	(0.08, 0.09)	650,697	0.09	(0.08, 0.10)	693,851	0.09	(0.08, 0.11)	683,418	0.09	(0.08, 0.11)
2nd decile	529,709	0.08	(0.07, 0.08)	578,475	0.08	(0.07, 0.09)	557,460	0.07	(0.07, 0.08)	598,434	0.08	(0.07, 0.09)
3rd decile	563,981	0.08	(0.08, 0.09)	574,121	0.08	(0.07, 0.09)	688,302	0.09	(0.08, 0.10)	635,084	0.09	(0.07, 0.10)
4th decile	620,835	0.09	(0.09, 0.10)	649,702	0.09	(0.08, 0.10)	666,787	0.09	(0.08, 0.10)	678,456	0.09	(0.08, 0.10)
5th decile	698,580	0.10	(0.10, 0.11)	682,772	0.10	(0.09, 0.11)	731,559	0.10	(0.09, 0.11)	698,389	0.09	(0.09, 0.10)
6th decile	639,174	0.09	(0.09, 0.10)	736,084	0.10	(0.09, 0.11)	753,670	0.10	(0.09, 0.11)	734,889	0.10	(0.09, 0.11)
7th decile	748,783	0.11	(0.10, 0.12)	754,974	0.11	(0.10, 0.11)	793,856	0.11	(0.10, 0.12)	837,198	0.11	(0.10, 0.12)
8th decile	758,648	0.11	(0.11, 0.12)	843,153	0.12	(0.11, 0.13)	825,966	0.11	(0.10, 0.12)	801,487	0.11	(0.10, 0.12)
9th decile	823,142	0.12	(0.12, 0.13)	797,958	0.11	(0.10, 0.12)	872,364	0.12	(0.11, 0.13)	847,896	0.11	(0.10, 0.13)
10th decile, high	835,780	0.12	(0.12, 0.13)	861,922	0.12	(0.11, 0.13)	892,886	0.12	(0.11, 0.13)	877,569	0.12	(0.11, 0.13)
Income imputed	1,570,196	0.23	(0.22, 0.24)	1,665,963	0.23	(0.22, 0.25)	2,056,732	0.28	(0.26, 0.29)	2,160,518	0.29	(0.28, 0.31)
Education												
≤ high school	2,193,301	0.32	(0.31, 0.33)	2,234,086	0.31	(0.30, 0.33)	2,294,048	0.31	(0.29, 0.32)	2,263,686	0.31	(0.29, 0.32)
Some post-secondary < bachelor's level	2,510,676	0.37	(0.36, 0.38)	2,650,916	0.37	(0.36, 0.39)	2,651,550	0.35	(0.34, 0.37)	2,599,037	0.35	(0.33, 0.37)
Bachelor's degree or above	1,885,635	0.28	(0.27, 0.29)	2,069,083	0.29	(0.28, 0.31)	2,432,500	0.33	(0.31, 0.34)	2,407,707	0.33	(0.31, 0.34)
Self-reported health												
Excellent/very good	4,236,152	0.62	(0.61, 0.63)	4,350,240	0.61	(0.59, 0.63)	4,555,363	0.61	(0.59, 0.63)	4,452,247	0.60	(0.58, 0.62)
Good	1,889,312	0.28	(0.27, 0.29)	1,950,981	0.27	(0.26, 0.29)	2,168,454	0.29	(0.27, 0.31)	2,042,570	0.28	(0.26, 0.29)
Fair	485,920	0.07	(0.07, 0.08)	563,671	0.08	(0.07, 0.09)	515,015	0.07	(0.06, 0.08)	620,562	0.08	(0.07, 0.09)
Poor	185,769	0.03	(0.02, 0.03)	260,104	0.04	(0.03, 0.05)	231,692	0.03	(0.03, 0.04)	265,352	0.04	(0.03, 0.05)
Hypertension												
Hypertension	905,632	0.13	(0.13, 0.14)	1,003,788	0.14	(0.13, 0.15)	1,183,512	0.16	(0.15, 0.17)	1,159,337	0.16	(0.14, 0.17)
Diabetes												
Diabetes	275,271	0.04	(0.04, 0.04)	405,657	0.06	(0.05, 0.07)	427,081	0.06	(0.05, 0.07)	465,085	0.06	(0.06, 0.07)
Chronic diseases												
Chronic diseases	2,043,910	0.30	(0.29, 0.31)	2,196,245	0.31	(0.29, 0.32)	2,252,518	0.30	(0.29, 0.32)	2,263,413	0.31	(0.29, 0.32)
Linguistic identity												
French	321,343	0.05	(0.04, 0.05)	302,715	0.04	(0.04, 0.05)	259,026	0.03	(0.03, 0.04)	213,189	0.03	(0.02, 0.03)
English	5,986,362	0.88	(0.87, 0.89)	6,301,342	0.88	(0.87, 0.89)	6,620,316	0.89	(0.87, 0.90)	6,588,265	0.89	(0.88, 0.90)
French & English	189,996	0.03	(0.02, 0.03)	218,336	0.03	(0.02, 0.04)	277,575	0.04	(0.03, 0.04)	303,185	0.04	(0.03, 0.05)
Other	122,900	0.02	(0.02, 0.02)	154,065	0.02	(0.02, 0.03)	149,496	0.02	(0.01, 0.03)	87,064	0.01	(0.01, 0.02)
Employment status												
Unemployed or out of the labour force	1,322,215	0.19	(0.19, 0.20)	1,544,339	0.22	(0.20, 0.23)	1,560,322	0.21	(0.20, 0.22)	1,632,997	0.22	(0.21, 0.24)
Employed	5,301,135	0.78	(0.77, 0.79)	5,417,361	0.76	(0.75, 0.77)	5,753,661	0.77	(0.76, 0.78)	5,576,904	0.75	(0.74, 0.77)
Rural												
Rural	952,050	0.14	(0.13, 0.15)	1,024,526	0.14	(0.14, 0.15)	1,135,243	0.15	(0.14, 0.16)	1,150,442	0.16	(0.14, 0.17)
Smoking												
Never smoker	2,410,478	0.35	(0.35, 0.36)	2,834,051	0.40	(0.38, 0.41)	3,141,464	0.42	(0.40, 0.44)	3,091,354	0.42	(0.40, 0.44)
Former smoker	2,681,854	0.39	(0.39, 0.40)	2,609,802	0.37	(0.35, 0.38)	2,673,426	0.36	(0.34, 0.37)	2,689,068	0.36	(0.35, 0.38)
Current smoker	1,640,781	0.24	(0.23, 0.25)	1,659,093	0.23	(0.22, 0.25)	1,601,586	0.21	(0.20, 0.23)	1,541,329	0.21	(0.19, 0.22)

Sex												
Female	3,447,406	0.51	(0.50, 0.52)	3,630,002	0.51	(0.49, 0.52)	3,787,511	0.51	(0.49, 0.52)	3,763,925	0.51	(0.49, 0.53)
Male	3,352,248	0.49	(0.48, 0.50)	3,499,855	0.49	(0.48, 0.51)	3,689,190	0.49	(0.48, 0.51)	3,628,897	0.49	(0.47, 0.51)
Age												
25-34	1,591,987	0.23	(0.23, 0.24)	1,656,694	0.23	(0.22, 0.25)	1,824,831	0.24	(0.23, 0.26)	1,749,143	0.24	(0.22, 0.25)
35-44	2,090,200	0.31	(0.30, 0.32)	2,028,270	0.28	(0.27, 0.30)	1,865,094	0.25	(0.23, 0.27)	1,832,740	0.25	(0.23, 0.26)
45-54	1,788,123	0.26	(0.25, 0.27)	1,863,898	0.26	(0.25, 0.28)	2,125,082	0.28	(0.27, 0.30)	1,935,663	0.26	(0.24, 0.28)
55-64	1,329,343	0.20	(0.19, 0.20)	1,580,995	0.22	(0.21, 0.24)	1,661,693	0.22	(0.21, 0.24)	1,875,276	0.25	(0.24, 0.27)
Total	6,799,654			7,129,857			7,476,700			7,392,822		

Table 2. Characteristics of study sample, Ontario, 2005, 2008, 2013-2014, 25-64 years old

Cycle	2005			2008			2013			2014		
	No.	%	95%CI	No.	%	95%CI	No.	%	95%CI	No.	%	95%CI
Corrective lens insurance coverage												
Public	134,758	0.09	(0.08, 0.10)	138,438	0.08	(0.07, 0.10)	149,166	0.08	(0.07, 0.09)	136,751	0.07	(0.06, 0.08)
Private	429,434	0.28	(0.27, 0.30)	505,523	0.31	(0.29, 0.33)	638,975	0.33	(0.31, 0.35)	657,692	0.32	(0.30, 0.34)
None	877,599	0.58	(0.57, 0.60)	930,338	0.57	(0.55, 0.59)	1,104,507	0.56	(0.54, 0.59)	1,154,117	0.57	(0.54, 0.59)
Household income												
1st decile	156,364	0.10	(0.09, 0.11)	147,443	0.09	(0.08, 0.11)	140,481	0.07	(0.06, 0.09)	162,014	0.08	(0.06, 0.10)
2nd decile	277,842	0.18	(0.17, 0.20)	261,043	0.16	(0.14, 0.18)	328,287	0.17	(0.15, 0.18)	298,177	0.15	(0.13, 0.16)
3rd decile	254,879	0.17	(0.16, 0.18)	281,469	0.17	(0.15, 0.19)	263,834	0.13	(0.12, 0.15)	282,752	0.14	(0.12, 0.15)
4th decile	194,433	0.13	(0.12, 0.14)	225,802	0.14	(0.13, 0.15)	267,532	0.14	(0.12, 0.15)	272,855	0.13	(0.12, 0.15)
5th decile	163,061	0.11	(0.10, 0.12)	173,327	0.11	(0.09, 0.12)	241,450	0.12	(0.11, 0.14)	242,487	0.12	(0.11, 0.13)
6th decile	132,725	0.09	(0.08, 0.10)	117,406	0.07	(0.06, 0.08)	182,721	0.09	(0.08, 0.10)	217,066	0.11	(0.09, 0.12)
7th decile	104,663	0.07	(0.06, 0.08)	145,126	0.09	(0.08, 0.10)	181,465	0.09	(0.08, 0.11)	184,657	0.09	(0.08, 0.10)
8th decile	100,732	0.07	(0.06, 0.08)	112,051	0.07	(0.06, 0.08)	151,612	0.08	(0.07, 0.09)	142,414	0.07	(0.06, 0.08)
9th decile	73,442	0.05	(0.04, 0.06)	87,977	0.05	(0.05, 0.06)	101,522	0.05	(0.04, 0.06)	120,152	0.06	(0.05, 0.07)
10th decile, high	52,876	0.03	(0.03, 0.04)	81,846	0.05	(0.04, 0.06)	98,264	0.05	(0.04, 0.06)	119,339	0.06	(0.05, 0.07)
Income imputed	539,800	0.36	(0.34, 0.37)	573,399	0.35	(0.33, 0.37)	742,065	0.38	(0.36, 0.40)	830,260	0.41	(0.39, 0.43)
Education												
≤ high school	852,765	0.56	(0.55, 0.58)	851,655	0.52	(0.50, 0.54)	1,031,185	0.53	(0.51, 0.55)	1,010,083	0.49	(0.47, 0.52)
Some post-secondary < bachelor's level	406,666	0.27	(0.26, 0.28)	458,382	0.28	(0.26, 0.30)	540,380	0.28	(0.26, 0.30)	555,549	0.27	(0.25, 0.29)
Bachelor's degree or above	171,788	0.11	(0.10, 0.12)	230,042	0.14	(0.12, 0.16)	318,146	0.16	(0.15, 0.18)	405,413	0.20	(0.18, 0.22)
Self-reported health												
Excellent/very good	631,995	0.42	(0.40, 0.43)	674,947	0.41	(0.39, 0.44)	888,332	0.45	(0.43, 0.48)	940,135	0.46	(0.44, 0.48)
Good	488,425	0.32	(0.31, 0.34)	533,146	0.33	(0.31, 0.35)	637,042	0.33	(0.31, 0.35)	651,059	0.32	(0.30, 0.34)
Fair	264,829	0.18	(0.16, 0.19)	280,592	0.17	(0.16, 0.19)	305,089	0.16	(0.14, 0.17)	309,197	0.15	(0.14, 0.17)
Poor	123,079	0.08	(0.07, 0.09)	140,353	0.09	(0.07, 0.10)	120,994	0.06	(0.05, 0.07)	138,483	0.07	(0.06, 0.08)
Hypertension	680,292	0.45	(0.43, 0.47)	788,644	0.48	(0.46, 0.51)	944,835	0.48	(0.46, 0.50)	996,829	0.49	(0.47, 0.51)
Diabetes	222,962	0.15	(0.14, 0.16)	263,127	0.16	(0.15, 0.18)	344,629	0.18	(0.16, 0.19)	390,244	0.19	(0.17, 0.21)
Chronic diseases	967,185	0.64	(0.62, 0.66)	1,054,816	0.65	(0.62, 0.67)	1,261,094	0.64	(0.62, 0.66)	1,257,821	0.62	(0.59, 0.64)
Linguistic identity												
French	72,555	0.05	(0.04, 0.05)	76,166	0.05	(0.04, 0.05)	83,400	0.04	(0.04, 0.05)	78,888	0.04	(0.03, 0.05)
English	1,280,103	0.85	(0.83, 0.86)	1,374,267	0.84	(0.82, 0.86)	1,640,393	0.84	(0.82, 0.86)	1,718,603	0.84	(0.82, 0.86)
French & English	25,319	0.02	(0.01, 0.02)	38,100	0.02	(0.02, 0.03)	53,284	0.03	(0.02, 0.04)	57,382	0.03	(0.02, 0.04)
Other	78,902	0.05	(0.04, 0.06)	77,139	0.05	(0.03, 0.06)	120,014	0.06	(0.05, 0.08)	112,580	0.06	(0.04, 0.08)
Employment status												
Unemployed or out of the labour force	1,349,530	0.89	(0.88, 0.90)	1,433,213	0.88	(0.86, 0.89)	1,664,471	0.85	(0.83, 0.87)	1,724,213	0.84	(0.83, 0.86)
Employed	132,971	0.09	(0.08, 0.10)	163,080	0.10	(0.09, 0.11)	255,961	0.13	(0.12, 0.15)	277,653	0.14	(0.12, 0.15)
Rural	218,823	0.14	(0.14, 0.15)	278,692	0.17	(0.16, 0.18)	364,547	0.19	(0.17, 0.20)	369,570	0.18	(0.17, 0.19)
Smoking												
Never smoker	565,708	0.37	(0.36, 0.39)	638,518	0.39	(0.37, 0.41)	752,978	0.38	(0.36, 0.41)	832,626	0.41	(0.39, 0.43)
Former smoker	786,000	0.52	(0.50, 0.54)	827,370	0.51	(0.48, 0.53)	1,002,063	0.51	(0.49, 0.53)	991,568	0.49	(0.46, 0.51)
Current smoker	140,800	0.09	(0.09, 0.10)	151,418	0.09	(0.08, 0.11)	174,535	0.09	(0.08, 0.10)	180,736	0.09	(0.08, 0.10)
Sex												
Female	837,402	0.55	(0.54, 0.57)	898,987	0.55	(0.53, 0.57)	1,070,869	0.55	(0.53, 0.57)	1,115,159	0.55	(0.52, 0.57)
Male	673,615	0.45	(0.43, 0.46)	734,504	0.45	(0.43, 0.47)	886,298	0.45	(0.43, 0.47)	926,753	0.45	(0.43, 0.48)
Age												
65-74	875,906	0.58	(0.56, 0.59)	930,801	0.57	(0.55, 0.59)	1,126,809	0.58	(0.55, 0.60)	1,225,750	0.60	(0.58, 0.62)
75+	635,112	0.42	(0.41, 0.44)	702,690	0.43	(0.41, 0.45)	830,357	0.42	(0.40, 0.45)	816,161	0.40	(0.38, 0.42)
Total	1,511,017			1,633,491			1,957,167			2,041,911		

Table 3. Odds of reporting corrective eyewear insurance coverage, Ontario, 2005, 2008, 2013-2014, 25-64 years old

	All		Public		Private	
	OR	95% CI	OR	95% CI	OR	95% CI
Household income (ref: 1st decile, low)						
2nd decile	1.08	0.89,1.30	0.50***	0.41,0.62	2.08***	1.65,2.61
3rd decile	1.60***	1.32,1.93	0.25***	0.19,0.34	3.92***	3.14,4.88
4th decile	2.20***	1.85,2.61	0.19***	0.14,0.25	5.55***	4.52,6.80
5th decile	2.46***	2.07,2.93	0.16***	0.11,0.23	6.26***	5.10,7.68
6th decile	3.68***	3.09,4.37	0.17***	0.13,0.23	9.08***	7.40,11.14
7th decile	4.31***	3.64,5.11	0.20***	0.16,0.25	10.39***	8.50,12.70
8th decile	5.70***	4.75,6.82	0.24***	0.18,0.32	12.97***	10.53,15.97
9th decile	6.39***	5.34,7.64	0.23***	0.18,0.30	14.53***	11.82,17.86
10th decile, high	6.24***	5.25,7.42	0.26***	0.20,0.33	13.81***	11.27,16.91
Income imputed	0.79***	0.72,0.86	0.75***	0.64,0.88	0.83***	0.76,0.91
Education (ref: ≤ high school)						
Some post-secondary < bachelor's level	1.07	0.98,1.16	0.78***	0.68,0.91	1.15***	1.05,1.25
Bachelor's degree or above	1.16***	1.04,1.29	0.69***	0.56,0.84	1.25***	1.13,1.39
Employed	1.23***	1.13,1.35	0.27***	0.24,0.32	1.85***	1.69,2.02
Self-reported health (ref: exc./very good)						
Good	1.01	0.92,1.10	1.00	0.85,1.17	1.02	0.93,1.11
Fair	1.06	0.92,1.23	1.50***	1.25,1.80	0.88*	0.76,1.02
Poor	1.23	0.92,1.63	1.63***	1.23,2.17	0.80*	0.62,1.03
Hypertension	1.07	0.94,1.20	1.22*	0.99,1.49	1.01	0.90,1.13
Diabetes	1.03	0.86,1.23	1.18	0.90,1.53	1.00	0.85,1.18
Chronic diseases	1.20***	1.10,1.30	1.79***	1.55,2.06	1.02	0.94,1.10
Smoking (ref: never smoker)						
Former smoker	1.15***	1.06,1.26	1.34***	1.11,1.61	1.08*	0.99,1.18
Current smoker	1.00	0.91,1.11	1.76***	1.47,2.11	0.87***	0.78,0.96
Linguistic identity (ref: English)						
French	1.22***	1.05,1.41	1.68***	1.31,2.16	1.04	0.90,1.21
French & English	0.91	0.68,1.23	0.85	0.44,1.62	0.92	0.68,1.25
Other	0.33***	0.23,0.46	0.46**	0.24,0.89	0.38***	0.26,0.53
Rural	0.64***	0.59,0.70	0.97	0.83,1.13	0.66***	0.61,0.72
Age (ref: 25-34)						
35-44	1.42***	1.29,1.57	0.98	0.81,1.19	1.45***	1.31,1.60
45-54	1.43***	1.28,1.60	1.17	0.96,1.43	1.39***	1.25,1.56
55-64	1.21***	1.09,1.34	0.75***	0.61,0.92	1.34***	1.21,1.49
Male	0.87***	0.81,0.94	0.98	0.85,1.12	0.86***	0.80,0.92
Year (ref: 2005)						
2008	0.97	0.89,1.06	0.84*	0.71,1.00	1.00	0.92,1.09
2013	1.14***	1.04,1.25	1.23**	1.04,1.45	1.07	0.98,1.18
2014	1.06	0.97,1.17	1.16*	0.98,1.37	1.02	0.93,1.13
Constant	0.46***	0.38,0.55	0.27***	0.21,0.35	0.13***	0.10,0.16
# of observations	57,440		57,377		57,377	

Notes. Household income, ratio of household income to the low-income cutoff correspondent to the specific combination of household size and community size at province-level; chronic diseases, if the respondent reported having been diagnosed with at least one of five chronic diseases — heart disease, cancer, joint pain or arthritis, chronic lung problems like asthma or chronic obstructive pulmonary disease and mental health problem); # of observations differs between models because a small number of respondents reported overall coverage but not public or private coverage separately; *, **, and ***, significant at 10%, 5%, and 1%, respectively.

Table 4. Odds of reporting corrective eyewear insurance coverage, Ontario, 2005, 2008, 2013-2014, ≥ 65 years old

	All		Public		Private	
	OR	95% CI	OR	95% CI	OR	95% CI
Household income (ref: 1st decile, low)						
2nd decile	1.04	0.81,1.34	0.91	0.65,1.27	1.16	0.85,1.58
3rd decile	2.07***	1.61,2.66	1.04	0.76,1.42	2.63***	1.93,3.58
4th decile	2.91***	2.28,3.71	1.08	0.78,1.49	3.74***	2.77,5.05
5th decile	3.45***	2.67,4.46	1.27	0.88,1.82	4.45***	3.28,6.04
6th decile	4.39***	3.40,5.67	1.36*	0.96,1.93	5.44***	4.00,7.39
7th decile	4.76***	3.66,6.18	1.25	0.86,1.81	6.15***	4.51,8.39
8th decile	5.89***	4.47,7.76	1.35	0.94,1.94	7.42***	5.38,10.23
9th decile	4.53***	3.42,6.00	1.09	0.75,1.61	6.06***	4.37,8.41
10th decile, high	4.42***	3.24,6.02	0.94	0.63,1.42	5.98***	4.21,8.49
Income imputed	0.96	0.87,1.06	0.94	0.86,1.03	1.00	0.90,1.11
Education (ref: ≤ high school)						
Some post-secondary < bachelor's level	1.21***	1.09,1.34	0.96	0.81,1.12	1.24***	1.12,1.39
Bachelor's degree or above	1.41***	1.22,1.64	1.26**	1.01,1.57	1.34***	1.16,1.56
Employed	0.89	0.77,1.05	0.71***	0.55,0.92	0.96	0.82,1.13
Self-reported health (ref: exc./very good)						
Good	0.88**	0.79,0.98	1.02	0.86,1.19	0.88**	0.78,0.98
Fair	0.84**	0.72,0.97	0.98	0.80,1.20	0.84**	0.72,0.99
Poor	0.72***	0.60,0.88	1.08	0.81,1.44	0.69***	0.56,0.84
Hypertension	1.06	0.96,1.16	1.11	0.97,1.28	1.03	0.94,1.14
Diabetes	0.91	0.80,1.04	1.10	0.91,1.34	0.86**	0.75,0.99
Chronic diseases	1.11*	1.00,1.22	1.04	0.89,1.22	1.11**	1.00,1.24
Smoking (ref: never smoker)						
Former smoker	1.12**	1.01,1.24	1.26***	1.08,1.47	1.04	0.93,1.15
Current smoker	0.96	0.82,1.12	1.18	0.92,1.51	0.90	0.76,1.06
Linguistic identity (ref: English)						
French	1.44***	1.22,1.70	1.73***	1.34,2.23	1.16	0.97,1.39
French & English	1.22	0.85,1.77	1.83**	1.02,3.29	1.15	0.78,1.70
Other	0.29***	0.18,0.48	0.58	0.30,1.12	0.25***	0.13,0.47
Rural	0.89	0.77,1.05	0.71***	0.55,0.92	0.96	0.82,1.13
Age (ref: 65-74)						
≥ 75	0.83***	0.76,0.92	1.38***	1.18,1.61	0.71***	0.64,0.79
Male	1.11**	1.01,1.22	1.06	0.91,1.22	1.12**	1.02,1.24
Year (ref: 2005)						
2008	0.99	0.87,1.12	0.91	0.75,1.10	1.09	0.95,1.24
2013	1.01	0.90,1.14	0.79**	0.65,0.95	1.16**	1.02,1.31
2014	0.96	0.85,1.08	0.74***	0.62,0.89	1.10	0.97,1.25
Constant	0.46***	0.38,0.55	0.27***	0.21,0.35	0.13***	0.10,0.16
# of observations	25,268		25,206		25,206	

Notes. Household income, ratio of household income to the low-income cutoff corresponding to the specific combination of household size and community size at province-level; chronic diseases, if the respondent reported having been diagnosed with at least one of five chronic diseases — heart disease, cancer, joint pain or arthritis, chronic lung problems like asthma or chronic obstructive pulmonary disease and mental health problem); # of observations differs between models because a small number of respondents reported overall coverage but not public or private coverage separately; *, **, and ***, significant at 10%, 5%, and 1%, respectively.

Figure 1. Self-reported corrective lens coverage, by type, age group and household income, Ontario, 2005, 2008, 2013-2014

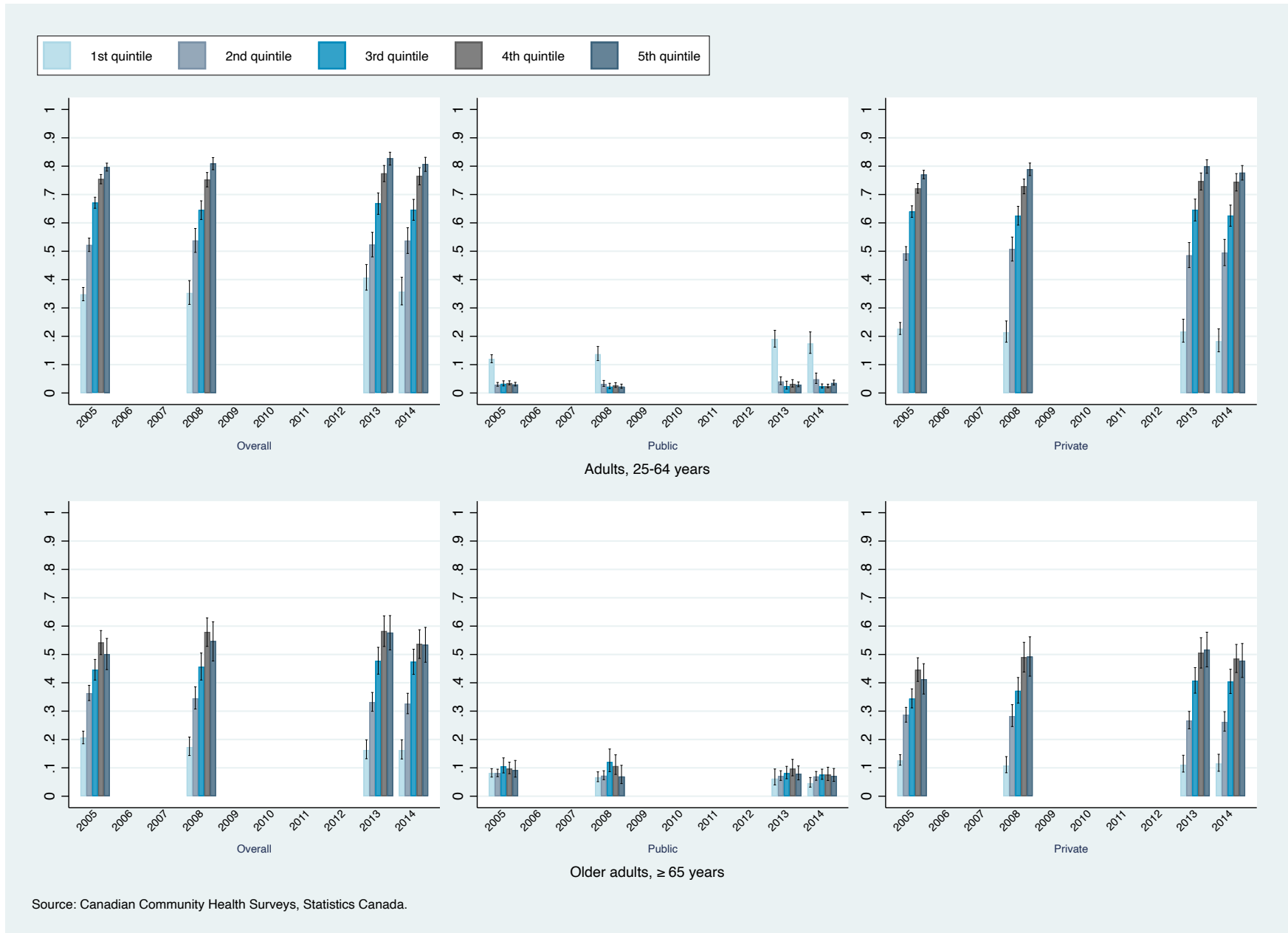


Figure 2. Self-reported corrective lens coverage, by type, age group and education, Ontario, 2005, 2008, 2013-2014

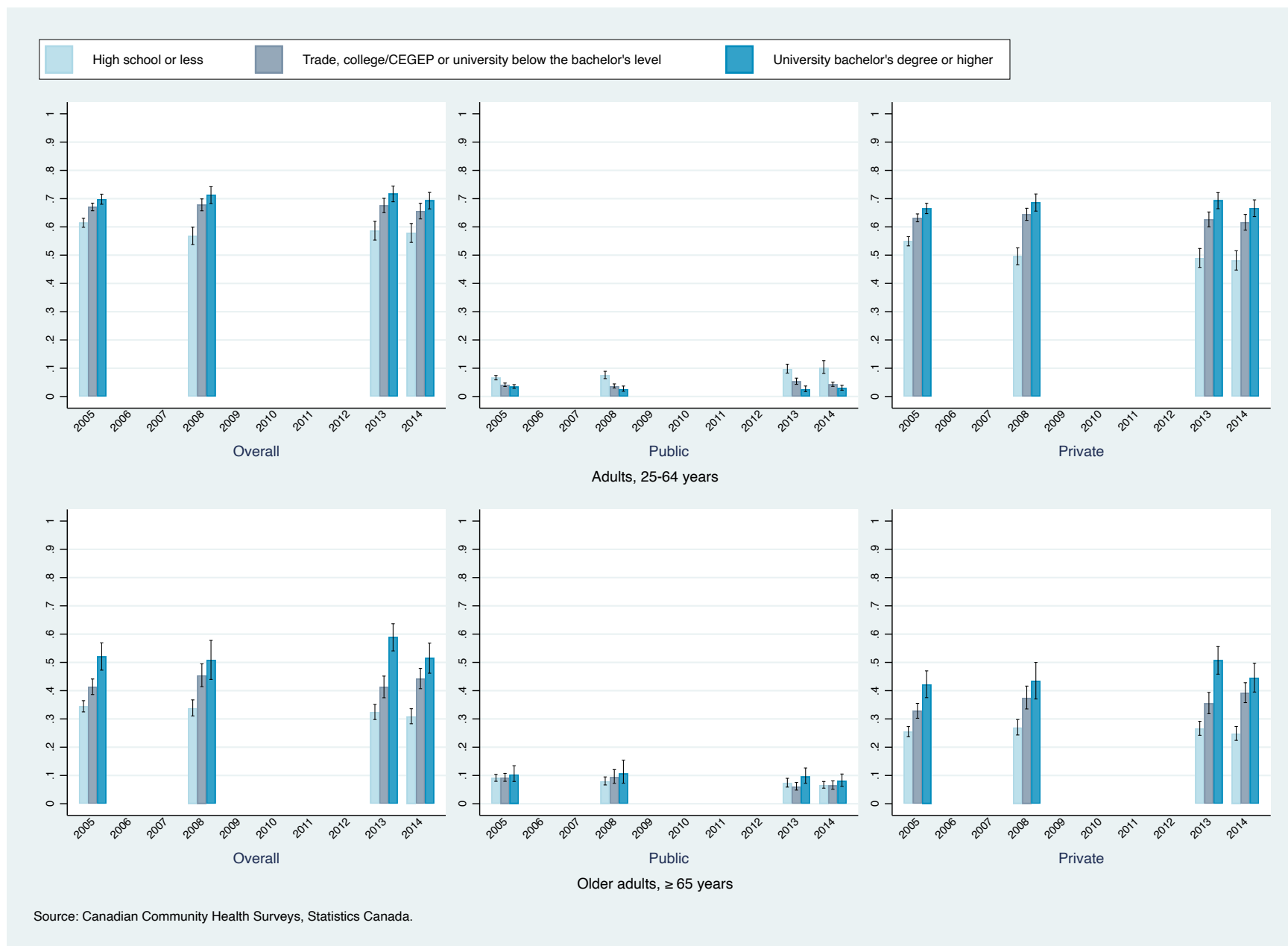


Figure 3. Predicted probability, per household income decile, of having reported corrective lens coverage, by type and age group, Ontario, 2005, 2008, 2013-2014

