



# **A \$4.9 Billion Decrease in Health Care Expenditure: The Ten-Year Impact of Improving Smoking, Alcohol, Diet and Physical Activity in Ontario**

## **Supplementary Exhibits**

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**EXHIBIT 1** Percentage attribution and health care expenditure for health behaviours and socioeconomic position (SEP), by Local Health Integration Network, in Ontario, 2004 to 2013

Local Health Integration Network	Population Attributable Fraction, %			Health Care Expenditure, \$		
	10-Year Health Behaviour Attributable Risk	10-Year SEP Attributable Risk	10-Year Health Behaviour & SEP Attributable Risk	10-Year Health Behaviour Attributable Cost	10-Year SEP Attributable Cost	10-Year Health Behaviour & SEP Attributable Cost
1. Erie St. Clair	27.8	20.0	41.8	4,140,000,000	2,980,000,000	6,240,000,000
2. South West	27.3	19.8	41.3	5,470,000,000	3,970,000,000	8,290,000,000
3. Waterloo Wellington	26.1	17.7	38.7	3,260,000,000	2,210,000,000	4,830,000,000
4. Hamilton Niagara Haldimand Brant	27.6	19.4	41.2	8,970,000,000	6,280,000,000	13,400,000,000
5. Central West	23.7	16.1	35.6	3,220,000,000	2,190,000,000	4,840,000,000
6. Mississauga Halton	24.8	14.6	35.3	4,750,000,000	2,790,000,000	6,780,000,000
7. Toronto Central	24.7	20.3	39.6	6,600,000,000	5,420,000,000	10,600,000,000
8. Central	22.8	16.0	34.8	7,130,000,000	5,010,000,000	10,900,000,000
9. Central East	25.8	18.5	39.2	8,070,000,000	5,780,000,000	12,300,000,000
10. South East	28.2	19.7	41.9	3,260,000,000	2,280,000,000	4,850,000,000
11. Champlain	26.3	17.2	38.5	6,720,000,000	4,400,000,000	9,830,000,000
12. North Simcoe Muskoka	27.4	17.3	39.5	2,630,000,000	1,660,000,000	3,800,000,000
13. North East	29.3	23.0	45.1	4,420,000,000	3,470,000,000	6,820,000,000
14. North West	29.1	21.8	44.2	1,730,000,000	1,300,000,000	2,630,000,000

**EXHIBIT 2** Smoking attributable cost and cost reduction, by Local Health Integration Network, in Ontario, 2004 to 2013

<b>Local Health Integration Network</b>	<b>10-Year Smoking Attributable Risk, %</b>	<b>10-Year Smoking Attributable Cost, \$</b>	<b>10-Year Smoking Cost Reduction, \$</b>
1. Erie St. Clair	12.8	1,920,000,000	300,000,000
2. South West	12.8	2,560,000,000	411,000,000
3. Waterloo Wellington	12.1	1,510,000,000	320,000,000
4. Hamilton Niagara Haldimand Brant	13.3	4,320,000,000	725,000,000
5. Central West	9.3	1,260,000,000	523,000,000
6. Mississauga Halton	10.6	2,030,000,000	457,000,000
7. Toronto Central	10.6	2,820,000,000	790,000,000
8. Central	8.8	2,750,000,000	803,000,000
9. Central East	11.5	3,590,000,000	655,000,000
10. South East	14.2	1,640,000,000	272,000,000
11. Champlain	13.0	3,310,000,000	773,000,000
12. North Simcoe Muskoka	14.1	1,360,000,000	289,000,000
13. North East	15.2	2,290,000,000	392,000,000
14. North West	15.3	914,000,000	227,000,000

**EXHIBIT 3** Smoking attributable costs and fractions by year, in Ontario, 2003/04 to 2013/14

Sector	Year	Public Accounts of Health Care Spending <sup>1</sup> , \$	Health Care Spending, CPI-Adjusted to 2014 <sup>1</sup> , \$	Cost, CPI-Adjusted to 2014, Age 25+ <sup>1,2</sup> , \$	Smoking Attributable Fraction, Age 25+ <sup>3,4</sup> , %	Smoking Attributable Cost, Age 25+ <sup>1,3</sup> , \$	Smoking Attributable Cost, Age 25+, 10-Year Total <sup>1,5</sup> , \$
Hospital Care	2003/04	11,000,000,000	13,200,000,000	11,400,000,000	16.9	1,920,000,000	
	2004/05	12,000,000,000	14,100,000,000	12,200,000,000	16.7	2,040,000,000	
	2005/06	12,200,000,000	14,000,000,000	12,200,000,000	16.5	2,000,000,000	
	2006/07	13,200,000,000	14,900,000,000	12,900,000,000	16.3	2,110,000,000	
	2007/08	13,600,000,000	15,200,000,000	13,200,000,000	16.2	2,140,000,000	
	2008/09	14,200,000,000	15,600,000,000	13,600,000,000	15.9	2,160,000,000	
	2009/10	14,800,000,000	16,000,000,000	13,900,000,000	15.6	2,170,000,000	
	2010/11	15,500,000,000	16,200,000,000	14,200,000,000	15.7	2,220,000,000	
	2011/12	16,100,000,000	16,500,000,000	14,300,000,000	15.7	2,260,000,000	
	2012/13	16,400,000,000	16,600,000,000	14,500,000,000	15.6	2,280,000,000	
	2013/14	17,000,000,000	17,000,000,000	14,900,000,000	15.5	2,320,000,000	21,700,000,000
Drugs	2003/04	2,720,000,000	3,270,000,000	3,190,000,000	7.8	249,000,000	
	2004/05	3,010,000,000	3,540,000,000	3,460,000,000	7.8	268,000,000	
	2005/06	3,290,000,000	3,790,000,000	3,700,000,000	7.7	284,000,000	
	2006/07	3,560,000,000	4,020,000,000	3,920,000,000	7.5	294,000,000	
	2007/08	3,670,000,000	4,110,000,000	4,020,000,000	7.3	294,000,000	
	2008/09	3,920,000,000	4,310,000,000	4,210,000,000	7.3	308,000,000	
	2009/10	4,220,000,000	4,580,000,000	4,460,000,000	7.3	326,000,000	
	2010/11	4,030,000,000	4,230,000,000	4,110,000,000	7.4	304,000,000	
	2011/12	4,130,000,000	4,240,000,000	4,100,000,000	7.5	307,000,000	
	2012/13	4,230,000,000	4,290,000,000	4,140,000,000	7.4	306,000,000	
	2013/14	4,630,000,000	4,630,000,000	4,470,000,000	7.3	326,000,000	3,020,000,000

**EXHIBIT 3 (continued)**

Sector	Year	Public Accounts of Health Care Spending <sup>1</sup> , \$	Health Care Spending, CPI-Adjusted to 2014 <sup>1</sup> , \$	Cost, CPI-Adjusted to 2014, Age 25+ <sup>1,2</sup> , \$	Smoking Attributable Fraction, Age 25+ <sup>3,4</sup>	Smoking Attributable Cost, Age 25+ <sup>1,3</sup> , \$	Smoking Attributable Cost, Age 25+, 10-Year Total <sup>1,5</sup> , \$
Community Care	2003/04	8,190,000,000	9,850,000,000	8,280,000,000	7.2	596,000,000	
	2004/05	8,740,000,000	10,300,000,000	8,670,000,000	7.1	618,000,000	
	2005/06	9,460,000,000	10,900,000,000	9,190,000,000	7.1	650,000,000	
	2006/07	10,300,000,000	11,600,000,000	9,900,000,000	6.9	681,000,000	
	2007/08	11,200,000,000	12,500,000,000	10,700,000,000	6.7	712,000,000	
	2008/09	12,200,000,000	13,500,000,000	11,500,000,000	6.5	752,000,000	
	2009/10	13,100,000,000	14,200,000,000	12,100,000,000	6.4	778,000,000	
	2010/11	14,000,000,000	14,600,000,000	12,500,000,000	6.5	810,000,000	
	2011/12	14,700,000,000	15,100,000,000	12,900,000,000	6.5	847,000,000	
	2012/13	15,100,000,000	15,400,000,000	13,200,000,000	6.4	846,000,000	
2013/14	15,600,000,000	15,600,000,000	13,400,000,000	6.3	844,000,000	7,540,000,000	
Other	2003/04	8,080,000,000	9,720,000,000	8,600,000,000	7.2	618,000,000	
	2004/05	8,350,000,000	9,820,000,000	8,720,000,000	7.1	622,000,000	
	2005/06	9,010,000,000	10,400,000,000	9,220,000,000	7.1	651,000,000	
	2006/07	9,210,000,000	10,400,000,000	9,280,000,000	6.9	638,000,000	
	2007/08	10,300,000,000	11,600,000,000	10,300,000,000	6.7	690,000,000	
	2008/09	11,200,000,000	12,400,000,000	11,100,000,000	6.5	723,000,000	
	2009/10	12,300,000,000	13,300,000,000	11,900,000,000	6.4	762,000,000	
	2010/11	12,800,000,000	13,400,000,000	12,000,000,000	6.5	778,000,000	
	2011/12	13,200,000,000	13,500,000,000	12,000,000,000	6.5	788,000,000	
	2012/13	13,900,000,000	14,100,000,000	12,600,000,000	6.4	808,000,000	
2013/14	12,700,000,000	12,700,000,000	11,400,000,000	6.3	717,000,000	7,180,000,000	

**EXHIBIT 3 (continued)**

Sector	Year	Public Accounts of Health Care Spending <sup>1</sup> , \$	Health Care Spending, CPI-Adjusted to 2014 <sup>1</sup> , \$	Cost, CPI-Adjusted to 2014, Age 25+ <sup>1,2</sup> , \$	Smoking Attributable Fraction, Age 25+ <sup>3,4</sup>	Smoking Attributable Cost, Age 25+ <sup>1,3</sup> , \$	Smoking Attributable Cost, Age 25+, 10-Year Total <sup>1,5</sup> , \$
Total	2003/04	29,900,000,000	36,000,000,000	31,400,000,000	10.8	3,380,000,000	
	2004/05	32,100,000,000	37,700,000,000	33,000,000,000	10.7	3,550,000,000	
	2005/06	33,900,000,000	39,000,000,000	34,300,000,000	10.5	3,590,000,000	
	2006/07	36,200,000,000	40,900,000,000	36,000,000,000	10.3	3,720,000,000	
	2007/08	38,700,000,000	43,400,000,000	38,200,000,000	10.0	3,840,000,000	
	2008/09	41,600,000,000	45,800,000,000	40,400,000,000	9.8	3,940,000,000	
	2009/10	44,400,000,000	48,200,000,000	42,400,000,000	9.5	4,040,000,000	
	2010/11	46,300,000,000	48,500,000,000	42,800,000,000	9.6	4,110,000,000	
	2011/12	48,100,000,000	49,300,000,000	43,400,000,000	9.7	4,200,000,000	
	2012/13	49,600,000,000	50,400,000,000	44,500,000,000	9.5	4,240,000,000	
2013/14	49,900,000,000	49,900,000,000	44,200,000,000	9.5	4,210,000,000	39,400,000,000	

<sup>1</sup> Displayed to 3 significant digits.

<sup>2</sup> Age 65+ for Drugs Sector.

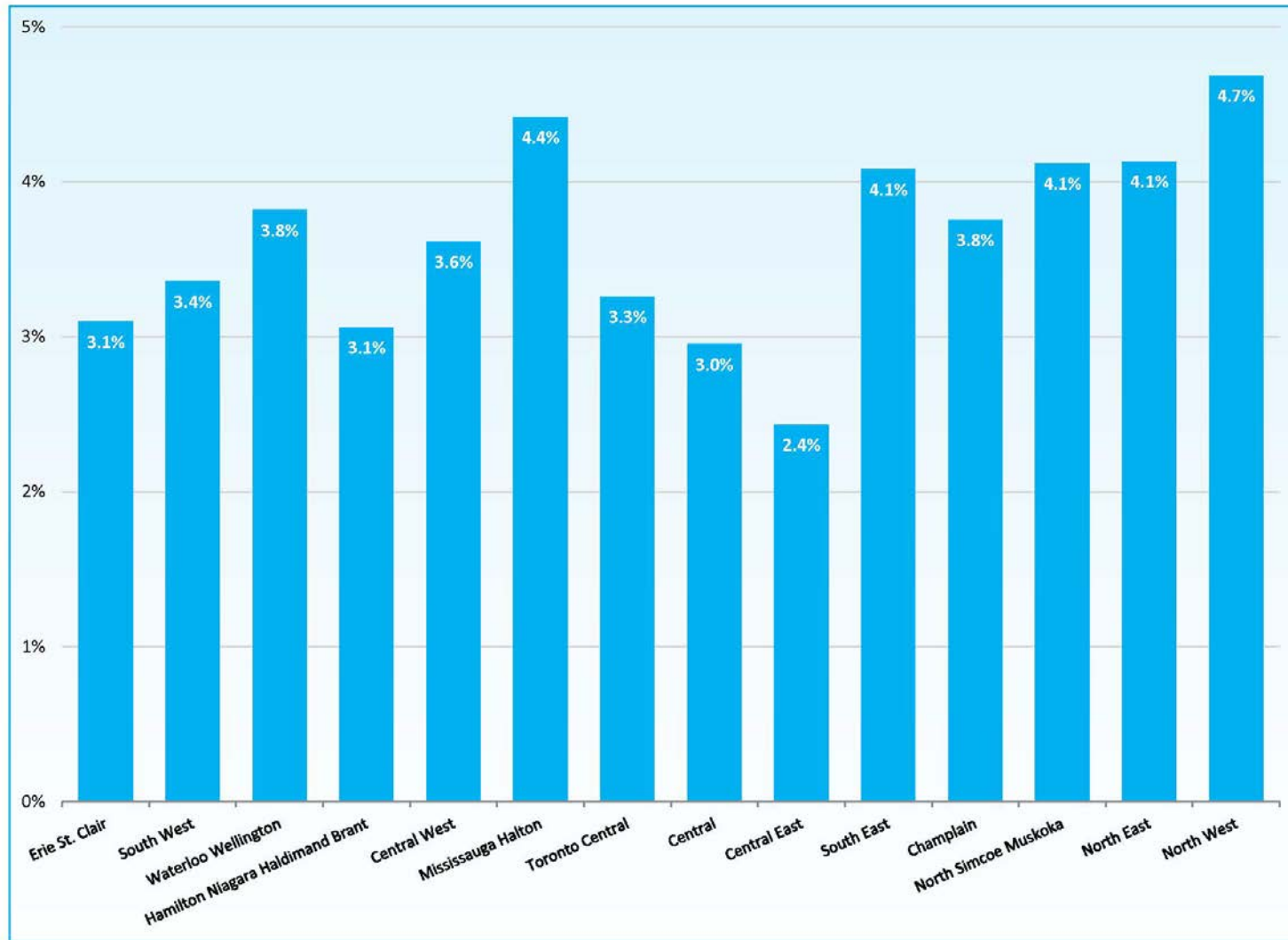
<sup>3</sup> From the primary attribution model (model 3).

<sup>4</sup> "Total" smoking attributable fractions = the smoking attributable costs of all four sectors combined, divided by total health care costs, for patients aged 25+, CPI adjusted.

<sup>5</sup> From 2004/05 to 2013/14.

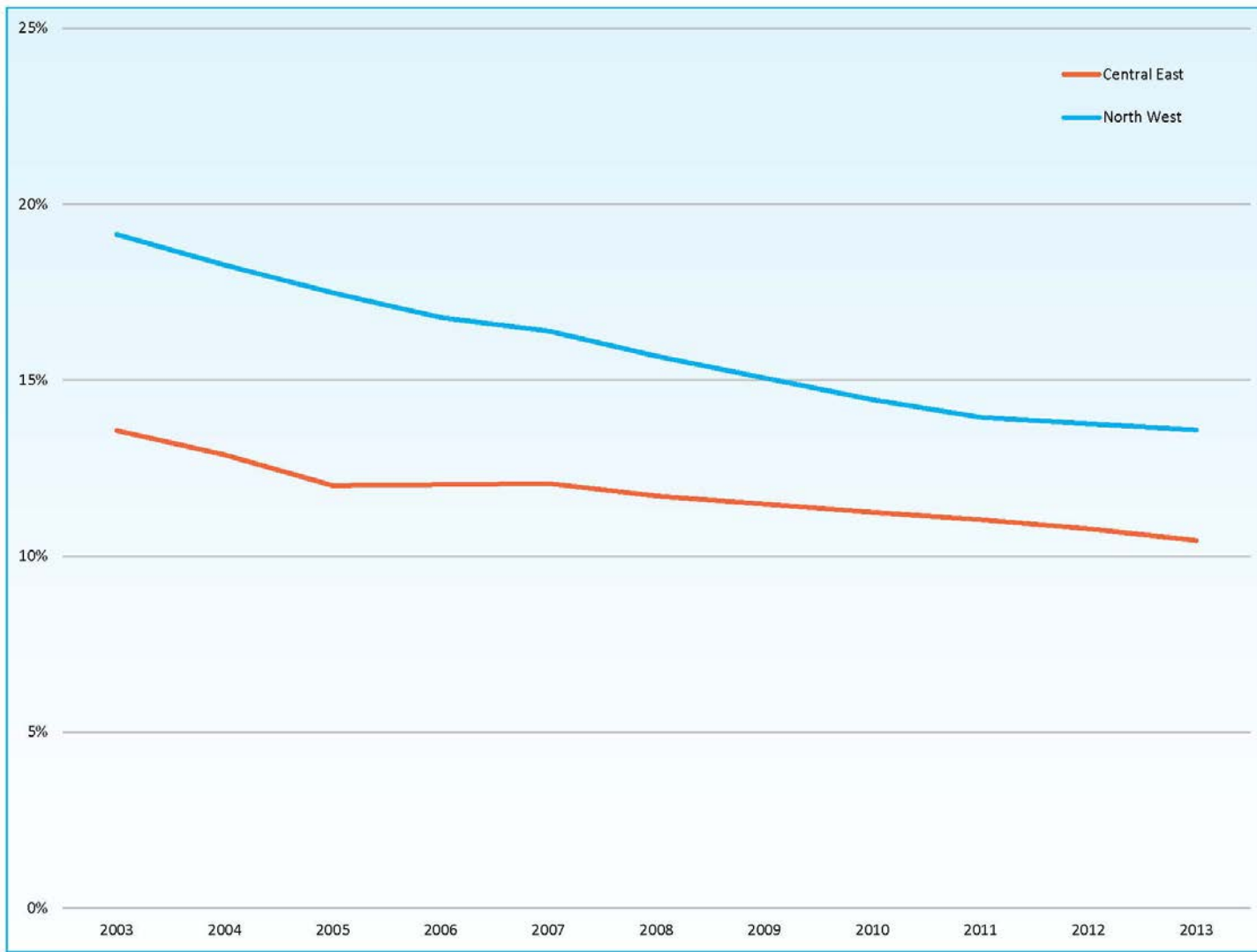
CPI = Consumer Price Index.

**EXHIBIT 4** Percentage change in smoking attributable health care costs, by Local Health Integration Network, in Ontario, 2004 to 2013





**EXHIBIT 5** Percentage change in smoking attributable burden for the Central East and North West Local Health Integration Networks,\* in Ontario, 2004 to 2013



\*The LHINs with the smallest (Central East) and largest (North West) percentage change in smoking attributable health.

**EXHIBIT 6** Health care cost ratios for men and women aged 25+ and 20+, for each smoking category with respect to non-smokers, by health care sector, in Ontario

Smoking Status	Multivariable Primary Attribution Model (Model 3)							
	Men aged 25+	Men aged 20+	Men aged 20+	Men aged 20+	Women aged 25+	Women aged 20+	Women aged 20+	Women aged 20+
Age 25+	+	-	-	-	+	-	-	-
Cigarettes <100 = ref <sup>1</sup>	+	+	+	-	+	+	+	-
OMHRS costs incl. <sup>2</sup>	-	-	+	-	-	-	+	-
<b>5 Smoking Categories</b>								
<b>Hospital care</b>								
Heavy smoker	1.73 (1.56, 1.92)	1.75 (1.58, 1.94)	1.77 (1.60, 1.96)	1.80 (1.62, 2.00)	1.68 (1.51, 1.87)	1.67 (1.5, 1.86)	1.67 (1.50, 1.85)	1.63 (1.47, 1.82)
Light smoker	1.64 (1.50, 1.80)	1.56 (1.43, 1.70)	1.51 (1.38, 1.64)	1.58 (1.44, 1.74)	1.25 (1.16, 1.34)	1.24 (1.15, 1.32)	1.26 (1.17, 1.35)	1.20 (1.12, 1.29)
Former heavy	1.42 (1.31, 1.54)	1.39 (1.28, 1.51)	1.36 (1.26, 1.48)	1.43 (1.31, 1.56)	1.50 (1.38, 1.63)	1.50 (1.37, 1.63)	1.48 (1.36, 1.62)	1.46 (1.34, 1.59)
Former light	1.34 (1.23, 1.45)	1.32 (1.22, 1.44)	1.28 (1.18, 1.39)	1.25 (1.16, 1.35)	1.18 (1.11, 1.27)	1.17 (1.09, 1.24)	1.17 (1.1, 1.25)	1.05 (0.99, 1.11)
Non-smoker	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Missing	1.82 (1.38, 2.41)	1.67 (1.27, 2.21)	1.54 (1.17, 2.03)	1.73 (1.31, 2.29)	0.82 (0.64, 1.03)	0.81 (0.64, 1.02)	0.79 (0.63, 1.00)	0.79 (0.62, 1.00)
<b>Drug care (age 65+)</b>								
Heavy smoker	1.23 (1.07, 1.41)	1.23 (1.07, 1.41)	1.23 (1.07, 1.41)	1.22 (1.06, 1.41)	1.15 (1.01, 1.29)	1.15 (1.01, 1.29)	1.15 (1.01, 1.29)	1.16 (1.03, 1.31)
Light smoker	1.14 (1.02, 1.28)	1.14 (1.02, 1.28)	1.14 (1.02, 1.28)	1.14 (1.01, 1.28)	1.15 (1.06, 1.24)	1.15 (1.06, 1.24)	1.15 (1.06, 1.24)	1.16 (1.07, 1.26)
Former heavy	1.21 (1.13, 1.30)	1.21 (1.13, 1.30)	1.21 (1.13, 1.30)	1.21 (1.12, 1.30)	1.33 (1.25, 1.42)	1.33 (1.25, 1.42)	1.33 (1.25, 1.42)	1.35 (1.26, 1.44)
Former light	1.07 (1.00, 1.15)	1.07 (1.00, 1.15)	1.07 (1.00, 1.15)	1.04 (0.97, 1.13)	1.15 (1.09, 1.21)	1.15 (1.09, 1.21)	1.15 (1.09, 1.21)	1.13 (1.08, 1.19)
Non-smoker	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Missing	1.13 (0.95, 1.33)	1.13 (0.95, 1.33)	1.13 (0.95, 1.33)	1.12 (0.94, 1.34)	1.23 (1.07, 1.43)	1.23 (1.06, 1.43)	1.23 (1.06, 1.43)	1.25 (1.08, 1.45)
<b>Community care</b>								
Heavy smoker	1.26 (1.20, 1.32)	1.25 (1.19, 1.31)	1.25 (1.19, 1.31)	1.25 (1.19, 1.32)	1.18 (1.13, 1.24)	1.19 (1.14, 1.25)	1.19 (1.14, 1.25)	1.18 (1.13, 1.24)
Light smoker	1.13 (1.08, 1.17)	1.09 (1.05, 1.14)	1.09 (1.05, 1.14)	1.09 (1.05, 1.14)	1.10 (1.07, 1.14)	1.10 (1.07, 1.14)	1.10 (1.07, 1.14)	1.09 (1.06, 1.13)
Former heavy	1.22 (1.18, 1.27)	1.21 (1.16, 1.26)	1.21 (1.16, 1.26)	1.21 (1.16, 1.26)	1.30 (1.25, 1.35)	1.30 (1.26, 1.35)	1.30 (1.26, 1.35)	1.29 (1.24, 1.34)
Former light	1.11 (1.06, 1.15)	1.09 (1.05, 1.14)	1.09 (1.05, 1.14)	1.06 (1.02, 1.10)	1.07 (1.04, 1.11)	1.08 (1.05, 1.11)	1.08 (1.05, 1.11)	1.03 (1.00, 1.05)
Non-smoker	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Missing	1.43 (1.25, 1.64)	1.37 (1.2, 1.56)	1.37 (1.20, 1.56)	1.37 (1.20, 1.57)	0.98 (0.88, 1.09)	0.98 (0.88, 1.08)	0.98 (0.88, 1.08)	0.97 (0.87, 1.07)
<b>3 Smoking Categories</b>								
<b>Hospital care</b>								
Current smoker	1.68 (1.55, 1.82)	1.63 (1.51, 1.76)	1.61 (1.49, 1.73)	1.66 (1.53, 1.80)	1.34 (1.25, 1.44)	1.34 (1.25, 1.42)	1.35 (1.27, 1.44)	1.30 (1.23, 1.37)
Former smoker	1.38 (1.29, 1.48)	1.36 (1.27, 1.45)	1.32 (1.24, 1.41)	1.31 (1.23, 1.41)	1.28 (1.21, 1.36)	1.27 (1.20, 1.35)	1.27 (1.20, 1.35)	1.14 (1.09, 1.19)
Non-smoker	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Missing	1.81 (1.37, 2.40)	1.66 (1.26, 2.20)	1.53 (1.16, 2.02)	1.71 (1.30, 2.26)	0.81 (0.64, 1.03)	0.80 (0.63, 1.02)	0.79 (0.62, 1.00)	0.78 (0.54, 1.02)
<b>Drug care (age 65+)</b>								
Current smoker	1.17 (1.06, 1.29)	1.17 (1.06, 1.29)	1.17 (1.06, 1.29)	1.16 (1.05, 1.29)	1.14 (1.07, 1.22)	1.14 (1.07, 1.23)	1.14 (1.07, 1.23)	1.15 (1.08, 1.22)
Former smoker	1.15 (1.08, 1.22)	1.15 (1.08, 1.22)	1.15 (1.08, 1.22)	1.12 (1.05, 1.20)	1.21 (1.16, 1.27)	1.21 (1.16, 1.27)	1.21 (1.16, 1.27)	1.19 (1.15, 1.23)
Non-smoker	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Missing	1.13 (0.95, 1.33)	1.12 (0.95, 1.33)	1.12 (0.95, 1.33)	1.12 (0.94, 1.34)	1.23 (1.06, 1.43)	1.23 (1.06, 1.43)	1.23 (1.06, 1.43)	1.25 (1.1, 1.4)

Response to an Ontario Ministry of Health and Long-Term Care Applied Health Research Question  
 (ICES Project No. 2015 0901 028 001)

Smoking Status	Multivariable Primary Attribution Model (Model 3)							
	Men aged 25+	Men aged 20+	Men aged 20+	Men aged 20+	Women aged 25+	Women aged 20+	Women aged 20+	Women aged 20+
<b>Community care</b>								
Current smoker	1.18 (1.13, 1.22)	1.15 (1.11, 1.19)	1.15 (1.11, 1.19)	1.15 (1.10, 1.19)	1.12 (1.09, 1.15)	1.12 (1.09, 1.16)	1.12 (1.09, 1.16)	1.11 (1.08, 1.14)
Former smoker	1.16 (1.13, 1.20)	1.15 (1.11, 1.18)	1.15 (1.11, 1.18)	1.11 (1.07, 1.15)	1.15 (1.12, 1.18)	1.15 (1.12, 1.18)	1.15 (1.12, 1.18)	1.08 (1.06, 1.10)
Non-smoker	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Missing	1.43 (1.25, 1.63)	1.36 (1.19, 1.55)	1.36 (1.19, 1.55)	1.35 (1.18, 1.55)	0.98 (0.88, 1.08)	0.97 (0.88, 1.08)	0.97 (0.88, 1.08)	0.96 (0.86, 1.06)

1. Those who smoked fewer than 100 cigarettes in a lifetime included in the reference group (non-smoker).
2. Cost data from the Ontario Mental Health Reporting System included in calculation of hospital care cost ratios.