



Region of Waterloo
PUBLIC HEALTH

Building Healthy and Supportive Communities

Tobacco Use and Its Consequences in Waterloo Region



Cigarette smoking caused 15.9 per cent of all deaths in Waterloo Region between 2000 and 2004 and resulted in 31,193 years of potential life lost prematurely (Region of Waterloo Public Health, 2009). These figures do not include deaths due to smoking-related fires. Exposure to second-hand smoke resulted in an additional 64 deaths for the same period. Tobacco products other than cigarettes, including smokeless tobacco, are also linked to serious health effects.

Tobacco and Health

Tobacco use is the single most significant cause of preventable disease and death in Canada. The link between tobacco use and lung cancer is well known. Smoking is the main cause of lung cancer, accounting for an estimated 86 per cent of lung cancer cases in Ontario (Cancer Care Ontario, 2008a). The risk of dying from lung cancer is more than 23 times greater among male cigarette smokers and 13 times greater among female cigarette smokers than among their non-smoking counterparts (Cancer Care Ontario, 2008b). Lung cancer is more deadly than any other cancer, causing more deaths in Ontario than colorectal, breast and prostate cancers combined (Cancer Care Ontario, 2008a). Other cancers unequivocally caused by cigarette smoking are cancers of the mouth and throat, stomach and bladder and pancreatic, uterine cervical and renal pelvic/ureter cancer (Holowaty et al., 2002). Cigarette smoking is the principal underlying cause in 80-90 per cent of cases of chronic obstructive pulmonary disease (COPD) (Public Health Agency of Canada, 2008). Smoking is also linked to cardiovascular disease, with ischemic heart disease among the top three causes of death due to smoking (Baliunas et al., 2007).

There is a substantial body of scientific evidence linking tobacco use to a broad range of diseases and conditions. The term tobaccosis has been used to describe illnesses which, to some degree, result from smoking, chewing and snuffing tobacco and breathing second-hand smoke (Holowaty et al., 2002). In addition to cancers, cardiovascular disease, and chronic obstructive pulmonary disease, including emphysema, tobacco use is linked to renal failure, pneumonia and childhood asthma, regional ileitis, cirrhosis of the liver, immunological deficiencies and failures of endocrine and metabolic functions, cataracts, osteoporosis, optic neuropathy, infertility, fetal and neonatal deaths and nicotine addiction (Holowaty et al., 2002).

FAST FACTS

- An estimated 2,223 (16 per cent) deaths between 2000 to 2004 were attributable to smoking in Waterloo Region, an average of 445 deaths each year.
- About one in five people (22 per cent) smoke in Waterloo Region.
- Twelve per cent of youth in Waterloo Region aged 12-19 years identify themselves as smokers.
- Smoking rates in Waterloo Region are highest in Cambridge and Kitchener.
- Second-hand smoke is considered a "group A carcinogen," meaning it is known to cause cancer in healthy non-smokers who are regularly exposed.
- Seven per cent of Waterloo Region residents report that at least one person smokes in their home everyday or almost every day.
- More men and boys smoke than women and girls.
- The highest rates of smoking are among persons between the ages of 20-44.
- Products such as flavoured tobacco, cigarillos and smokeless products are putting youth at increased risk of nicotine dependency and addiction.
- Low-cost, readily available contra band cigarettes in Ontario have contributed to the "levelling off" of smoking rates in Ontario, which had been declining from 2000 to 2005.

Smokeless Tobacco

While sometimes promoted as less harmful alternatives to smoking, smokeless tobacco products such as chew, snuff or snus, a new product being test marketed in Canada, have serious effects on health. Smokeless tobacco is a mixture of tobacco, sweeteners, salt, other flavouring agents, abrasives and other chemicals. There are more than two dozen carcinogens in smokeless tobacco products. Use of smokeless tobacco increases the likelihood of:

- nicotine addiction
- oral cancer (up to 50-fold for cheek and gum cancer among long-term users)
- periodontal disease including receding gums and loss of tooth structure, resulting in increased dental caries and attachment loss
- cardiovascular disease, peripheral vascular diseases, hypertension
- peptic ulcers
- fetal morbidity and mortality
- soft tissue lesions including leukoplakia, thickened white patches on the cheek, gums or tongue at the site of the tobacco placement, that can be precursors to cancer (Ontario Tobacco Research Unit, 2007)

Second-hand Smoke

Second-hand smoke is a complex mixture of gases and particles. It includes smoke from the burning cigarette, cigar, or pipe tip (sidestream smoke) and exhaled mainstream smoke. Second-hand smoke contains more than 4,000 chemicals, at least 250 of which are known to be toxic, including more than 50 that have been shown to cause cancer (U.S. Environmental Protection Agency, 1992).

The U.S. Environmental Protection Agency (1992) has labelled second-hand smoke a “Group A carcinogen,” meaning it is known to cause cancer.

Second-hand smoke has been shown to cause the following diseases and conditions among healthy non-smokers regularly exposed to it:

- *Children* – Sudden Infant Death Syndrome; bronchitis; pneumonia and other lower respiratory tract infections; asthma induction and exacerbation; chronic cough, phlegm, wheezing and breathlessness and middle ear infections.
- *Pregnant women* – Low birth weight babies
- *Adults* – Coronary heart disease (25-30 per cent increased risk), lung cancer (20-30 per cent increased risk), asthma induction and exacerbation, and pre-term delivery in pregnant women (United States Department of Health and Human Services, 2006).

Exposure to second-hand smoke is *associated* with (i.e., evidence suggests it results in an increased risk or exacerbation, but is not sufficient to conclude a causal relationship) additional diseases and conditions, including:

- *Children* – Adverse impact on learning and behavioural development, decreased lung function, exacerbation of cystic fibrosis. Childhood cancers, leukemias, lymphomas, and childhood brain tumors are associated with both prenatal and postnatal exposure to second-hand smoke.
- *Pregnant women* – Preterm births. See also childhood cancers associated with prenatal exposure above.
- *Adults* – Stroke; breast, cervical and nasal sinus cancer; miscarriages; chronic respiratory symptoms and decreased lung function in adults (United States Department of Health and Human Services, 2006).

People with diabetes, high blood pressure, vascular diseases, asthma, bronchitis and emphysema are particularly vulnerable when exposed to second-hand smoke.

Health Impact of Tobacco in Waterloo Region

Deaths Attributed to Smoking and Years of Potential Life Lost

The proportion of deaths from various categories of disease which can be attributed to smoking in a specific community and for a specific period of time is calculated using information about the amount of smoking and disease-specific mortality rates in that community along with evidence of the relationship between smoking and these categories of disease. Current smoking-related deaths in Waterloo Region result from an earlier time when the rate of smoking, particularly among men, was considerably higher than it is today. The number of deaths due to smoking reported here is likely an *underestimate* of the actual number of smoking-attributed deaths in Waterloo Region because it was calculated using the smoking rate in 2003 when smoking was much less prevalent. The information reported here also does not include deaths due to pipe and cigar smoking or to use of smokeless tobacco.

From 2000 to 2004 in Waterloo Region, 2,223 of all deaths were attributable to smoking, which amounted to 15.9 per cent of all deaths in Waterloo Region. This does not include deaths due to second-hand smoke, smoking-related fires or from the use of other tobacco products. The main causes of smoking-attributable death were malignant neoplasms (1,004), cardiovascular diseases (747) and respiratory diseases (470). Lung cancer (698), ischemic heart disease (473), and chronic obstructive pulmonary disease (COPD) (370) were the single largest disease contributors to deaths

caused by smoking for each disease category respectively. Smoking resulted in 31,193 years of life lost prematurely in Waterloo Region from 2000-2004. This makes cigarette smoking one of the most important risk factors for disease and a major contributor to mortality in Waterloo Region.

More men than women smoked cigarettes in 2003 and the prevalence of smoking decreased as age increased. Table 1 provides estimates of smoking-attributable mortality by all smoking-related disease categories and of passive smoking-attributed mortality (i.e., deaths attributed to exposure to second-hand smoke) for lung cancer and ischemic heart disease.

Overall results (Table 1 & 2) in Waterloo Region show an estimated 2,223 smoking-attributable deaths, accounting for 1,416 deaths among men and 807 among women for the years 2000-2004, including two children under the age of one who died as a result of smoking-related causes.* Almost two thirds (63.7 per cent) of those who died from smoking-related causes in Waterloo Region were men, reflecting the higher rate of smoking among males. Smoking-attributable deaths represented 15.9 per cent of all 13,943 deaths in Waterloo Region from 2000-2004.

Total deaths due to exposure to second-hand smoke for lung cancer and ischemic heart disease accounted for an additional 64 deaths from 2000-2004, representing 2.8 per cent of all smoking-attributable deaths. Fourteen Waterloo Region residents died from lung cancer and 50 residents died from ischemic heart disease as a result of exposure to second-hand smoke.

Smoking was responsible for more than 75 per cent of some causes of death, including emphysema and bronchitis (91.2 per cent), cancer of the larynx (90.3 per cent), lung cancer (including trachea & bronchus) (81.4 per cent), cancer of the oesophagus (75.5 per cent), and chronic obstructive pulmonary disease (79.2 per cent).

Waterloo Region residents lost an estimated 31,193 years of potential life between 2000 and 2004 as a result of premature mortality resulting from cigarette smoking. This represents an average of 6,239 years of potential life lost each year.

Table 1: Smoking-attributable mortality, Waterloo Region, 2000-2004

Disease Category	Sex	Total Deaths	Smoking Attributable Deaths	Per cent of Disease Category Deaths
Malignant neoplasms	Male	961	673	70.0%
	Female	676	331	49.9%
	Total	1,637	1,004	61.3%
Cardiovascular diseases	Male	2,284	501	21.9%
	Female	2,363	246	10.4%
	Total	4,647	747	16.1%
Respiratory diseases	Male	365	241	66.0%
	Female	437	229	52.4%
	Total	802	470	58.6%
Total	Male	3,635	1,416	39.0%
	Female	3,493	807	23.1%
	Total	7,128	2,223	31.2%

Source: IntelliHEALTH ONTARIO, 2000-2004.

Years of potential life lost (YPLL) measures the effect on a population of its members dying prematurely or before normal life expectancy. Those who die as a result of smoking would have lived longer had they not smoked. The difference between their age of death and life expectancy is known as the residual life expectancy (RLE). RLE varies depending on the person's sex, age and year of death. For instance, a woman who died in 2002 at age 50 would have had a RLE of 33.6 years, meaning that, on average, Ontario women of the same age could expect to live another 33.5 years. The total of these extra, or "lost" years, for all people dying prematurely in a population such as Waterloo Region is known as YPLL due to smoking. For every 100,000 people in Waterloo Region, there was an average expected loss of 1,344 years of life each year as a result of deaths due to smoking.

Overall, smoking affected more men than women: In men, 20.9 per cent of all deaths were attributed to smoking, compared to 11.2 per cent of deaths among women. The average age at death for smoking-attributable deaths was 63.7 years for men and 66.9 years for women. The average age at death overall for Waterloo Region residents during the same period (2000-2004) was 70.5 for men and 77.1 for women.

* For the time period of interest, 2000-2004, a sensitivity analyses produced a low estimate of 1,892 smoking-attributable deaths (m:1,261; f:631). The upper estimate was 2,504 smoking-attributable deaths (m: 1,536; f: 968).

Table 2: Annual deaths, smoking-attributable mortality (SAM), and years of potential life lost (YPLL), by cause of death and sex - Waterloo Region, 2000-2004

Disease category (ICD-10-CA code)*	MALE				FEMALE				TOTAL			
	Total No. of Deaths (age 35+)	SAM Deaths (age 35+)	Per cent of deaths attributable to smoking by cause (age 35+)	YPLL	Total No. of Deaths (age 35+)	SAM Deaths (35+)	Per cent of deaths attributable to smoking by cause (age 35+)	YPLL	Total No. of Deaths (age 35+)	SAM Deaths (35+)	Per cent of deaths attributable to smoking by cause (age 35+)	YPLL
Neoplasms												
Lip, oral cavity, pharynx (C00-C14)	51	39	76.5%	673	25	12	48.0%	203	76	51	67.1%	876
Oesophagus (C15)	91	72	79.1%	1,209	19	11	57.9%	208	110	83	75.5%	1,417
Stomach (C16)	79	24	30.4%	351	35	4	11.4%	38	114	28	24.6%	389
Pancreas (C25)	76	17	22.4%	300	96	21	21.9%	307	172	38	22.1%	607
Larynx (C32)	23	22	95.7%	406	8	6	75.0%	104	31	28	90.3%	510
Trachea, lung, bronchus (C33-C34)	486	436	89.7%	6,642	371	262	70.6%	4,746	857	698	81.4%	11,388
Cervix uteri (C53)	-	-	-	-	25	1	4.0%	32	25	1	4.0%	32
Kidney, other urinary (C64-65)	57	23	40.4%	338	35	1	0.0%	-	92	23	25.0%	338
Urinary bladder (C67)	70	35	50.0%	381	35	10	28.6%	112	105	45	42.9%	493
Acute myeloid leukemia (C92.0)	28	5	17.9%	85	27	4	14.8%	48	55	9	16.4%	133
Neoplasm total	961	673	70.0%	10,385	676	331	49.0%	5,798	1,637	1,004	61.3%	16,183
Cardiovascular diseases												
Ischemic heart disease (I20-I25)	1,469	331	22.5%	5,154	1,231	142	11.5%	1,537	2,700	473	17.5%	6,691
Other heart disease (I00-I09, I26-I51)	282	53	20.2%	617	378	31	8.2%	246	640	84	13.1%	863
Cerebrovascular disease (I60-I69)	418	53	12.7%	760	642	41	6.4%	615	1,060	94	8.9%	1,375
Atherosclerosis (I70)	12	3	25.0%	16	20	1	5.0%	0	32	4	12.5%	16
Aortic aneurysm (I71)	81	56	69.1%	752	56	26	46.4%	297	137	82	59.9%	1,049
Other arterial disease (I72-I79)	42	5	11.9%	52	36	5	13.9%	20	78	10	12.8%	72
Cardiovascular total	2,284	501	21.9%	7,351	2,363	246	10.4%	2,715	4,647	747	16.1%	10,066
Respiratory diseases												
Pneumonia, influenza (J10-J18)	119	30	25.2%	281	159	18	11.3%	163	278	48	17.3%	444
Bronchitis, emphysema (J40-J42, J43)	26	26	100.0%	290	31	26	83.9%	329	57	52	91.2%	619
Chronic airway obstruction (J44)	220	185	84.1%	1,785	247	185	74.9%	1,937	467	370	79.2%	3,722
Respiratory total	365	241	66.0%	2,356	437	229	52.4%	2,429	802	470	58.6%	4,785
Perinatal conditions (Short gestational/ low birthweight (P07), Respiratory distress syndrome (P22), Other respiratory-newborn (P23-P28), Sudden infant death syndrome (R95))												
Perinatal total	25	1		77	17	1		82	42	2		159
Sub-total	3,635	1,416		20,169	3,493	807		11,024	7,128	2,223		31,193
Second-hand smoke deaths												
Lung cancer (C33-C34)		8				6				14		
Ischemic heart disease (I20-I25)		27				23				50		
Second-hand smoke total		35				29				64		
Overall total (direct & indirect)	3,635	1,451		20,169	3,493	836		11,024	7,128	2,287		31,193

* International Classification of Diseases (Canadian Edition), Tenth Revision.

Footnotes from Table 2 (page 4):

* Relative risk factors were adjusted for the effects of age, but not for other potential influences such as education or alcohol use. However, Cancer Prevention Studies II data showed education, alcohol, and other variables had negligible additional impact on estimates of smoking attributed deaths from lung cancer, chronic obstructive pulmonary disease, ischemic heart disease, and cerebrovascular disease. Although the CPS-II cohort includes more than 1.2 million men and women, it is not representative of the U.S. population and likely the Canadian population. The CPS-II population contains somewhat more whites, persons in the middle class, and persons with higher education than the U.S. population in general and the same is likely true of the survey's representation of the Canadian population. Smoking prevalence among currently smoking women 65 years of age or older in Waterloo Region for 2002 was not reliable due to a small sample size. For this category of smoking prevalence only, a value from 2002 for the Waterloo-Wellington-Dufferin District Health Council, the next closest level of corresponding geography, was used because it was based on a large enough sample size to be statistically reliable and is considered to be a very good approximation for Waterloo Region.

Financial Cost

Besides its many adverse health outcomes, tobacco use has a profound economic toll. The price of tobacco use includes the direct cost of treating tobacco-related illness such as acute care hospitalization, outpatient care including family physician visits, prescription drugs and fire damage caused by smoking. It also includes losses associated with the workplace such as employee absenteeism due to smoking-related illness and the resulting loss of productivity. Further, it includes indirect costs related to productivity losses resulting from disability and premature death. In 2002, the combined costs resulting from the use of tobacco was estimated at almost \$6.1 billion for Ontario and \$17 billion for Canada. The per capita (per person) costs were \$502 for Ontario and \$541 for Canada (OTRU, 2006). This estimate was determined using a cost-of-illness study whereby the external costs of tobacco use are combined and then compared with a hypothetical situation where no tobacco use exists (Canadian Centre on Substance Abuse, 2003).

Who Uses Tobacco in Waterloo Region?

About one in five people aged 12 years and older (22.0 per cent) identified themselves as either daily or occasional smokers in Waterloo Region in 2007. Of those, most (82.7 per cent) described themselves as daily smokers (Canadian Community Health Survey [CCHS], 2007a). A separate survey conducted in 2007 of Waterloo Region residents aged 18 years or older who smoke daily found they smoked an average of 14.9 cigarettes per day. The majority showed a low (53.5 per cent) or moderate (40.9 per cent) level of

tobacco dependency. Only a small proportion (5.5 per cent*) was highly dependent on tobacco (Rapid Risk Factor Surveillance System [RRFSS], 2007). These categories of dependency take into account the time of an individual's first cigarette of the day and the number of cigarettes smoked daily.

Smoking rates have decreased in Waterloo Region since 2000, but have flattened in recent years. This is similar to the trend in Canada as a whole. In Waterloo Region, the percentage of people who smoke was significantly greater in 2000/1 than in 2005 (26.6 per cent vs. 19.1 per cent) (CCHS, 2001a; CCHS, 2005a), but no significant change has occurred since then. Results from the Canadian Tobacco Use Monitoring Survey (CTUMS) (Health Canada, 2009) indicate the smoking rate for Canadians over the age of 15 years was 17.9 per cent in the first half of 2008 and has remained unchanged since 2005. The smoking rate in Waterloo Region (22.0 per cent) approximates that for Ontario as a whole (20.8 per cent) (CCHS, 2007a). However, as shown below, rates among some groups within the population are substantially higher.

Tobacco Use and Age

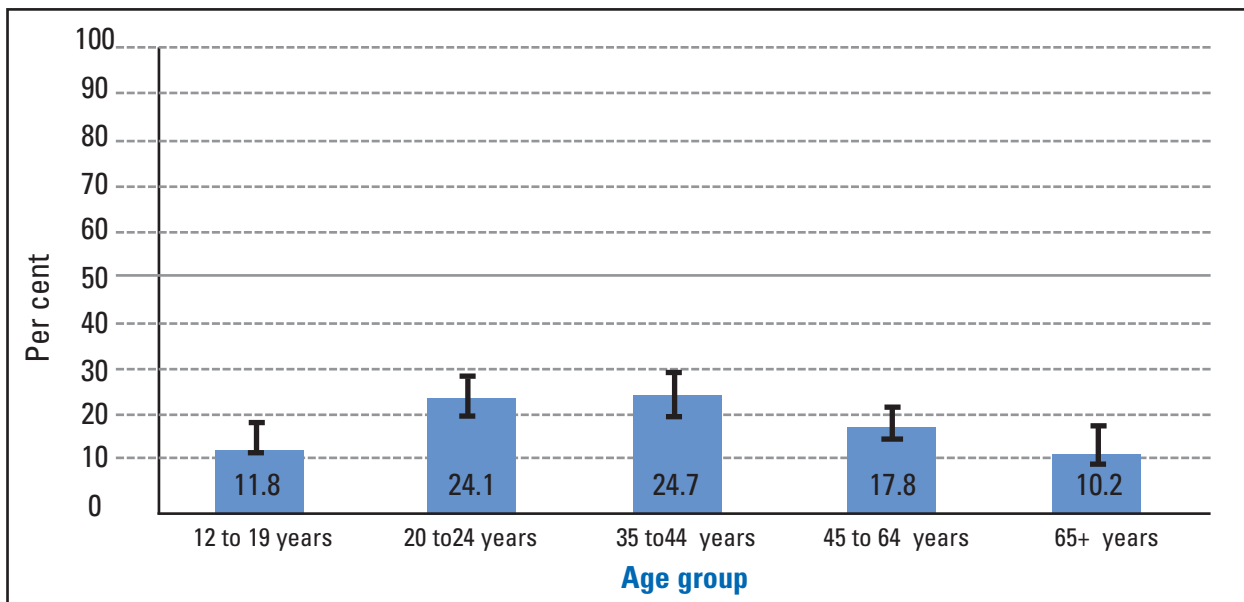
Smoking rates in Waterloo Region are highest among adults aged 20-44 years (see Figure 1; CCHS, 2005a)*.

Tobacco Use and Gender

Adult men have higher smoking rates (24.7 per cent) than women (19.8 per cent) (CCHS, 2007a). This trend has persisted over time and starts at a young age. The Canadian Community Health Survey (CHSS 3.1) (2005a) found 14.6 per cent* of boys aged 12-19 in Waterloo Region described themselves as smokers compared to 9.0 per cent* of girls aged 12-19 years.

* Rates for 2007 are not available due to high sampling variability.

Figure 1: Current daily and occasional smokers by age group, Waterloo Region, 2005



Source: CCHS 3.1 (2005a)

Note: High sampling variability associated with the estimates of smoking rates for the age groups 12 to 19 years and 65+ years; use with caution.

Tobacco Use and Socioeconomic Status

Smoking rates are proportionately higher among adults who live in low-income households (CCHS, 2007b), have high school education or less (ROWPH, 2006a), work in trades and related occupations (Centre for Addiction and Mental Health, n.d., cited in Ontario Ministry of Health Promotion, November 2008), and those who are unemployed (ROWPH, 2006c).

Although smoking rates have dropped in all household income groups in Waterloo Region, Figure 2 shows the decline was greater among households reporting incomes of more than \$40,000 a year than among those with annual incomes of less than \$40,000 (CHSS 2001b; CHSS 2003b; CHSS 2005b; CHSS 2007b).

Tobacco Use and Experience of Mental Health Problems

Smoking rates tend to be very high among those who experience mental health problems. Though data for Waterloo Region are not available, a study in British Columbia found 50-90 per cent of people with mental health problems smoked, compared to about 20 per cent of the general population (Ptasznik, 2008).

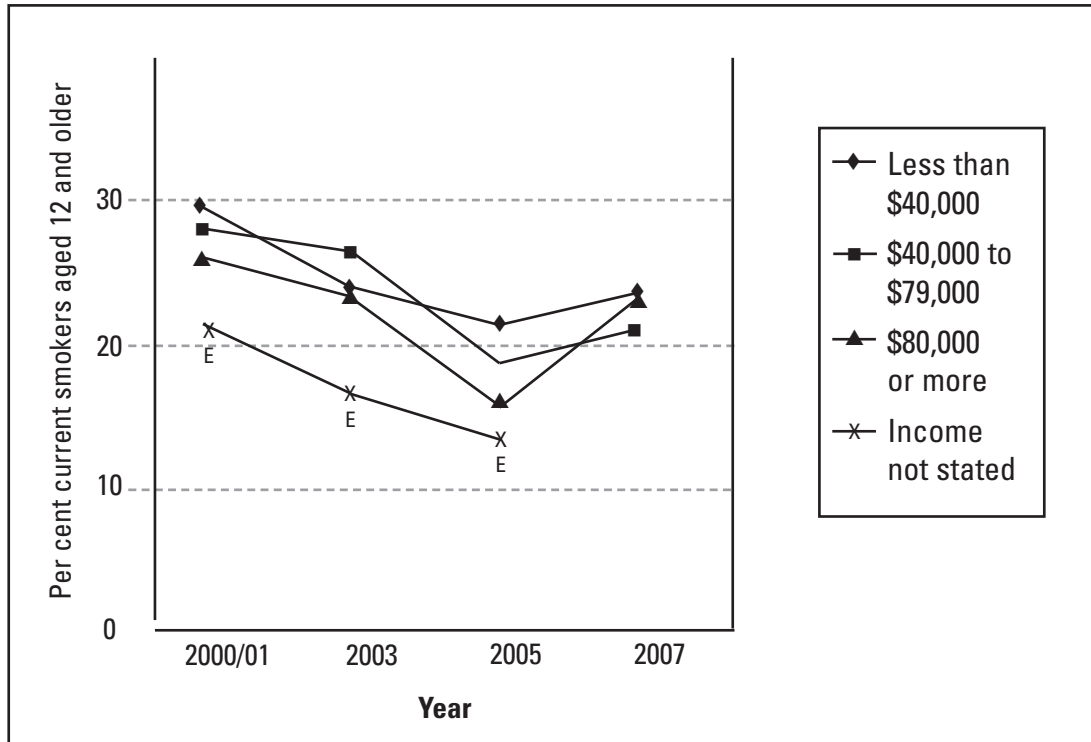
Tobacco Use in Area Municipalities

The proportion of people who smoke and rates of exposure to second-hand smoke in the home differ across the three

urban centres and four rural townships that make up Waterloo Region (see Table 3). Adult smoking rates and levels of exposure to second-hand smoke in the home are highest in Cambridge (24.4 per cent of Cambridge residents smoke, 69.2 per cent have totally smoke-free homes) and in Kitchener (23.0 per cent and 69.3 per cent respectively), both of which exceed the provincial average. Adults in the City of Waterloo are significantly less likely to smoke (13.6 per cent) and more likely to have totally smoke-free homes (81.0 per cent) than adults in the City of Cambridge and the City of Kitchener, although this difference is not significant from that in the surrounding townships (17.8 per cent of township residents smoke and 81.6 per cent have smoke-free homes) (ROWPH, 2007; ROWPH, 2006c).

These differences in adult smoking rates and exposure levels likely reflect socioeconomic differences across the region's cities and townships. In the City of Waterloo, 43.5 per cent of adults over 15 have a high school education or less and 16.8 per cent of the labour force is made up of those who work in the trades or related occupations. By comparison, 52.9 per cent of adults in the City of Kitchener and 57.0 per cent in the City of Cambridge have a high school education or less. A greater proportion of the labour force in the City of Kitchener (29.6 per cent) and the City of Cambridge (31.5 per cent) works in the trades or related occupations than in the City of Waterloo (Statistics Canada, 2006). As outlined earlier, these socioeconomic differences are correlated with smoking behaviours.

Figure 2: Individuals aged 12 years and older who reported being a current smoker (daily or occasional) by income, Waterloo Region 2000-2007



* E -- High sampling variability associated with these estimates; use with caution.

Source: CCHS (4.1) (2007b), CCHS (3.1) (2005b), CCHS (2.1) (2003b), CCHS (1.1) (2001b)

When Do Most People Start to Smoke?

Like other risk-taking behaviours such as alcohol and drug use, most people start smoking in their teenage years or earlier. Cigarette smoking starts as early as grade 5 (age 10) and generally increases with each progressive grade through high school. Waterloo Region residents who describe themselves as current smokers report trying their first whole cigarette at 15.4 years of age on average, younger than the age for Ontario overall (16.1 years), and report they began to smoke daily by the time they were, on average, 18 years of age (CCHS, 2007b).

The Canadian Community Health Survey (CHSS 3.1) (2005a) found 11.8 per cent* of youth in Waterloo Region aged 12-19 years identified themselves as smokers. If use of alternative tobacco products such as cigars and smokeless tobacco are taken into account, the youth tobacco use rate may be higher. An estimated 7.8 per cent* of youth aged 15-19 years reported using tobacco products other than cigarettes in 2000/2001, the last year for which statistics are available (CHSS, 2000/2001).

* High sampling variability associated with the estimate, use with caution.

Exposure to Second-hand Smoke

Home and Vehicles

An estimated 7.0 per cent* of Waterloo Region residents reported at least one person smoked inside their home every day or almost everyday in 2007 compared to 5.7 per cent of Ontario residents (CCHS, 2007a). A separate survey found households with children were more likely to have totally smoke-free homes than households without children (82.1 per cent vs. 66.7 per cent) (ROWPH, 2007). A totally smoke-free home refers to a place of residence where no one – occupant(s) or visitors – smokes inside the home at any time. Households earning \$30,000 or more annually were more likely to have maintained totally smoke-free homes in Waterloo Region than households earning less than \$30,000 annually (76.0 per cent vs. 55.7 per cent). Likewise, drivers with household incomes greater than \$30,000 were more likely to ban smoking in their vehicles than drivers with incomes less than \$30,000 (81.5 per cent vs. 68.6 per cent) (ROWPH, 2006b).

A 2008 Waterloo area survey found similar results. Of 703 respondents across Waterloo Region, most of whom (78.2

Table 3: Tobacco use and exposure to second hand smoke by geographic location in Waterloo Region, 2003-2006

Tobacco Use	Region of Waterloo Municipalities and Surrounding Townships, 2003-2006			
	City of Waterloo	City of Cambridge	City of Kitchener	Townships: Woolwich, Wilmot, Wellesley and North Dumfries
Adult smoking (per cent of population)	13.6 %	24.4 %	23.0 %	17.8 %
Households with totally smoke-free homes (per cent of population)	81.0 %	69.2 %	69.3 %	81.6 %

Source: ROWPH 2006c, ROWPH 2007

per cent) reported living in detached housing, 6.5 per cent said someone often smoked inside their home and an equal number said they would permit someone to smoke in their home if they were asked (University of Waterloo, 2009). Of these, 5.4 per cent reported being always or very often exposed to second-hand smoke in their home and 25.3 per cent said they were sometimes exposed.

Multi-unit Dwellings

Exposure to second-hand smoke in multi-unit dwellings can result not only from someone smoking within one's own home, but also from people smoking in neighbouring units. A survey of residents of housing owned or operated by the Region of Waterloo conducted in 2008 found 24 per cent of residents who did not permit smoking in their own home said they were nevertheless always or very often exposed to second-hand smoke in their home. A further 29 per cent said they were sometimes exposed to second-hand smoke in their home (ROWPH, 2009). Of those, 44 per cent said someone in their home had health problems that are worsened by exposure to second-hand smoke.

Fetal Exposure

Smoking rates during pregnancy are one way of estimating fetal exposure to chemicals in second-hand smoke. In 2007 11.7 per cent of pregnant women who were assessed at pre-birth clinics in Waterloo Region indicated they primarily smoked one to five cigarettes per day (4.8 per cent) or six to

ten cigarettes per day (4.8 per cent) during their pregnancy (Sanderson & Drew, 2009). Eighty per cent of families with a live birth were screened prenatally at pre-birth clinics (Healthy Babies Healthy Children Integrated Services for Children Information System [ISCIS], 2007). While exact comparisons are not available at the national and provincial level, in 2005 13.4 per cent of Canadian women and 9.7 per cent of Ontario women who gave birth in the previous five years reported having smoked more than ten cigarettes per day during their pregnancy (Lindsay, Royle, & Heaman, 2008).

Support for Smoke-free Public Places

There is a high level of support for smoke-free public places in Waterloo Region. A 2008 survey of Waterloo Region residents aged 18 and older found 89.0 per cent supported banning smoking in doorways to public places, 87.4 per cent supported smoke-free doorways to workplaces, 86.1 per cent supported smoke-free public playgrounds and 79.5 per cent supported smoke-free outdoor sports fields and spectator areas (Region of Waterloo Public Health, 2009). Support was also high for smoke-free public beaches (71.3 per cent) and smoke-free outdoor public patios where food or drink is served (70.6 per cent). Support for smoke-free public playgrounds was particularly high among the youngest group surveyed. Ninety-five per cent (95.4 per cent) of adults between the ages of 18 and 24 support smoke-free public playgrounds.

* High sampling variability associated with the estimate, use with caution.

Targets for Smoking Reduction

“Cancer 2020” is a comprehensive action plan for cancer prevention and early detection. It establishes targets for the reduction of tobacco use in Ontario by the year 2020 (Cancer Care Ontario & Canadian Cancer Society, 2001). To achieve these targets in Waterloo Region:

- Adult smoking rates will need to decrease from 20.5 per cent to 5 per cent¹ by the year 2020
- Teen smoking rates will need to decrease from 11.8 per cent² to 2.0 per cent
- Current levels of exposure to second-hand smoke at home will need to drop from 7.0 per cent³ to 1.0 per cent

Challenges in Tobacco Control

In the face of clear evidence of a causal link between smoking and disease and death, some question why anyone would begin to use tobacco products. The tobacco industry has long linked tobacco use to a host of desirable characteristics including sophistication, liberation, “coolness,” adulthood, sexiness, ruggedness, and slimness. Though the reality of tobacco use is far from this image, these desirable images persist in movies and video games and act as powerful lures to children and youth trying to establish their identity. As shown in this report, most people start to smoke by the age of 18.

A second and no less powerful reason for continued uptake of tobacco products is their delivery of nicotine, a highly addictive drug. Nicotine stimulates the pleasure centre of the brain. As a mood and behaviour altering agent, tobacco is as addictive as heroin and 5-10 times more potent than cocaine or morphine (University of Minnesota, 2007). Nicotine rapidly enters the bloodstream and brain when tobacco smoke is inhaled, but it can also be absorbed through mucosal membranes in the mouth when smokeless products are used or if tobacco smoke is not inhaled. Whereas it was once thought nicotine dependence developed after several years of heavy or daily smoking, evidence suggests it may develop soon after starting to smoke (O’Loughlin et al., 2003). Industry papers indicate the tobacco industry has taken advantage of this knowledge, manipulating nicotine levels in products to enhance tobacco’s addictive qualities (Colishaw, 1999).

Finally, tobacco products are readily available. They are sold in 376 retail outlets in Waterloo Region. They are also available through a growing contraband trade.

The Tobacco Industry

The tobacco industry, with its significant resources and history of deception, has long been a formidable opponent in tobacco control efforts. Despite years of regulation, there is evidence the industry persists in marketing tobacco products to youth.

Tobacco marketing tends to be subliminal and manipulative (World Health Organization, 2008, Glantz, Slade, Bero, Hanauer, & Barnes, 1998). Tactics include the introduction of tobacco products that appeal to youth, discount pricing, advertising, and product placement in video games and films. While the tobacco industry is prohibited from advertising in Canadian publications that have less than 85 per cent adult readership, it has recently ended a voluntary advertising ban in Canada and has begun to advertise in publications such as entertainment weeklies directed at the young adult market. Publications such as *Echo Weekly*, available in Waterloo Region, have recently included full-page advertisements for chew tobacco products.

There is evidence that “product placements” of tobacco products in films and video games have been encouraged by industry payments (Mekemson & Glantz, 2002). Warner Brothers received funding from Philip Morris to place Marlboro cigarettes in the 1980 film *Superman II*, for example (University of California, 2002). While a legal agreement between US tobacco companies and United States Attorneys General in 1988 banned tobacco companies from paying for product placement in films, smoking in movies has increased rapidly since 1990 and there are suggestions that the tobacco industry has played a role in this increase (Mekemson & Glantz, 2002).

Some tobacco products appear to be designed to have particular appeal to youth, acting as an entry way to nicotine addiction.

(i) Chew or “spit” tobacco

Chew tobacco is available in youth-appealing flavour “blends” including green apple, cherry, berry, peach, vanilla, wintergreen and spearmint. It is packaged so it can be used discreetly, making it easier to hide from parents, teachers and employers (Kahn, 2008). Popular brands of chew tobacco are available in “pucks” or tins and in “logs” of seven tins. Advertising messages promote the fact that smokeless products can be used invisibly anytime, anywhere and suggest these products are safer to use than lighted tobacco. The use of chew tobacco has been linked to sports, particularly hockey and baseball. Though local statistics are not

1. Smoking prevalence (per cent) among adults 18 years and older in Waterloo Region (Region of Waterloo Public Health, 2006).
2. Smoking prevalence (per cent) among youth 12-19 years in Waterloo Region (CCHS 3.1) (2005b)
3. Exposure to second-hand smoke in home (per cent) in Waterloo Region (CCHS 4.1) (2007a)

available, anecdotal reports suggest chew tobacco has enjoyed somewhat of a resurgence among high school athletes involved in these sports.

Smokeless products are also marketed to people who smoke cigarettes as an alternative to smoking in places where it is prohibited. Though smokeless tobacco is widely available and advertised in Canada, regular use remains at less than one per cent, which suggests people who smoke are not inclined to use these products as alternates (Kahn, 2008).

(ii) Cigarillos

Like chew tobacco, cigarillos, also known as “little cigars,” are available in fruit and mint flavours as well as alcohol-related flavours. Cigarillos are similar in size and shape to cigarettes, but are wrapped in tobacco leaf rather than paper. Taking advantage of less restrictive regulations for leaf-wrapped tobacco, the industry has designed a product attractive to youth, increasing the potential for addiction to nicotine. Cigarillos are sold individually or in small packs known as “kiddy packs,” practices which have long been prohibited for cigarettes. They are packaged in tubes that resemble lip gloss or markers. Single cigarillos are not required to have health warnings.

It is no accident that cigarillos are a youth phenomenon. While statistics for Waterloo Region are not available, across Canada teenagers are five times more likely to have smoked a cigarillo in the past month as are Canadians over the age of 25. Evidence of significant growth in cigarillo sales in Canada – 50,000 in 2001 compared to 80 million in 2006 according to Health Canada – suggest industry promotion of these products is meeting with success (Physicians for a Smoke-Free Canada, 2008). Thirty-three percent of Canadian youth aged 15-19 and 50 per cent of young adults aged 20-24 reported having ever tried little cigars (cigarillos) in a survey conducted in the first half of 2008. Ten per cent of 15-19 year olds and 13 per cent of 20-24 year olds reported smoking little cigars in the past 30 days (Health Canada, 2009).

Tobacco Sales to Youth

Legislation aimed at reducing youth access to tobacco has existed in Ontario since 1994. The *Tobacco Control Act* made it illegal to sell or supply tobacco to youth under the age of 19 in Ontario. The *Smoke Free Ontario Act*, which came into force in 2006, further required vendors to ask for age identification of anyone who appears to be less than 25 years of age. Despite this long-standing legislation, youth test shoppers between 15 and 17 years of age were sold tobacco on 158 occasions in Waterloo Region from 2006-2008. Compliance rates with youth access restrictions currently

are lower in Waterloo Region than elsewhere in Canada. Eighty-two per cent* of retailers in Waterloo Region complied with youth access restrictions in 2008, refusing to sell cigarettes to test shoppers. In Canada as a whole, 85.9 per cent of retailers comply with youth access restrictions (Health Canada, 2008a) and 89 per cent of Ontario retailers complied with these restrictions in 2007 (Global Tobacco Control Forum, 2008). To be most effective, tobacco retailer compliance with sales prohibitions must approach 100 per cent (Leatherdale, 2007). Otherwise, research has shown young people who smoke will travel beyond their neighbourhoods to buy tobacco from non-compliant retailers.

Educating tobacco vendors and enforcing youth access restrictions at retail outlets is only part of the story in reducing youth access to tobacco. Many young people get tobacco products from their friends, older siblings or by asking someone to buy for them, starting at a very young age. The Youth Smoking Survey (2006-2007) found 72.0 per cent of Canadian youth in grades 5-12 obtained their cigarettes this way (Health Canada, 2008b). There is also evidence that youth are increasingly accessing contraband tobacco.

Contraband Tobacco

The Royal Canadian Mounted Police (RCMP) defines contraband tobacco as tobacco products that do not comply with “the provisions of all applicable federal and provincial statutes,” including “importation, stamping, marking, manufacturing, distributing and payment of duties and taxes” (RCMP, 2008, p.12).

The availability of contraband tobacco on the street and in retail outlets on First Nations reserves in Ontario poses a significant challenge to tobacco control efforts in 2009. Contraband cigarettes cost less than one-third the price of fully taxed tobacco products, making them desirable for those who currently smoke and a temptation for youth trying tobacco for the first time.

They can be obtained for as little as \$6 for a carton of 200 compared to \$50-\$70 (depending on the brand) for a legally purchased carton in Ontario (Perley, 2009).

Several studies indicate high cigarette prices deter smoking initiation by youth and result in fewer cigarettes smoked by adults (Holowaty et al., 2002). The Canadian Convenience Store Association (cited in Perley, 2009) commissioned a study surveying cigarette butts picked up from public grounds outside of high schools in Ontario and Quebec in 2007 as a measure of contraband cigarette use by high-school students. In Ontario 26 per cent of the retrieved cigarette butts were from illegal products.

* In Waterloo Region, youth test shoppers made sales attempts at 366 different tobacco vendors in 2008 and 66 of these sold a tobacco product to them.

The 2008 Canadian Tobacco Use Monitoring Survey asked people who smoke cigarettes if they had made any attempts to purchase cigarettes at a lower price during the past six months. Thirty-eight per cent reported they had purchased a discount brand cigarette, 20 per cent had purchased cigarettes from a First Nations Reserve, 14 per cent bought cigarettes from outside the province, and four per cent reported they had purchased cigarettes that may have been smuggled. Some reported multiple sources (Health Canada, 2009).

The Canadian Cancer Society (2009) has stated that a failure to deal with the increasing supply of contraband will lead to increased smoking rates and will undermine other tobacco control interventions. Clearly, the growing trade in contraband tobacco has the potential to set back the progress made over recent years in the fight against tobacco and its deadly impact on public health.

What is Public Health Doing?

- All clients of public health clinical services are routinely asked about their tobacco use, advised to quit and given referrals to services that will help them quit, a best practice endorsed by the Registered Nurses Association of Ontario
- Pregnant women participating in one-on-one programs at Public Health receive counselling to help them reduce their tobacco use or quit entirely (Growing Healthy Two-together program)
- Public Health coordinates local promotion of activities such as the annual Driven to Quit challenge to help people end tobacco use
- Public Health works with local health care providers to increase local capacity to provide services that help people end tobacco use
- Consultation is provided to local workplaces wishing to provide cessation support to their employees or to implement smoke-free policies
- Public Health is working with Waterloo Region Housing, Region of Waterloo Community Housing Inc. and their tenants to develop policies to reduce tenant exposure to second-hand smoke in their homes
- Public Health staff monitor surveillance data about smoking rates and levels of exposure to second-hand smoke in Waterloo Region and provide information to the public about the risks associated with tobacco use
- Youth peer leaders employed at Public Health plan and carry out activities to raise awareness about ways the tobacco industry traps children and youth into tobacco addiction and about the dangers of tobacco use and exposure to second-hand smoke
- Grants are made available to high schools to carry out tobacco prevention and awareness activities
- Tobacco enforcement officers in the Region's Licensing and Regulatory Services enforce the *Smoke-Free Ontario Act* in workplaces and public places and monitor retailer compliance with the tobacco display ban and youth access restrictions

WHAT DOES THIS MEAN?

- Given extensive research on the links between tobacco use and exposure to second-hand smoke and a long list of serious and fatal health conditions, continued tobacco control efforts are required. This is particularly the case in the face of both a proliferating trade in contraband tobacco and an opportunistic industry.
 - The challenges of preventing young people from starting to use tobacco products, helping those who do use these products to quit, and protecting the public from exposure to second-hand smoke remain.
 - While smoking rates have declined substantially in recent decades, they have begun to flatten and remain high among some of the most vulnerable members of our community, including those who experience mental health problems and people living on low incomes.
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REFERENCES

- Baliunas, D., Patra, J., Rehm, J., Popova, S., Kaiserman, M., & Taylor, B. (2007). Smoking-attributable mortality and expected years of life lost in Canada 2002: Conclusions for prevention and policy. *Chronic Diseases in Canada*, 27(4), 154-162. Retrieved January 23, 2009, from http://www.phac-aspc.gc.ca/publicat/cdic-mcc/27-4/pdf/cdic274-3_e.pdf
- Canadian Cancer Society. (2009). *Handy facts about tobacco contraband*. Retrieved May 11, 2009, from http://convio.cancer.ca/site/PageServer?pagename=GEN_CAN_fight_contraband_facts
- Canadian Centre on Substance Abuse. (2003). *The costs of substance abuse in Canada 2002: Backgrounder*. Retrieved April 7, 2009, from <http://www.ccsa.ca/2006%20CCSA%20Documents/ccsa-bckgrd-20060426-e.pdf>
- Canadian Community Health Survey. (2000/2001). Retrieved December 3, 2008 from <http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.pgm>
- Canadian Community Health Survey, Cycle 1.1. (2001a). Master File
- Canadian Community Health Survey, Cycle 1.1. (2001b). Share File
- Canadian Community Health Survey, Cycle 2.1. (2003a). Master File
- Canadian Community Health Survey, Cycle 2.1. (2003b). Share File
- Canadian Community Health Survey, Cycle 3.1. (2005a). Master File
- Canadian Community Health Survey, Cycle 3.1. (2005b). Share File
- Canadian Community Health Survey, Cycle 4.1. (2007a). Master File
- Canadian Community Health Survey, Cycle 4.1. (2007b). Share File
- Cancer Care Ontario. (2008a). *Cancer fact: Lung cancer continues to be the biggest cancer killer in Ontario*. Retrieved November 24, 2008, from <http://www.cancercare.on.ca/documents/CF-Jan2008-lungcabiggestkiller.pdf>
- Cancer Care Ontario. (2008b). *Facts about tobacco*. Retrieved December 12, 2008, from <http://www.cancercare.on.ca/english/home/pcs/prevention/tobacco/>
- Cancer Care Ontario & Canadian Cancer Society. (2001). *Targeting cancer: An action plan for cancer prevention and detection. Cancer 2020 summary report*. Retrieved January 21, 2009, from http://www.cancercare.on.ca/documents/Cancer2020CCS-1513Report_summary.pdf
- Colishaw, N.E. (1999). *Manipulation: The story of Imperial Tobacco and its cigarettes*. Ottawa: Physicians for a Smoke-Free Canada. Retrieved April 2, 2009, from <http://www.smoke-free.ca/documents/manipulation1.htm>
- Glantz, S.A., Slade, J., Bero, L.A., Hanauer, P., & Barnes, D.E. (1998). *The cigarette papers*. Berkeley, CA: University of California Press. Retrieved May 11, 2009, from <http://www.escholarship.org/editions/view?docId=ft8489p25j;brand=ucpress>
- Global Tobacco Control Forum. (2008). *The framework convention on tobacco control in Canada: A civil society "shadow" report*. Retrieved December 13, 2008, from http://www.smoke-free.ca/eng_issues/global/content/globalforum-shadow-report-2008-final-web.pdf
- Health Canada. (2008a). *Evaluation of retailer behaviour towards certain youth access-to-tobacco restrictions – 2007 key results*. Retrieved January 22, 2009, from: http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/eval/2007_result-eng.php
- Health Canada. (2008b). *Summary of results of the 2006-07 youth smoking survey: Overview*. Retrieved November 19, 2008, from www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/survey-sondage_2006
- Health Canada. (2009). *Canadian tobacco use monitoring survey. Summary of results for the first half of 2008* (February-June). Retrieved April 20, 2009, from http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/research-recherche/stat/_ctums-esutc_2008/wave-phase-1_summary-sommaire-eng.php
- Healthy Babies Healthy Children Integrated Services for Children Information System. (2008, January). *2007 Year-end monitoring report*. Available from Region of Waterloo Public Health, 99 Regina St. S., Waterloo, ON.
- Holowaty, E., Chin Cheong, S., Di Cori, S., Garcia, J., Luk, R., Lyons, C., & Thériault, M-E. (2002). *Tobacco or health in Ontario*. Cancer Care Ontario, Surveillance Unit and Prevention Unit, Division of Preventive Oncology and Ontario Tobacco Research Unit.
- Kahn, S. (2008, March). *Spit tobacco report*. Available from Toronto Public Health, 277 Victoria Street, 5th Floor Toronto, ON.
- Leatherdale, S. (2007, August). *Emerging issues in youth and tobacco*. Webinar presentation, Cancer Care Ontario.
- Lindsay, J. Royle, C., & Heaman, M. (2008). Rate of maternal smoking during pregnancy. In *Canadian Perinatal Health Report* (pp. 39-42). Ottawa: Public Health Agency of Canada.
- Mekemson, C., & Glantz, S.A. (2002). How the tobacco industry built its relationship with Hollywood. *Tobacco Control*, 11(1), i81-i91. Retrieved March 5, 2009, from http://tobaccocontrol.bmj.com/cgi/content/full/11/suppl_1/i81

- O'Loughlin, J. DiFranza, J., Tyndale, R.F., Meshfedjian, G., Mcmillan-Davey, E., Clarke, P.B.S., Hanley, J., & Paradis, G. (2003). Nicotine-dependence symptoms are associated with smoking frequency in adolescents. *American Journal of Preventive Medicine*, 25(3) 219-225. Retrieved January 27, 2009, from http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VHT-49JFRFF7&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&_view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=823aea0e7ebee74b9a92990dc8329979
- Ontario Ministry of Health Promotion. (2008, November 18). *Comprehensive tobacco control programming*. Presented at Ontario Public Health Standards workshop, Toronto, ON.
- Ontario Tobacco Research Unit. (2006). *The burden of tobacco use in Ontario (OTRU Update)*. Retrieved January 23, 2009 from http://www.otru.org/pdf/updates/update_june2006.pdf
- Ontario Tobacco Research Unit. (2007). *Smokeless tobacco and snus: The current evidence for health risks* (OTRU Update). Retrieved January 23, 2009, from http://www.otru.org/pdf/updates/update_june2007.pdf
- Physicians for a Smoke-Free Canada. (2008, February). *Cigarillo smoking in Canada – A review of results from CTUMS, Wave 1 – 2007*. Retrieved November 18, 2008, from http://www.smoke-free.ca/pdf_1/cigarillos-2008.pdf
- Public Health Agency of Canada. (2008, July 10). *Chronic obstructive pulmonary disease (COPD)*. Retrieved November 26, 2008, from <http://www.phac-aspc.gc.ca/cd-mc/crd-mrc/copd-mpoc-eng.php>
- Perley, M. (2009, February 4-5). *Contraband tobacco in Canada today: Ontario and Québec lead the way*. Presented at A taxing issue: Public health and contraband tobacco, Buffalo, NY.
- Ptasznik, A. (2008, Autumn). "Enjoy your cigarettes; it's all you have". *CrossCurrents: The Journal of Addiction and Mental Health*. Retrieved December 4, 2008, from http://www.camh.net/Publications/Cross_Currents/Autumn_2008/enjoycigarettes_crcuautumn08.html
- Rapid Risk Factor Surveillance System*. (2007, January –December). Extracted December 1, 2008.
- Rapid Risk Factor Surveillance System*. (2008, January - August). Extracted November 4, 2008.
- Region of Waterloo Public Health. (2009, February). [Smoking attributable mortality and years of potential life lost in Waterloo Region 2000-2004]. Unpublished raw data.
- Region of Waterloo Public Health. (2006a, October). *Tobacco: Never smoked. Smoked fewer than 100 cigarettes in lifetime by gender and educational attainment, Waterloo Region 2003-2006* (Public Health Briefs). Waterloo, ON: Author.
- Region of Waterloo Public Health. (2006b, October). *Tobacco: Smoke-free vehicles. Smoke-free vehicles by gender, Waterloo Region 2004* (Public Health Briefs). Waterloo, ON: Author.
- Region of Waterloo Public Health. (2006c, October). *Tobacco: Smoking status. Current and former smokers by age, Waterloo Region 2003-2006* (Public Health Briefs). Waterloo, ON: Author.
- Region of Waterloo Public Health. (2007, January). *Tobacco: Smoke-free homes. Totally smoke-free homes by municipality, income, and households with or without children, Waterloo Region 2003-2006* (Public Health Briefs). Waterloo, ON: Author.
- Royal Canadian Mounted Police, Customs & Excise Branch, Border Integrity, Federal and International Operations. (2008). *Contraband tobacco enforcement strategy*. Retrieved February 20, 2009, from <http://www.rcmp-grc.gc.ca/ce-da/tobacco-tabac-strat-2008-eng.pdf>
- Sanderson, R., & Drew, S. (2009). *Maternal and child indicator report for Waterloo Region: HBHC-ISCIS report 2007*. Waterloo, ON: Region of Waterloo Public Health.
- Smoke-Free Ontario Act* S.O. 1994, c. 10.
- Statistics Canada. (2006). *Census of Canada: 2006 community profiles*. Retrieved December 3, 2008, from <http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/details/page.cfm?Lang=E&Geo1=HR&Code1=3565&Geo2=PR&Code2=35&Data=Count&SearchText=waterloo&SearchType=Begins&SearchPR=35&B1=All&Custom=>
- United States Department of Health and Human Services. (2006). *The health consequences of involuntary exposure to tobacco smoke: A report of the Surgeon General*. Atlanta, GA: Author. Retrieved February 13, 2009, from <http://www.surgeongeneral.gov/library/secondhandsmoke/report/fullreport.pdf>
- United States Environmental Protection Agency, Office of Health and Environmental Assessment, Office of Research and Development. (1992, December). *Respiratory health effects of passive smoking: Lung cancer and other disorders*. EPA/600/690/006F. Washington, DC: Author. Retrieved December 2008, from <http://cfpub2.epa.gov/ncea/cfm/recorddisplay.cfm?deid=2835>
- University of California, San Francisco. (2002). *Superman II – The movie (1979)*. Legacy tobacco documents library. Retrieved April 2, 2009, from <http://legacy.library.ucsf.edu/tid/hgt85e00>

University of Minnesota, Division of Periodontology. (2007). *Nicotine addiction*. Retrieved January 27, 2009, from <http://www1.umn.edu/periodontology/tobacco/nicaddct.html>

University of Waterloo, Survey Research Centre. (2009). *Waterloo Region area survey final technical report with results*. Waterloo, ON: University of Waterloo.

World Health Organization. (2008). *The WHO report on the global tobacco epidemic, 2008: The MPOWER package*. Geneva: Author. Retrieved May 11, 2009, from http://www.who.int/tobacco/mpower/mpower_report_full_2008.pdf