



Ontario

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Cancer Risk Factors in Ontario

Alcohol – highlights, implications, context

FOREWORD



Cancer Risk Factors in Ontario: Alcohol is the third report in our Cancer Risk Factors in Ontario series. It follows the January 2014 release of *Cancer Risk Factors in Ontario: Tobacco*, which provided information on tobacco use in Ontario as it relates to cancer, and estimated the smoking-related cancer risk in the population. The first report, *Cancer Risk Factors in Ontario: Evidence Summary*, reviewed the epidemiologic evidence for a wide range of cancer risk factors. This report series supports one of Cancer Care Ontario's key strategic priorities to reduce chronic disease through prevention.

Alcohol consumption is an established cause of several cancers, as well as other chronic and acute diseases. Awareness of the link between alcohol consumption and cancer is low, with only a third of Canadians aware that they can lower their risk of cancer by reducing their alcohol consumption. While alcohol is a risk factor for cancer when consumed in any quantity, light to moderate levels of consumption can protect against cardiovascular disease. This poses unique challenges for increasing awareness of the link between alcohol consumption and cancer.

Cancer Risk Factors in Ontario: Alcohol presents the prevalence and distribution of alcohol consumption in Ontario, and examines alcohol consumption from a cancer perspective, including estimates of the alcohol-associated cancer burden in the Ontario population. It also offers a detailed examination of socio-demographic variation in alcohol consumption, plus a special section on off-reserve Aboriginal Peoples. The primary source of data for this report is the Canadian Community Health Survey (CCHS), a national cross-sectional survey conducted by Statistics Canada.

The intent of *Cancer Risk Factors in Ontario: Alcohol* is to complement and supplement other reports on alcohol consumption in Ontario and serve as a resource for public health and health professionals, policy-makers and planners involved in both cancer control and alcohol control in the province. Future reports in this series will focus on other well-established cancer risk factors.

Linda Rabeneck, MD MPH FRCPC
Vice-President, Prevention and Cancer Control
Cancer Care Ontario



HIGHLIGHTS

CANCERS ATTRIBUTABLE TO ALCOHOL CONSUMPTION

- In this report, between 1,000 and 3,000 cases of cancer diagnosed in Ontario during 2010 (2%–4% of all new cancer cases) are estimated to be attributable to alcohol consumption. Drinking alcoholic beverages increases the risk of cancers of the oral cavity and pharynx, esophagus, larynx and liver. It is also a cause of colorectal and breast cancers, two of the three leading causes of cancer death in Ontario.

EXCEEDING CANCER PREVENTION RECOMMENDATIONS FOR ALCOHOL CONSUMPTION

- In 2012, nearly 1 million, or 8.8%, of Ontario adults aged 19 years and older reported drinking more alcohol than the upper limit recommended for cancer prevention by the World Cancer Research Fund/American Institute for Cancer Research (i.e., no more than two drinks a day for men and one drink a day for women).¹
- Although the prevalence of drinking in excess of the cancer prevention recommendations has historically been higher in adult males than females, the gap between the sexes has closed in recent years. In 2012, 9.1% of males and 8.6% of females reported exceeding the recommendations.
- While the prevalence of drinking in excess of the daily cancer prevention recommendations averaged across one week was highest in the youngest age group (19–29), the oldest age group (65 and older) exceeded the recommendations on more days per week.
- The prevalence of drinking in excess of the cancer prevention recommendations varies significantly across the province; prevalence among Ontario's 14 Local Health Integration Networks (LHINs) ranged from 5.5%–12.6%, and from 5.7%–15.0% across Ontario's 36 public health units (PHUs).
- Significant socio-demographic inequalities exist for drinking in excess of the cancer prevention recommendations; prevalence was significantly higher among adults living in rural compared with urban areas, among the highest income group compared with all lower income groups, and among Canadian-born adults compared with immigrants in Canada for more than 10 years (numbers among immigrants in Canada 10 years or less are too small for valid estimates).
- In 2012, 3.7% of Ontario males and 2.6% of Ontario females aged 19 and older reported both drinking in excess of the cancer prevention recommendations and being current smokers. Smokers who also drink alcohol are at an especially increased risk for cancers of the oral cavity, pharynx, larynx and esophagus (squamous cell carcinoma).^{2,3}



LEVELS OF ALCOHOL CONSUMPTION

- In 2012, a higher proportion of Ontario's adult females than males reported abstaining from alcohol in the past 12 months, while a higher proportion of males than females reported higher levels of consumption (eight or more drinks during the past week).
- The proportion of Ontarians who said they did not drink during the past 12 months increased significantly between 2003 (males 14.6%, females 23.6%) and 2012 (males 18.0%, females 26.2%), which may be attributable to higher numbers of immigrants who do not drink alcohol rather than to shifts in individual drinking behaviour.
- The prevalence of abstaining during the past 12 months was lowest in younger adults (ages 19–29) and generally rose with increasing age.
- The proportion of the population abstaining during the past 12 months varies significantly across the province, ranging from 13.4%–31.5% among Ontario's 14 LHINs.
- The proportion of adult Ontarians abstaining during the past 12 months was significantly higher among adults living in urban than in rural areas, and decreased significantly with increasing level of education, with increasing income and among immigrants who have been in Canada for longer than 10 years compared with more recent immigrants.
- Males, on average, consumed more drinks per week than females in 2012 (median consumption 2.4 and 0.6, respectively).
- Median drink consumption was significantly higher among adults living in rural than in urban areas, among the most educated than the least educated, among the highest income group than the lowest, and among Canadian-born than immigrants.

ABORIGINAL PEOPLES (OFF-RESERVE)

- In keeping with Cancer Care Ontario's commitment to working on cancer control with Aboriginal Peoples, a section of this report describes alcohol consumption in off-reserve Aboriginal populations.
- Drinking in excess of the cancer prevention recommendations was slightly more prevalent among off-reserve First Nations and Métis populations than non-Aboriginals, although the differences were not statistically significant. Roughly 5% of off-reserve First Nations and Métis reported drinking in excess of the cancer prevention recommendations and being current smokers.
- Significant differences in alcohol consumption were observed for some off-reserve Aboriginal populations; a significantly smaller proportion of Métis adult females than non-Aboriginal adult females reported abstaining during the past 12 months, while Métis adult males had significantly higher median drink consumption during the past week than non-Aboriginal adult males.



IMPLICATIONS FOR CANCER CONTROL

- **Impact on cancer burden.** Because alcohol consumption is a **modifiable** risk factor for several cancers, the findings of this report demonstrate that a substantial number of cancers diagnosed in Ontario (as many as 3,000 annually) could be prevented by reducing alcohol consumption in the population. This highlights a considerable opportunity for cancer prevention efforts in the province and provides a reasonable estimate of the potential impact of successful alcohol-related prevention efforts on the cancer burden in Ontario.
- **A cancer prevention opportunity.** The majority of Ontario adults drink alcohol to some extent, with only 18.0% of males and 26.2% of females reporting that they had not had a drink in the past 12 months.
 - Awareness of the link between alcohol consumption and cancer is low among the Canadian public—survey data show that only a third of Canadians are aware that they can lower their risk of cancer by reducing their alcohol consumption.⁴ These findings highlight a substantial opportunity for increasing public awareness of alcohol as a carcinogen and ultimately reducing alcohol consumption in the Ontario population.
 - While just under 9% of Ontario adults aged 19 years and older (nearly 1 million people) drink more alcohol than recommended for cancer prevention (i.e., more than two drinks per day for men and more than one drink per day for women), this figure has not declined since at least 2003 and may be an underestimate because of under-reporting of alcohol consumption.
 - Although alcohol is a risk factor for cancer when consumed in any quantity, light to moderate levels of consumption can protect against cardiovascular disease. This poses unique challenges for increasing awareness of the link between alcohol consumption and its negative health effects, such as cancer.
- **Priority areas for prevention measures.** Alcohol consumption data play a key role in identifying opportunities and determining strategies for cancer prevention by allowing health professionals and policy-makers to focus their efforts on specific groups that tend to consume more alcohol.
 - Because the prevalence of consuming alcohol in excess of the cancer prevention recommendations is highest among Ontario adults aged 19–29, young adults are increasing their risk of getting cancer in the future, given that the cancer-related effects of excess drinking may not materialize until at least 10 years later.
 - The proportion of the population that exceeds the cancer prevention recommendations for alcohol consumption varies substantially across geographic regions in Ontario.
 - Ontarians who drink in excess of the cancer prevention recommendations are more likely to smoke. This small but important subgroup of the population has a higher risk for some cancers due to the synergistic interaction between tobacco smoking and alcohol consumption. Comprehensive prevention initiatives could be developed to address both risk factors.



- The prevalence of exceeding the cancer prevention recommendations for alcohol consumption varies significantly across several socio-demographic factors, often in different ways than tobacco use. While smoking is more common in lower income groups, drinking alcohol in excess of cancer prevention recommendations is more common in higher income groups, who may be unaware of this aspect of cancer risk.
- Cancer Care Ontario's *Aboriginal Cancer Strategy II (ACS II)* has a plan for addressing risk and preventing cancers caused by many factors, including alcohol, in Ontario's First Nations, Inuit and Métis (FNIM) populations.
- **Monitoring the impact of policy changes.** Evidence supports a number of public policy measures for decreasing alcohol consumption, including reducing population density of outlets and restricting days and hours of sale.⁵ Increasing the price of alcohol is also a highly cost-effective way to reduce alcohol-attributable cancer risk, as well as other alcohol-related harms.⁶ Time trends in the kinds of alcohol consumption data shown in this report, in conjunction with sales information, can help assess the impact of these and other relevant policies.



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ABOUT THIS REPORT



- We hope that this report, with its focus on alcohol as it relates to cancer, will supplement other reports on alcohol consumption in Ontario, and serve as a resource for public health and health professionals, policy-makers and planners involved in both cancer control and alcohol control in the province.
- *Cancer Risk Factors in Ontario: Alcohol* presents the distribution of alcohol consumption in Ontario and features:
 - alcohol-associated cancer risk in the population
 - alcohol consumption behaviours reported according to Local Health Integration Networks and public health units
 - socio-demographic differences in alcohol consumption behaviours
 - the combined prevalence of smoking and alcohol consumption
 - alcohol consumption behaviours in off-reserve Aboriginal populations in Ontario
- This report is the third in Cancer Care Ontario's Cancer Risk Factors in Ontario series. The first report of the series, *Cancer Risk Factors in Ontario: Evidence Summary*, summarized the epidemiologic evidence for a wide range of cancer risk factors, including alcohol. The second report provided information on the prevalence and distribution of tobacco use and cessation in Ontario, as it relates to cancer, and smoking-related cancer risk in the population.
- The primary source of data for this report is the Canadian Community Health Survey (CCHS), Ontario Share files (full survey waves 2000/01, 2003 and 2005 and half-survey annual waves 2007–2012). The CCHS is a national cross-sectional survey conducted by Statistics Canada, with a large sample size considered representative of 98% of the Canadian population aged 12 years and older (individuals who are homeless, residents of First Nations reserves and other Aboriginal settlements, institutional residents, full-time members of the Canadian Forces and residents of certain remote regions are excluded).
- Studies suggest that incidence rates of some alcohol-related cancers, such as colorectal cancer, have increased rapidly over time within Ontario's Aboriginal populations.⁷ Cancer Care Ontario's *Aboriginal Cancer Strategy II (ACS II)* outlines a plan for addressing risk and preventing cancer in Ontario's First Nations, Inuit and Métis (FNIM) communities. The special section in this report on alcohol consumption in off-reserve Aboriginal Peoples provides valuable information that can be used to support cancer control initiatives specific to FNIM populations.
- Data tables for the figures in this report are available online, along with slides for presentation. Methods and indicator definitions are included in the appendices.



1. CONTEXT

1.1 WHY IS ALCOHOL CONTROL IMPORTANT FOR CANCER AND CHRONIC DISEASE PREVENTION?

- Drinking alcoholic beverages is a major preventable cause of morbidity and mortality. Alcohol consumption has a causal impact on a number of chronic and acute disease outcomes, including cancer, alcohol use disorders and depressive disorders, preterm birth complications and fetal alcohol syndrome, and intentional and unintentional injuries. Heavy alcohol consumption is also causally associated with ischaemic heart disease, ischaemic stroke and diabetes mellitus.⁸
- Alcoholic beverages, such as beer, wine and spirits, have been designated as carcinogenic to humans by the International Agency for Research on Cancer (IARC) in its “Group 1” category, meaning there is sufficient evidence of carcinogenicity in humans. Epidemiologic evidence shows that drinking alcoholic beverages increases the risk of cancers of the oral cavity and pharynx, esophagus (primarily squamous cell carcinoma), larynx and liver. It is also a cause of colorectal and breast cancers, two of the three leading causes of cancer death in Ontario. Pancreatic cancer may also be caused by alcohol consumption, although more research is needed to confirm this association.²
- **There is no clear “safe limit” of alcohol intake to prevent an increased risk of cancer.**¹ Even small amounts of alcohol have been shown to increase the risk of some cancers. The relative risk of oral and pharyngeal cancers, for example, is increased by 21% for those consuming one drink* or less per day compared to non-drinkers, and the risk of these cancers increases with the amount consumed.⁹ Similarly, the relative risk of female breast cancer is increased by 7%–10% with every 10 g/day increase in alcohol consumption.^{1,10,11} Heavy alcohol drinkers (intake of four or more drinks per day) are at a substantially increased risk of cancer.^{9,10,12–15}
- All types of alcoholic beverages increase the risk of cancer, suggesting that the increased risk is due to ethanol, a human carcinogen.² Several aspects of alcohol-related cancer risk remain unclear, including whether and how cancer risk is affected by patterns of alcohol consumption (e.g., binge drinking) as opposed to the amount of alcohol consumed, the number of years after initiating drinking when the impact on risk becomes the greatest, and whether the potential for alcohol-related cell damage is higher at certain ages.¹⁶
- Alcohol may increase cancer risk in several ways,¹⁷ including:
 - reactive metabolites of alcohol, such as acetaldehyde, may be carcinogenic and able to damage human DNA
 - alcohol may act as a solvent that allows other carcinogens to penetrate cells more easily and cause genetic damage
 - the production of potentially damaging free radical oxygen through the metabolism of alcohol may mediate its effects

*In Canada, one standard alcoholic drink contains 13.6 g of alcohol—a 341 ml (12 oz) bottle of 5% beer, 142 ml (5 oz) glass of wine, or a 43 ml (1.5 oz) shot of distilled liquor.



- alcohol increases the production of estrogen, which can increase the risk of some cancers, such as breast
- the diets of people who are heavy alcohol drinkers may be lacking essential nutrients, which may make body tissues more susceptible to carcinogenesis
- The effect of cessation of alcohol consumption on cancer risk has not been studied extensively for all associated cancer types. Recent meta-analyses suggest, however, that the risk of cancers of the head and neck,¹⁸ the esophagus^{18,19} and the larynx²⁰ is significantly reduced after cessation, although risk appears to remain elevated above that of never-drinkers for many years after cessation (15 to more than 20 years).

1.2 SYNERGISM BETWEEN ALCOHOL CONSUMPTION AND TOBACCO SMOKING

- For some cancers, particularly those of the oral cavity, pharynx, larynx and esophagus (squamous cell carcinoma),^{2,3} there is a synergistic interaction between tobacco smoking and alcohol consumption, whereby the risk for these cancers among people who both drink alcohol and smoke tobacco is much greater than among people who only smoke or drink.
- In general, the risk of cancers of the oral cavity, pharynx, larynx and esophagus is much higher among people who are both heavy drinkers and heavy smokers than among people who do not drink or smoke.

1.3 GUIDELINES AND RECOMMENDATIONS FOR ALCOHOL CONSUMPTION

At an individual level, guidelines and recommendations for alcohol consumption patterns have been developed to minimize the potential short- and long-term harms of alcohol. These include an internationally developed cancer prevention recommendation and Canada's low-risk alcohol drinking guidelines:

- **Maximum alcohol recommendations for cancer prevention.** Although in 2007 the World Cancer Research Fund and the American Institute for Cancer Research developed the maximum recommended intake of alcohol to prevent an increased risk of cancer, these organizations acknowledge that there is **no established "safe limit"** to prevent an increased risk of cancer. Their recommendations were developed to take into account that light to moderate alcohol consumption can protect against cardiovascular disease.

The World Cancer Research Fund/American Institute for Cancer Research recommendation is specific to cancer and used by the Canadian Partnership Against Cancer and Cancer Care Ontario:

- "If alcoholic beverages are consumed, limit consumption to no more than two drinks per day for men and one drink per day for women."¹

The Canadian Cancer Society recommendations are slightly more conservative, using the wording "less than" instead of "no more than" to reflect the current evidence that there is



no known safe level of alcohol consumption for cancer prevention and that the less alcohol consumed, the lower the risk of cancer.²¹

- **Canada's Low-Risk Alcohol Drinking Guidelines.** Published by the Canadian Centre on Substance Abuse, *Canada's Low-Risk Alcohol Drinking Guidelines* aim to provide consistent information to Canadians, allowing them to moderate their alcohol consumption and reduce short- and long-term alcohol-related harm. These guidelines have support from federal, provincial and territorial health ministers, as well as several public health organizations. The low-risk guidelines pertain to a broad group of health effects and the alcohol amounts specified in them are higher than those in recommendations for cancer prevention:^{22,23}
 - Reduce long-term health risks by drinking no more than 10 drinks* per week, with no more than two drinks per day on most days, for women and no more than 15 drinks per week, with no more than three drinks per day on most days, for men.
 - Reduce your risk of injury and harm by drinking no more than three drinks (for women) and four drinks (for men) on any one day. Stay within the weekly limits outlined above.
 - The remaining three guidelines address drinking by youth and situations when drinking should be avoided, such as during pregnancy.

As part of their Low-Risk Drinking Guidelines Topic Summaries series, the Canadian Centre for Substance Abuse recently released *Cancer & Alcohol*, which promotes the Canadian Cancer Society alcohol consumption recommendation for cancer risk reduction and acknowledges that alcohol amounts in their cancer prevention guidelines are lower than those in *Canada's Low-Risk Alcohol Drinking Guidelines*.

Throughout this report, alcohol consumption is measured in relation to the alcohol recommendations for cancer prevention specified by the World Cancer Research Fund/American Institute for Cancer Research, calculated based on the amount of alcohol consumed daily averaged over one week. This is in line with alcohol consumption measurement by the Canadian Partnership Against Cancer.²⁴

*In these guidelines and throughout Canada, one standard alcoholic drink contains 13.6 g of alcohol – a 341 ml (12 oz) bottle of 5% beer, 142 ml (5 oz) glass of wine, or a 43 ml (1.5 oz) shot of distilled liquor.



1.4 ALCOHOL CONTROL IN ONTARIO

Several system-level policies exist or are recommended in Ontario to control the sale and consumption of alcohol:

- Through the Liquor Control Board of Ontario (LCBO), a Crown corporation of the Ontario government, there is a partial government monopoly over off-premise sale of alcohol. In addition to the publicly owned LCBO retail outlets, alcohol is sold through the Beer Store network and the Ontario winery stores, which are privately run by Ontario's brewers and vintners, respectively.
- The physical availability of alcohol is regulated through provincial restrictions on hours of sale. Ontario has a lower population density of on- and off-premise alcohol outlets than most other Canadian provinces; survey data show, however, that over 75% of Ontarians live within a 10-minute commute of an alcohol retail outlet.²⁵ The Ontario government recently announced plans to expand the number of LCBO outlets in the province to 672 locations by the end of 2015/16, which is up from 638 locations at the end of 2012/13,²⁶ and to open LCBO express outlets within large grocery stores.²⁷
- *Taking Action to Prevent Chronic Disease: Recommendations for a Healthier Ontario*, prepared by Cancer Care Ontario and Public Health Ontario, includes four population-level recommendations for preventing chronic disease in Ontario that are specific to alcohol consumption:²⁸
 - Maintain and reinforce socially responsible pricing.
 - Ensure effective controls on alcohol availability.
 - Strengthen targeted controls on alcohol marketing and promotion.
 - Increase access to brief counselling interventions.