Alcohol Consumption in Halton

The Regional Municipality of Halton

January 2017

Halton
REGION

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Purpose of this report

The purpose of this report is to provide an overview of alcohol consumption patterns in Halton, and to identify populations that are more likely to engage in risky drinking behaviours. Risky drinking refers to consuming alcohol at levels that may put that person or others at risk for health or social problems.

Halton compares favourably to Ontario across many health indicators, such as physical activity, life expectancy, and teen pregnancy.[1] However, alcohol consumption is one of the few health indicators where Halton rates are less favourable than the provincial average.

Alcohol consumption at any level can carry some degree of health risk.[2] It is important to identify groups within the population who are drinking and at what level.

With this information, we can inform public health programs, services, and influence policies that seek to reduce risky drinking behaviour.

Data sources and methods

While reading this report, it is important to consider where the data came from, the quality of the data, statistical significance, the methods, and limitations.

Sources of Data

This report used data from two different sources: the Canadian Community Health Survey (CCHS) and the Halton Youth Survey (HYS).

The **CCHS** is a voluntary, cross-sectional survey of Canadian residents conducted by Statistics Canada.[3] It collects information on health status, healthcare use, and health determinants across Canada. The survey collects data on residents aged 12 and over. The CCHS was the primary source of information for this report, however, HYS data were utilized for the section of the report on youth and alcohol consumption.

The **HYS** is a survey of over 10,000 grade seven and ten students from the Halton District School Board and the Halton Catholic District School Board. The HYS is intended to collect information related to healthy youth development such as connections to family, school and peers, as well as participation in risky behaviours.[4]

Limitations

CCHS data are collected at a national level in two year cycles. Despite the survey's large sample size (approximately 120,000 observations every two years for Canada), a single CCHS cycle may not provide a sufficient sample size for certain analyses at the health unit level. This paper focuses on priority populations based on relatively

specific socio-demographic and health characteristics. For the purposes of this report, a single CCHS cycle did not yield enough observations; therefore, cycles from 2009/10, 2011/12 and 2013/14 were combined. This provided a sample of 106,886 and 3,489 respondents aged 20+ from Ontario and Halton, respectively.

While combining CCHS cycles yields larger sample sizes and resulting estimates are more precise than those from a single cycle, it cannot be assumed that these estimates represent Halton or Ontario populations. Individuals living on Indian Reserves and Crown lands; residents of institutions; full-time members of the Canadian Armed Forces; and residents of certain remote areas were excluded.

The CCHS has evolved over time and changes in content, coverage, and geography must be considered when interpreting results. A limitation to this report were changes in the wording of ALC_3, which was a variable used to derive the heavy drinking and LRADG indicators. Prior to 2013, ALC_3 asked all respondents (male and female) how often they had consumed five or more drinks on one occasion in the last 12 months. In 2013, this question was revised to ask females about consuming four or more drinks to correspond with the new Low-Risk Alcohol Drinking Guidelines. There was no significant difference in the percentage of females who reported consuming four or five or more drinks on one occasion before and after this change (36% in 2011/12 and 37% in 2013/14), however caution should be taken when comparing differences by sex for these indicators.

For more information on the CCHS, see the Halton [Data Notes: Canadian Community Health Survey (CCHS)](#) or visit the Statistics Canada website at [www.statcan.gc.ca/.cchs](#).

A limitation associated with both datasets is that the data are self-reported. Individuals may not have recalled information accurately and this may effect survey results. In addition, the perception of social approval or disapproval by respondents may have affected their responses to questions.

Other data notes

For comparisons with Ontario, overlapping 95% confidence intervals (CIs) were used to determine statistical significance. Coefficients of variation (CVs) were used to determine if estimates were reportable.

Statistics Canada bootstrap weights were used to account for the complex sampling design of the survey. See the [Halton Health Statistics Data Interpretation Guide](#) for more information on CIs and CVs.

All CCHS data presented include adults aged 20 and over as the majority of alcohol consumption questions used for the indicators in this report ask about drinking behaviours in the past 12 months. Therefore, all drinking experiences considered by respondents should have occurred when they were over the legal drinking age (19 + years).

Respondents who answered don't know or refused were excluded from analysis. Estimates marked with an asterisk (*) should be interpreted with caution due to high variability. Estimates marked with a double asterisk (**) are not reportable.
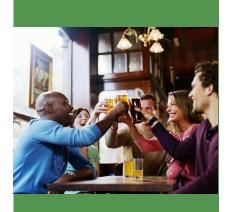
Background

Alcohol consumption is a socially acceptable part of life for many people, and nearly 80% of Canadians aged 15 and over drink.[2] Alcohol is often served at festivals, sporting events and parties, and is used to celebrate milestones and achievements. Alcohol is used to promote relaxation and increase the pleasure of eating by pairing alcoholic beverages with certain foods.[5] However, alcohol is also associated with a wide range of harms such as injuries and violence, and the development of many chronic diseases and cancers.[2,6]

Limiting alcohol consumption is part of a healthy lifestyle. However, the environments in which we live, learn, work, and play have a significant impact on alcohol consumption rates. In Canada, alcohol is widely available and promoted. For example, Canadians are exposed to alcohol messages and images through advertising and marketing of alcohol beverages on TV, in movies, literature, and through alcohol retail outlets in our community.[2] We are also exposed to alcohol through our social networks, at gatherings and through social media.[2]

Changing social norms related to alcohol consumption is difficult. However, policies that address limiting the availability and marketing of alcohol can be an effective way to reduce alcohol consumption and the associated negative health effects.

Canada's Low-Risk Alcohol Drinking Guidelines

What is "a drink"?

Throughout this report, the term "a drink" refers to:[7]

- 341 ml (12 oz.) of beer, cider, or cooler (5% alcohol content)

- 142 ml (5 oz) of wine (12% alcohol content)

- 43 ml (1.5 oz) of distilled alcohol, such as rye, gin, rum etc. (40% alcohol content)

The Canadian Low-Risk Alcohol Drinking Guidelines are a set of guidelines from the Canadian Centre on Substance Abuse to provide Canadians with information to moderate alcohol consumption and reduce alcohol related harm.[7,8]

The first two guidelines related to frequency and quantity of alcohol consumption, while the last three guidelines related to populations or situations where alcohol should be avoided.[7,8]

The guidelines are summarized below:[7]

Guideline 1

Reduce long-term health risks by drinking no more than:

- 10 drinks per week for women, with no more than 2 drinks per day most days

- 15 drinks per week for men, with no more than 3 drinks per day most days.

Plan non-drinking days every week to avoid developing a habit.

Guideline 2

Reduce the risk of injury and harm by drinking no more than 3 drinks for women and 4 drinks for men on any single occasion.

Guideline 3

Do not drink when:

- driving a vehicle or using machinery and tools;

- taking medicine or other drugs that interact with alcohol;

- doing any kind of dangerous physical activity;

- living with mental or physical health problems;

- living with alcohol dependence;

- pregnant or planning to be pregnant;

- responsible for the safety of others;

- making important decisions.

Guideline 4

The safest choice for women who are pregnant, planning to become pregnant or before breastfeeding is to drink no alcohol at all.

Guideline 5

Children or youth should delay drinking until late teens, as alcohol can harm the way the brain and body develops.
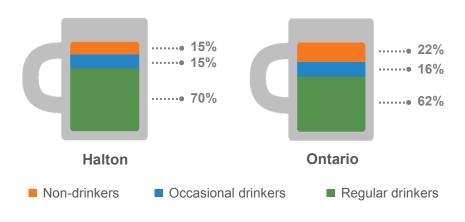
Alcohol use in Halton

An overview

This section provides an overview of alcohol use in Halton compared to Ontario based on data from the Canadian Community Health Survey (CCHS). Overall, alcohol use in Halton is similar to or higher than in Ontario.

Type of Drinker

The proportion of respondents who were non-drinkers (no drink in the past year), occasional drinkers (drank less than once per month in the past year, and regular drinkers (drank once per month or more in the past year).

Halton
- 15%
- 15%
- 70%

Ontario
- 22%
- 16%
- 62%

- ■ Non-drinkers
- ■ Occasional drinkers
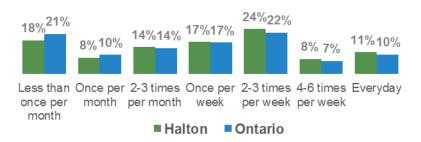- ■ Regular drinkers

> Compared to Ontario residents, Halton residents were more likely to be regular drinkers, and less likely to be non-drinkers. These differences were statistically significant. There was no significant difference in the percentage of occasional drinkers in Halton and Ontario.

Frequency of drinking

How often the respondent had a drink in the past 12 months (of those that were drinkers).

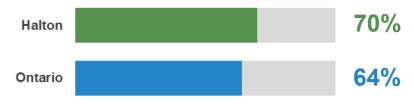|	Halton	Ontario
Less than once per month	18%	21%
Once per month	8%	10%
2-3 times per month	14%	14%
Once per week	17%	17%
2-3 times per week	24%	22%
4-6 times per week	8%	7%
Everyday	11%	10%

■ Halton ■ Ontario

> Ontario residents were significantly more likely than Halton residents to have only had an alcoholic beverage less than once per month in the past year. There were no other statistically significant differences in the frequency of drinking in Halton and Ontario.

Drank in the past week

The proportion of respondents who had a drink in the past week.

- Halton **70%**
- Ontario **64%**

> Compared to Ontario residents, Halton residents were significantly more likely to have had an alcoholic beverage in the past week.

Risky alcohol use in Halton

Risky drinking behaviours were assessed using core indicators developed by the Association of Public Health Epidemiologists of Ontario (APHEO). These core indicators are a set of definitions used by public health professionals across Ontario.[9] The two indicators used to assess risky drinking were exceeding the Low Risk Alcohol Drinking Guidelines (guidelines one and two)[7] and heavy drinking. Overall, risky alcohol use in Halton was similar to or greater than Ontario as a whole, according to CCHS data.
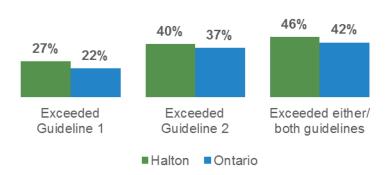
Exceeding the Low-risk Alcohol Drinking Guidelines

The proportion of respondents who exceeded the following Low-Risk Alcohol Drinking Guidelines:

- **Guideline 1** (no more than three drinks per day and 15 drinks per week for males, and no more than two drinks per day and 10 drinks per week for females); and/or

- **Guideline 2** (no more than four drinks for males or three drinks for females on any one occasion in the past year).

Please note that for the remainder of this report, "exceeding the LRADG" refers specifically to exceeding Guidelines 1 and 2.

	Halton	Ontario
Exceeded Guideline 1	27%	22%
Exceeded Guideline 2	40%	37%
Exceeded either/both guidelines	46%	42%

Compared to Ontario, Halton residents were more likely to report exceeding Guideline 1, Guideline 2, and either/both guidelines. These differences were all statistically significant. There was no significant difference in the percentage of residents in Halton and Ontario who reported exceeding Guideline 2.

Heavy drinking

The proportion of respondents who consumed five or more drinks for men, and four or more drinks for women on at least one occasion per month in the past 12 months.

Halton	20%
Ontario	17%

Compared to Ontario residents, Halton residents were more likely to report drinking heavily in the past year. This difference was statistically significant.

Priority populations

Limiting or reducing alcohol consumption is a lifestyle choice that contributes to good health and well-being. However, lifestyle choices are influenced by the environments where we live, learn, work and play. More specifically, there are several interrelated factors that influence patterns of alcohol consumption. These include:

- **individual characteristics** such as age and sex;
- **socioeconomic factors** such as income and education;
- and **environmental conditions** such as access to alcohol, exposure to alcohol messaging, and social norms surrounding alcohol use.

When these factors are considered, it becomes apparent that patterns of alcohol consumption are not the same across the population. Within the population, there are subgroups that are more likely to engage in risky drinking behaviours, or are more likely to experience negative health consequences as a result of alcohol consumption (such as youth and pregnant women).

For the purposes of this report, socio-demographic characteristics, such as sex, age, income, and marital status, were used to identify priority populations.

Why priority populations?

Identifying groups of people that are more likely to engage in risky drinking behaviours, or who are at a higher risk of negative health effects due to alcohol consumption, can be used to inform public health interventions. This information can help to optimize the allocation of resources and to support policies that help to reduce alcohol consumption.

What priority populations were identified?

Data from the Canadian Community Health Survey were used to determine what individual and socio-demographic characteristics were associated with exceeding the first and or/second of the guidelines outlined in the Low Risk Alcohol Drinking Guidelines (LRADG) (see page 5), and heavy drinking using multivariate logistic regression. The characteristics selected for the analyses were based on the literature and data availability; and included age, sex, household income, education, urban versus rural residence, marital status and immigrant status.

Multivariate logistic regression modeling was necessary to account for the fact that many of these factors may be related to one another. By incorporating multiple variables into the model, it is possible to control for these relationships and more accurately determine which factors are associated with risky alcohol consumption.

Based on the results of the logistic regression analyses, significant differences in risky drinking behaviours were found by sex, age, marital status, immigrant status, and income. The following groups were identified as priority populations due to statistically significantly higher rates of risky drinking:

- males;
- younger adults;
- Canadian born residents;
- young singles (based on the LRADG);
- divorced/separated/widowed residents (based on heavy drinking); and
- high income adults.

Two additional priority populations were identified because these groups are more likely to experience negative health effects as a result of alcohol consumption, as outlined in the fourth and fifth LRADG guidelines. These populations included:

- women who are pregnant or planning to be pregnant; and
- Youth (underage drinking).

Sex

Worldwide, alcohol consumption and risky drinking tends to be more prevalent among males compared to females.[10-12] The reasons for this difference are not well understood, but are likely related to a combination of biological differences in the response to alcohol between males and females, as well as social and cultural norms.[10]

The consequences of alcohol use may be different for males and females.[11] Males and females metabolize alcohol differently due to a variety of factors, including differences in body size and composition.[11] As a result, females typically become intoxicated from smaller quantities of alcohol compared to males.[11] Research also suggests that females may be more prone than males to certain negative consequences of alcohol use, including liver damage, heart disease, and vulnerability to sexual assault.[11]
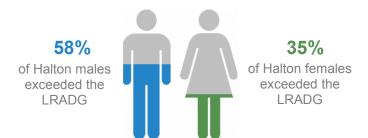
Males, however, are more likely to drink excessively and as a result experience higher rates of alcohol related deaths and hospitalizations, are more likely to be involved in a motor vehicle collision due to driving while intoxicated, and are more likely to experience violence compared to females.[12] Alcohol use disorders, such as alcohol dependence, are also more common among males.[12]

These differences by sex need to be considered when planning appropriate health interventions to protect and maximize population health.
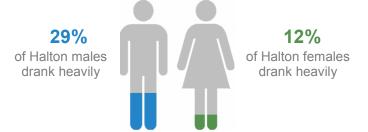
At a glance

Exceeding the low-risk alcohol drinking guidelines

Halton males were significantly more likely than females to exceed the LRADG.

58%
of Halton males exceeded the LRADG

35%
of Halton females exceeded the LRADG

Heavy drinking

A similar relationship was observed for heavy drinking. Males were significantly more likely to drink heavily than females.

29%
of Halton males drank heavily

12%
of Halton females drank heavily

> ! When controlling for a number of other demographic characteristics, Halton males were still significantly more likely to exceed the LRADG and drink heavily compared to females (**See Appendix**).

Age

Research has shown that among adults in North America, alcohol consumption generally decreases with age.[2,13,14] Changes in drinking habits may be related to a variety of health and lifestyle changes throughout the life course, including negative consequences of drinking (e.g. hangovers), increasing social responsibilities (e.g. employment or parenting), and the effects of alcohol on various medical conditions and/or interactions with medications that are more commonly used by older adults.[14,15]

Research also shows that dangerous drinking behaviours are most common among young adults aged 20-29 years.[2] This is a concern because young people's brains are still developing and may be at greater risk than mature adults of lasting brain damage from heavy alcohol consumption.[16]

Young adulthood is a time of change and subsequent exploration, as this is the age many young people move out of their family homes and in with peers. Young adults may view alcohol consumption as a social norm and drinking heavily and its consequences as a 'rite of passage'.[16] Moving out of their family home is a transition that may induce stress, frustration, and a desire to belong with peers, which may lead to unhealthy behaviours such as increased alcohol consumption.

These circumstances may explain the increased levels of drinking observed in young adults and the decline as age increases. These circumstances must be considered to maximize impact of public health policies and programming aimed at alcohol consumption among young adults.

In Halton, this drinking pattern remains true. Younger adults were more likely to exceed the LRADG and drink heavily according to CCHS data.

At a glance

Exceeding the low-risk alcohol drinking guidelines

As age increased, the percentage of Halton adults who exceeded the LRADG decreased (Figure 1).
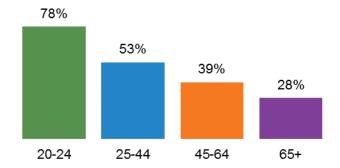

Figure 1: Percentage of Halton adults aged 20+ who exceeded the LRADG, by age, 2009-2014 combined

While exceeding the LRADG decreased as age increased regardless of marital status, the rate of decline with age differed by martial status (see the Marital Status section of this report).

Heavy drinking

A similar relationship was observed for heavy drinking. As age increased, the percentage of Halton adults who drank heavily decreased significantly (Figure 2).
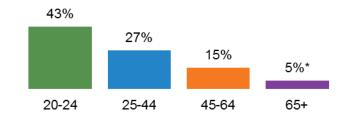

Figure 2: Percentage of Halton adults aged 20+ who drank heavily, by age, 2009-2014 combined

! When controlling for a number of other demographic characteristics, age was still a significant factor on likelihood to exceed the LRADG and drink heavily (**See Appendix**).

Immigrant status

In general, when new immigrants arrive in Canada, they tend to be healthier than the average Canadian-born citizen.[17] This may be due to a number of factors, including healthier lifestyles prior to immigrating, healthier and wealthier people being more likely to immigrate, as well as medical screening to qualify for immigration to Canada.[18] This phenomenon is known as the "Healthy Immigrant Effect". Over time, however, this health advantage tends to diminish to levels similar to Canadian born residents.[17] This is likely due to a combination of environmental and behavioral changes as immigrants become immersed in Canada's culture and environment.

In Halton, there appears to be a relationship between immigration status and risky drinking behaviours. When looking at CCHS data, Canadian-born Halton residents are more likely than immigrants to exceed the LRADG and engage in heavy drinking. When looking at length of time that immigrants have spent in Canada, recent immigrants (those who immigrated within the last 10 years) report the least risky drinking behaviours, while long-term immigrants (those who immigrated over 10 years ago) report drinking habits closer to that of Canadian-born Halton residents.

At a glance

Exceeding the low-risk alcohol drinking guidelines

Canadian born residents were significantly more likely than long-term and recent immigrants to exceed the LRADG (Figure 3). Long-term immigrants were also more likely to exceed the LRADG than recent immigrants, however this difference was not statistically significant.
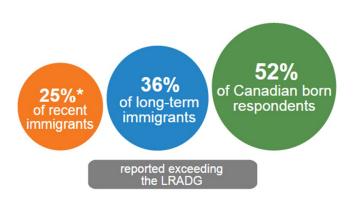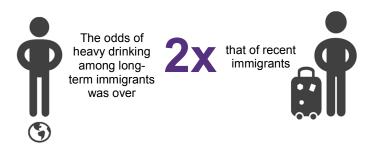

Figure 3: Percentage of Halton adults aged 20+ who exceeded the LRADG, by immigrant status, 2009-2014 combined

Heavy drinking

Long-term immigrants had significantly higher odds of heavy drinking compared to recent immigrants. Canadian born residents had even higher odds of heavy drinking compared to recent immigrants, and this difference was also statistically significant.

The odds of heavy drinking among long-term immigrants was over **2x** that of recent immigrants

The odds of heavy drinking among Canadian born residents was over **5x** that of recent immigrants

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! When controlling for a number of other demographic characteristics, Halton residents born in Canada were still significantly more likely to exceed the LRADG and drink heavily compared to immigrants (**See Appendix**).

Marital status

Research has shown that alcohol consumption patterns tend to vary by marital status, with heavier consumption and more risky drinking levels among single and divorced individuals.[19] Major life changes may play a role in shifting someone's drinking habits. Excess alcohol consumption among single people could be because heavy drinkers may be less likely to marry, or marriage may be accompanied by a decrease in alcohol consumption.[20] Also, changes to relationships, such as a divorce or separation, may have a negative impact on mental health and lead to increased alcohol consumption.[21]

In Halton, divorced/widowed/separated individuals were more likely than married/common-law individuals to engage in heavy drinking. The relationship between marital status and exceeding the LRADG in Halton was more complicated: among younger adults, those who were single were more likely than those who were married or common-law to exceed the LRADG. However, among older adults, those who were married or common-law were more likely to exceed the LRADG than those who were single.

At a glance

Exceeding the low-risk alcohol drinking guidelines

Looking at marital status and age together, single residents aged 20-24 were the most likely to exceed the LRADG (Figure 4). As age increased, the percentage of single residents who exceed the LRADG decreased sharply and single residents became the least likely to exceed the LRADG.
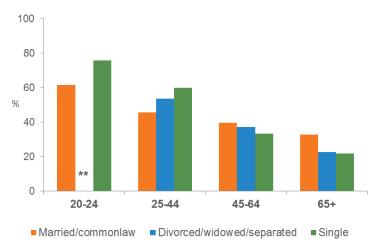

Figure 4: Percentage of Halton adults aged 20+ who exceeded the LRADG, by marital status and age, 2009-2014 combined

The key point to take away from Figure 4 is that for single residents, we see a steep decline in exceeding the LRADG with age.

Heavy drinking

The odds of a divorced/widowed/separated resident reporting drinking heavily was over two times that of a married/common-law resident, and this difference was statistically significant.

The odds of heavy drinking among divorced/ widowed/ separated residents was over **2x** that of married/ common-law residents

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! After controlling for a number of other demographic characteristics, as age increased, the odds of exceeding the LRADG decreased. This decrease was most pronounced among single adults. Divorced/widowed/separated residents were more likely than married/common-law to report drinking heavily. (**See Appendix**).

Income

Income may be an important factor in predicting alcohol consumption.[22] Research shows that lower-income individuals are at a higher risk of engaging in dangerous drinking behaviours, while higher income is associated with a higher frequency of light drinking.[22] Greater frequencies of consumption among higher income individuals may be due to: having more disposable income to purchase alcohol; social norms supportive of drinking among middle and higher income social groups; and drinking in social and job-related networking situations.[22]

Although low-income individuals may not report the highest rates of risky drinking behaviours, low income individuals may be more prone to alcohol related harms, as low income populations may have higher rates of other health issues (e.g. obesity) that could increase an individual's vulnerability to alcohol related health problems.

In Halton, higher income was associated with an increased likelihood of both exceeding the LRADG and drinking heavily.

At a glance

Exceeding the low-risk alcohol drinking guidelines

As income increased, the likelihood of Halton adults exceeding the LRADG also increased (Figure 5). This difference was statistically significant when comparing low and high income adults.

Heavy drinking

A similar relationship was observed for heavy drinking. As income increased, the likelihood of Halton adults drinking heavily also increased. This difference was statistically significant when comparing low and high income adults (Figure 6).
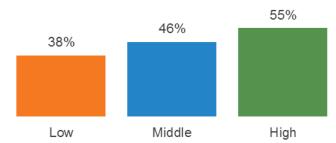

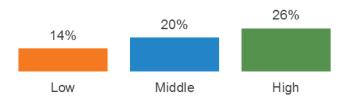Figure 5: Percentage of Halton adults aged 20+ who exceeded the LRADG, by income, 2009-2014 combined

Figure 6: Percentage of Halton adults aged 20+ who drank heavily, by income, 2009-2014 combined

Definition

Income groups are determined by identifying the adjusted household income for each respondent. The adjusted household income reflects the fact that as number of family members increase, so do the needs of the household. These adjusted household incomes are then adjusted in 10 equal deciles, and categorized into 3 income groups: low (decile 1-3), middle (decile 4-7) and high (decile 8-10).
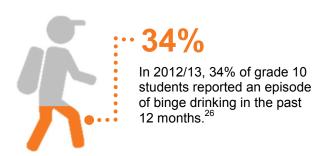
! When controlling for a number of other demographic characteristics, higher-income adults were still significantly more likely to exceed the LRADG and drink heavily (**See Appendix**).

Youth

Adolescence is a pivotal development stage when underage drinking could result in negative life trajectories.[23] A complex web of family, peer, community, societal and cultural factors all influence opportunity to maximize healthy choices among youth, including underage drinking.[24] Research has shown that underage drinking is associated with a greater risk of sexual health related issues, relationship issues with parents and friends, physical violence, injury, alcohol poisoning and even death.[16,25]

Based on data from the Halton Youth Survey (HYS), in 2012/13 34% of grade 10 students reported an episode of binge drinking in the past 12 months.[26] There has been a slight decline in the reported prevalence of binge drinking among grade 10 students since 2006 (46%).[26] The HYS also found an association between high-risk behaviour like binge drinking and Developmental Assets® necessary for children to succeed.[26] Students with more Developmental Assets® were less likely to engage in patterns of high-risk behaviour like binge drinking.[26] Therefore, Developmental Assets® such as family support and communication, caring school climates, positive peer influence, and school engagement should be considered when considering policies and programs aimed at reducing risky drinking among youth.

At a glance

34%

In 2012/13, 34% of grade 10 students reported an episode of binge drinking in the past 12 months.[26]

In 2012/13, as the percentage of Halton grade ten students who reported an episode of binge drinking in the past 12 months decreased as the number of Developmental Assets® they possessed increased. These differences were statistically significant.
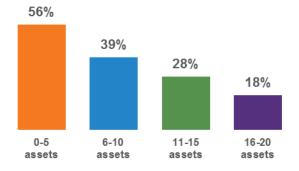
Definition

The Halton Youth Survey defines an episode of **binge drinking** as consuming five or more drinks on one occasion over the last year.

Developmental Assets® refers to the 40 Developmental Assets® for healthy youth development created by the Search Institute. These assets are "researched-based, positive qualities that influence young people's development, helping them become caring, responsible, and productive adults". The Halton Youth Survey only collected data on 20 of the 40 Developmental Assets®.[27]

Figure 7: Percentage of Halton grade 10 students who reported binge drinking, by number of Developmental Assets®, 2012/13.

Pregnant or planning to be pregnant

When consumed during pregnancy, alcohol can cause serious cognitive and physical problems in the unborn child.[28] These problems are referred to as fetal alcohol spectrum disorder (FASD).

Three out of four women in Halton of reproductive age (15-49) are regular or occasional drinkers. Alcohol can affect a fetus at any time throughout pregnancy, including early in pregnancy before many women confirm that they are pregnant.[29] The Canadian Low Risk Alcohol Drinking Guidelines recommend that:

> *"if you are pregnant or planning to become pregnant...the safest choice is to drink no alcohol at all".*[7]

Therefore, important components of FASD prevention initiatives include messaging that women who are pregnant or planning on becoming pregnant should abstain from alcohol, as well as providing access to effective forms of contraception.

The issue of alcohol exposure during pregnancy must be approached with an understanding of the possible circumstances and social environments these individuals face. More research should be done to determine these factors.

Going forward

This report provides an overview of alcohol consumption patterns in Halton and identifies populations who are more likely to engage in risky drinking behaviours. Although alcohol consumption is a personal choice, consumption patterns in the population are shaped by individual characteristics, as well the surrounding social, political, and economic environments. Information about how these environments shape alcohol consumption patterns should be used to implement public polices that help to limit exposure and alcohol availability.

In addition to delivering public health interventions and advocating for policies that aim to reduce alcohol consumption across the entire population, it is also important to deliver interventions that are tailored to reach and benefit priority populations. This approach helps to ensure that population health outcomes are improved, and health inequities related to alcohol consumption are reduced.

Appendix

Multivariate Logistic Regression

Methods

Logistic regression analysis used CCHS data and STATA statistical software. Similar to the analysis for the rest of this report, the combined dataset for 2009/10, 2011/12 and 2013/14 was used. For the logistic regression analysis, bootstrap weights supplied by Statistics Canada were used, which account for the complex sampling design of the survey. The model was built using the method outlined by Hosmer, Lemeshow and Sturdivant.[30]

Variables considered for inclusion in the regression model were age, sex, income, education, urban/rural status, immigration status, employment status and marital status. Missing data were excluded from the analysis.

Variables were considered for inclusion in the model if they had a p-value of <0.2 in the univariate analysis. Variables were kept in the final model if they were statistically significant (p-value <0.05) in a multivariate analysis, were part of a statistically significant interaction term, or if they affected other coefficients by >20% when added/removed from the model. The Wald test was used to determine statistical significance of variables in the model. The model was used to generate odds ratios and 95% confidence intervals.

Final models are provided in Table 1 (exceeding the LRADG) and Table 2 (heavy drinking).

Table 1: Association between exceeding the low-risk alcohol drinking guidelines and socio-demographic characteristics, Halton, 2009-2014 combined (Source: Canadian Community Health Survey)

Variable	Odds Ratio (95% CI)
Age (years)	**0.97 (0.96-0.98)**
Sex	
Male	**2.45 (1.85-3.24)**
Female	1.00
Income	
Low	1.00
Middle	1.03 (0.76-1.36)
High	**1.36 (1.00-1.85)**
Immigrant Status	
Canadian born	**5.13 (2.93-8.98)**
Long-term immigrant	**3.23 (1.96-5.52)**
Recent immigrant	1.00
Marital Status	
Married/common-law	1.00
Divorced/widowed/separated	1.51 (0.26-8.88)
Single	**4.5 (1.82-11.15)**
Marital Status * Age	
Married/common-law * Age	1.00
Divorced/widowed/separated * Age	0.99 (0.97-1.02)
Single * Age	**0.96 (0.94-0.98)**

Odds ratios in **bold** indicate statistically significant results.

Table 2: Association between drinking heavily and socio-demographic characteristics, Halton, 2009-2014 combined (Source: Canadian Community Health Survey)

Variable	Odds Ratio (95% CI)
Age (years)	**0.95 (0.93-0.96)**
Sex	
Male	**3.21 (2.38-4.34)**
Female	1.00
Income	
Low	1.00
Middle	1.19 (0.78-1.82)
High	**1.54 (0.99-2.38)**
Immigrant Status	
Canadian born	**5.08 (2.21-11.69)**
Long-term immigrant	**2.40 (1.06-5.43)**
Recent immigrant	1.00
Marital Status	
Married/common-law	1.00
Divorced/widowed/separated	**2.03 (1.22-3.36)**
Single	1.11 (0.67-1.83)

Odds ratios in **bold** indicate statistically significant results

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