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Cannabis Use and Risky Behaviours and Harms: A Comparison of Urban and Rural Populations in Canada

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Introduction

Cannabis is the most prevalent illicit substance used by Canadians 15 years of age and older (Health Canada, 2012a). Its use has been linked to a number of both short- and long-term health consequences, including depression, paranoia, cancer, learning problems, and memory and attention deficits (Kalant, 2004).

While several studies examined the prevalence of cannabis use by age and sex, fewer studies have examined differences in cannabis use and its related harms and behaviours between urban and rural populations. The results of these studies are mixed; some studies indicate lower cannabis use rates among rural populations compared to urban (Gfroerer, Larson, & Colliver, 2007; Martino, Ellickson, & McCaffrey, 2008), while others suggest higher rates (Coomber et al., 2011). Still others found the rates of cannabis use to be similar between urban and rural populations (Centre for Addiction and Mental Health, 2012; Cronk & Sarvela, 1997; Scheer, Borden, & Donnermeyer, 2000).

In addition to the mixed findings, the terms “urban” and “rural” are inconsistently defined among existing studies. For the purpose of this paper, we have adopted the definitions used by Statistics Canada. Statistics Canada defines urban as an area of Canada with a population of at least 1,000 and no fewer than 400 persons per square kilometer and a rural area as any area where the population does not meet the urban criteria.

The majority of existing studies were conducted in the United States and focused, primarily, on student and youth populations. To date, no study has examined differences in cannabis use and risky behaviours and harms between urban and rural populations in Canada.

This paper fills an information gap by comparing contemporary national data on the prevalence of cannabis use and related behaviours and harms between urban and rural populations in Canada. It is intended for policy makers, substance use treatment and prevention program developers, and researchers. The information included in this report can inform efforts aimed at reducing the harms associated with cannabis use, as well as related risky behaviours.

Objectives

The report’s objectives are to identify and compare between urban and rural populations in Canada:

- The lifetime, past-year and past-month prevalence of cannabis use; and
- The prevalence of harms and risky behaviours associated with cannabis use.

Three risky behaviours and harms are examined: driving after cannabis use; being a passenger of a driver who has used cannabis; and experiencing a social, legal or financial problem associated with cannabis use. These parameters were selected from an existing list used by Health Canada for the Canadian Alcohol and Drug Use Monitoring Survey (CADUMS).



Methods

This study uses data from the 2011 CADUMS, a national, general-population survey led by Health Canada that collects information on alcohol and drug use. In 2011, a random sample of 10,076 Canadians, ages 15 and older, across all 10 provinces were surveyed by telephone (Health Canada, 2012a). The response rate for the 2011 CADUMS was 45.5%.¹

All analyses for this study were conducted using PASW Statistics 18. The prevalence of lifetime, past-year and past-month use of cannabis was calculated by computing the proportion of participants who reported using cannabis in each of the respective time periods. Similarly, the prevalence of experiencing a harm or engaging in a risky behaviour was calculated by computing the proportion of participants who reported driving after cannabis use, being a passenger of a driver who used cannabis and experiencing a social, legal or financial problem, respectively. Analyses for each objective were stratified by sub-group (i.e., rural–urban, age, gender). Statistical significance was determined by assessing whether the 95% confidence intervals overlapped. Non-overlapping confidence intervals were deemed to be statistically significant.

Rural–Urban Populations

Two distinct populations were examined in this study (urban and rural) as determined by respondent postal codes. “Urban” participants were defined as individuals who reside in an area of Canada with a population of at least 1,000 and no fewer than 400 persons per square kilometre. Respondents who did not reside in an area defined as urban (i.e., all territory outside urban areas) were classified as “rural” (Statistics Canada, 2007).

Demographic Variables

Age and sex were the only demographic variables examined in this study. Respondents were categorized into three groups according to age: teen (ages 15–17), young adult (ages 18–24) and adult (ages 25 and older) to maintain consistency with other research (Gfroerer et al., 2007; Lambert, Gale, & Hartley, 2008). The sex variable consisted of male and female categories.

All analyses were stratified by location (i.e., urban and rural). Age and sex were examined as independent variables for each of the measures.

¹ For additional details concerning CADUMS, please refer to Health Canada 2012b or contact Health Canada directly.



Analysis

The following parameters were compared between urban and rural populations.

Cannabis Use

One of the objectives of this study was to determine the prevalence of cannabis use among the Canadian population. Three different prevalence rates were assessed, as listed and defined below:

- **Lifetime cannabis use** refers to the proportion of respondents who reported using cannabis at least once in their lifetime.
- **Past-year cannabis use** refers to the proportion of respondents who reported using cannabis at least once in the past 12 months.
- **Past-month cannabis use** refers to the proportion of respondents who reported using cannabis at least once in the past 30 days.

Harms and Risky Behaviours Related to Cannabis

Another objective of this study was to determine the prevalence of harms and risky behaviours associated with cannabis use among the Canadian population. The three variables assessed are listed and defined below:

- **Driving after cannabis use** refers to the proportion of respondents with a valid driver's license who had used cannabis within the last year and who reported driving a motor vehicle within two hours of using cannabis.
- **Being a passenger of a driver who has used cannabis** refers to the proportion of respondents who reported in the past year riding in a motor vehicle driven by someone who had used cannabis in the previous two hours.
- **Experiencing a social, legal or financial problem** refers to the proportion of respondents who had used cannabis in the past three-months and reported experiencing a social, legal or financial problem in the past month.



Results

This study analyzed data from 10,076 Canadian respondents ages 15 and older. Over half of the sample (51.5%) was female. The majority (83.8%) of respondents were adults (age 25+), while 10.7% were young adults (18-24) and 5.5% were teens (15-17). The majority (81.1%) of participants lived in areas classified as urban, while 18.9% of the study population lived in areas classified as rural. These findings accurately reflect the distribution of the Canadian population as reported by Statistics Canada (2011).

Cannabis Use

Lifetime: Over one-third (39.4%) of Canadians ages 15 and older reported using cannabis at least once in their lifetime in 2011. No significant differences in lifetime cannabis use were found between rural and urban respondents. However, urban males had a significantly higher lifetime prevalence of cannabis use than urban females (see Table 1).

Past-year: Approximately 9% of Canadians 15 years of age and older used cannabis in the past year. Again, no significant differences were found between rural (9.8%) and urban (9.0%) respondents. Similarly, past-year cannabis use did not differ between rural and urban respondents when stratified by age or sex (see Table 1). However, both rural and urban male respondents had a significantly higher prevalence of past-year cannabis use than their female counterparts (rural: 13.4 vs. 6.0; urban: 11.9 vs. 6.2). Urban adults also had a significantly lower prevalence of past-year cannabis use than their younger counterparts.

Past-month: The results indicate that approximately 5% of Canadians, 15 years of age and older, used cannabis at least once in the past month. Comparable prevalence rates were found between urban and rural respondents (5.3% vs. 5.9%). Owing to the small number of respondents reporting past-month use in the rural population, we were unable to examine differences between urban and rural teens and young adults. No significant difference in past-month cannabis use was found between urban and rural adults. However, urban adults had a significantly lower prevalence of past-month cannabis use than their younger counterparts. Past-month cannabis-use rates were similar for both rural and urban males and rural and urban females. However, both rural and urban males had significantly higher past-month prevalence rates of cannabis use than females.

Harms and Risky Behaviours Related to Cannabis

The second objective of this study was to compare the prevalence of harms and risky behaviours associated with cannabis use among urban and rural respondents.

The results indicate that 20% of Canadians, ages 15 and older, reported driving after cannabis use at least once in the past 12 months. Generally, no significant differences between urban and rural populations were found. We were unable to explore differences in driving after cannabis use between the geographic populations by age because of insufficient sample sizes. When we explored the prevalence of this behaviour by sex between urban and rural populations, we found that males in the rural population had a similar prevalence as males in the urban population. Due to small cell sizes we were unable to compare the prevalence of this behaviour between urban females and rural females. However our results did indicate that urban males had a significantly higher prevalence of this behaviour than urban females (26.6% vs. 9.2% respectively).

The data also showed that 5.1% of Canadians ages 15 and older rode in a vehicle driven by someone who had used cannabis in the preceding two hours in the past 12 months. The prevalence



of this behaviour did not differ significantly between urban and rural respondents (4.9% vs. 5.7%). Adults in both the urban and rural populations had a significantly lower prevalence of this risky behaviour than their younger counterparts. While there were no differences in the prevalence of this risky behaviour by sex between urban and rural respondents, rural males were found to have a significantly higher prevalence of this behaviour than rural females (9.4% vs. 2.0%).

The last analysis examined the past-month prevalence of experiencing a social, legal or financial problem related to one's cannabis use. Owing to insufficient sample sizes we were unable to report prevalence estimates for the general population or for urban and rural populations.

Table 1 Prevalence estimates of self-reported cannabis use by age, sex and population (CADUMS 2011)

	General population ages 15+ (n=10,065)	Rural (n=2,731)	Urban (n=7,334)
Lifetime cannabis use	39.4 (37.6, 41.2)	40.7 (36.8, 44.6)	39.1 (37.1, 41.1)
Teen (ages 15-17)		S	27.0 (18.0, 38.3)*
Young Adult (ages 18-24)		28.0 (16.4, 43.3)*	40.1 (32.6, 48.0)
Adult (ages ≥25)		43.1 (39.2, 47.2)	39.8 (37.7, 41.9)
Male (ages 15+)		45.5 (39.9, 51.5)	45.5 (42.4, 48.6)§
Female (ages 15+)		35.5 (30.7, 40.6)	33.2 (30.6, 35.8)
	General population ages 15+ (n=10,062)	Rural (n=2,729)	Urban (n=7,333)
Past-year cannabis use	9.1 (8.1, 10.3)	9.8 (7.7, 12.4)	9.0 (7.8, 10.3)
Teen (ages 15-17)		S	18.6 (11.2, 29.2)*
Young Adult (ages 18-24)		15.4 (7.9, 27.7)*	24.5 (18.5, 31.5)
Adult (ages ≥25)		8.7 (6.7, 11.2)	6.2 (5.3, 7.3) †
Male (ages 15+)		13.4 (10.0, 17.7)§	11.9 (10.0, 14.1)§
Female (ages 15+)		6.0 (3.9, 9.2)*	6.2 (5.0, 7.8)
	General population ages 15+ (n=10,058)	Rural (n=2,728)	Urban (n=7,330)
Past-month cannabis use	5.4 (4.6, 6.3)	5.9 (4.4, 8.0)	5.3 (4.4, 6.3)
Teen (ages 15-17)		S	12.3 (6.9, 21.0)*
Young Adult (ages 18-24)		S	14.6 (9.9, 21.0)*
Adult (ages ≥25)		5.9 (4.2, 8.2)*	3.6 (2.9, 4.3)†
Male (ages 15+)		8.8 (6.1, 12.4)*§	7.5 (6.0, 9.4)§
Female (ages 15+)		3.0 (1.7, 5.4)*	3.3 (2.4, 4.4)
* Estimate qualified owing to high sampling variability; interpret with caution. S Estimate suppressed owing to high sampling variability ♦ Indicates that the difference between rural and urban populations is statistically significant. † Indicates that the difference between age groups within respective urban and rural populations is statistically significant. § Indicates that the difference between sexes within respective urban and rural population is statistically significant.			



Table 2 Prevalence estimates for cannabis-related harms and risky behaviours by age, sex, and population (CADUMS 2011)

	General population ages 15+ (n=625)	Rural (n=171)	Urban (n=454)
Driving after cannabis use	20.5 (15.4, 26.6)	19.0 (11.5, 29.7)*	20.9 (14.9, 28.4)
Teen (ages 15-17)		S	S
Young Adult (18-24)		S	S
Adult (ages ≥25)		22.0 (13.0, 34.5)*	19.4 (13.8, 26.6)*
Male (ages 15+)		22.1 (12.9, 35.2)*	26.6 (18.4, 36.8)*§
Female (ages 15+)		S	9.2 (4.9, 16.5)*
	General population ages 15+ (n=10,076)	Rural (n=2,728)	Urban (n=7,330)
Passenger of a driver who has used cannabis	5.1 (4.3, 6.0)	5.7 (4.1, 8.0)*	4.9 (4.0, 6.0)
Teen (ages 15-17)		S	13.7 (7.4, 23.9)*
Young Adult (18-24)		16.5 (8.8, 28.8)*	16.7 (11.8, 23.0)*
Adult (ages ≥25)		4.1 (2.7, 6.3)*†	2.7 (2.2, 3.5)§
Male (ages 15+)		9.4 (6.3, 13.6)*§	6.1 (4.7, 7.7)
Female (ages 15+)		2.0 (1.0, 3.6)*	3.9 (2.8, 5.3)
<p>* Estimate qualified owing to high sampling variability; interpret with caution. S Estimate suppressed owing to high sampling variability ♦ Indicates that the difference between rural and urban populations is statistically significant. † Indicates that the difference between age groups within respective urban and rural populations is statistically significant. § Indicates that the difference between sexes within respective urban and rural population is statistically significant.</p>			



Discussion and Implications

Urban and Rural Differences

The purpose of this study was to determine whether cannabis use and related behaviours and harms differed between urban and rural populations in Canada. This study did not detect any meaningful differences between urban and rural populations with regard to cannabis use and related behaviours and harms. The conclusion applies to their respective lifetime, past-year and past-month use of cannabis, as well as their rates of risky behaviours and harms associated with cannabis use. These findings are consistent with some existing literature examining differences between urban and rural populations (Centre for Addiction and Mental Health, 2012; Cronk & Sarvela, 1997; Scheer, Borden, & Donnermeyer, 2000).

Interestingly, despite greater access to public transportation, the proportion of urban respondents who reported driving under the influence of cannabis in the past year was nearly identical to that of rural respondents. This finding can be explained by differences in how the two populations were defined. For example, if meaningful differences (i.e., lifestyle, access to public transportation, etc.) between the urban and rural populations were not captured by the definitions used to distinguish these two populations, then differences in rates of driving after cannabis use would not be captured. Alternatively, this can be explained by the setting in which the urban respondents used cannabis. For example, urban respondents who reported driving after cannabis use might have used cannabis in an area that had limited access to public transportation.

Owing to low sample sizes, we were unable to report the prevalence of experiencing a social, legal or financial harm associated with cannabis use in the past three months. This gap might be explained by respondent under-reporting or it might indicate that very few cannabis users experienced these harms in the past three months.

Gender Differences

While we did not find any meaningful differences in cannabis use and related risky behaviours and harms between urban and rural populations in Canada, we did find significant differences between males and females.

Males in both the urban and rural populations were significantly more likely to have a higher prevalence of past-year and past-month cannabis use than their respective female counterparts. Urban males also had a significantly higher prevalence of lifetime use than urban females. These findings are supported by existing research indicating that males have higher cannabis-use rates than females (Health Canada, 2011; Eaton et al., 2012).

The prevalence of driving after cannabis use was also significantly higher among urban males than urban females, a finding consistent with a 2006 study that found males are 3.6 times more likely than females to drive under the influence of cannabis (Beirness & Davis, 2006).

Lastly, both urban and rural males had a significantly higher prevalence of being a passenger of a driver who had used cannabis than both urban and rural females.

These findings suggest there is a need for future research to focus on males because of their higher prevalence of cannabis use, driving after cannabis use and being a passenger in a vehicle driven by someone who has used cannabis. Research should examine this subpopulation to determine the reasons for initial use, continued use, discontinuation of use and risky behaviours associated with



use so that this information can be used to develop effective prevention and treatment programs. Alternatively, future research could focus on females in an attempt to better understand the reasons for their lower rates of cannabis use and related risky behaviours.

General Population

The past year and past month use of cannabis among [urban] adults was significantly lower than their younger counterparts; a finding that is reflected in other studies and in national data sets (Gfroerer, Larson, & Colliver, 2007; Public Health Agency of Canada, 2011; Substance Abuse and Mental Health Services Administration, 2013). The current study also found that 20% of Canadians who possessed a valid driver's license and who also reported using cannabis in the past year drove a motor vehicle within two hours of using cannabis. This prevalence is slightly lower than a 2006 study that found that approximately one third of past-year cannabis users who possessed a valid driver's license drove within two hours of using cannabis (D. Beirness & C. G. Davis, 2006).

Limitations

All estimates are based on self-reported data and, therefore, may be underestimated as a result of under-reporting.

Furthermore, the study was limited to a crude definition of "urban" and "rural" that limited our analyses and interpretation. It is possible that the results might differ using an alternative definition.

Small sample sizes resulted in the suppression of certain outcomes and also inflated some of our confidence intervals. Future research examining differences between urban and rural populations should include a larger rural sample equivalent to the urban sample.

Lastly, it is important to recognize that the study did not include information from individuals residing in prisons, hospitals or military establishments, or from transient populations such as the homeless. Nor did the study include individuals living in any of the three Canadian territories.

Implications

Research shows that youth are more likely than adults to engage in risky substance use and also to experience greater harms from that use (Canadian Centre on Substance Abuse, 2007). Given that teens and young adults are the highest users of cannabis in Canada, efforts are needed to inform and educate them about the harms related to cannabis. Campaigns should be applicable to all Canadians, but should ensure messages are targeted towards those at highest risk, young Canadians and males.

Efforts are also needed to increase awareness about driving after cannabis use, as such behaviour can be as dangerous as driving after using alcohol (Canadian Centre on Substance Abuse, 2011).

Lastly, research examining the availability of cannabis prevention and treatment resources in Canada is limited. When it comes to general health care, Sibley and Weiner (2011) found that rural communities appear to be disadvantaged as compared to urban communities. If the same is true for cannabis prevention and treatment resources, then efforts are needed to increase such resources in rural populations given the absence of differences in cannabis use and related risky behaviours between urban and rural populations.



Conclusion

In conclusion, the study failed to detect any meaningful differences between urban and rural populations, both in terms of their cannabis use and of related harms and risky behaviours. The prevalence of cannabis use, particularly among young Canadians, is concerning given its association with cognitive deficits, mental illness and future substance use. Equally concerning is the prevalence of driving after cannabis use as this practice can be just as dangerous as driving after alcohol use. Overall, our findings validate the need to target young people, especially young males, in an effort to reduce these behaviours and their associated harms.



References

- Beirness, D., & Davis, C. G. (2006). *Driving under the influence of cannabis*. Analysis drawn from the 2004 Canadian Addiction Survey. Ottawa ON: Canadian Centre on Substance Abuse.
- Canadian Centre on Substance Abuse. (2007). *Substance abuse in Canada: Youth in focus*. Ottawa, ON: Canadian Centre on Substance Abuse.
- Canadian Centre on Substance Abuse. (2011). *Cannabis Fact Sheet*. Ottawa, ON: Canadian Centre on Substance Abuse.
- Centre for Addiction and Mental Health. (2012). Rural vs. non-rural differences in drug-related risk behaviours among high school students. *CAMH Population Studies eBulletin*, 13(1).
- Coomber, K., Toumbourou, J. W., Miller, P., Staiger, P. K., Hemphill, S. A., & Catalano, R. F. (2011). Rural adolescent alcohol, tobacco, and illicit drug use: a comparison of students in Victoria, Australia, and Washington State, United States. *Journal of Rural Health*, 27(4), 409-415.
- Cronk, C. E., & Sarvela, P. D. (1997). Alcohol, tobacco, and other drug use among rural/small town and urban youth: a secondary analysis of the monitoring the future data set.. *American Journal of Public Health*, 87(5), 760-764.
- Eaton, D. K., Kann, L., Kinchen, S., Shanklin, S., Flint, K. H., Hawkins, J., . . . Wechsler, H. (2012). Youth risk behavior surveillance - United States, 2011. *MMWR Surveillance Summaries*, 61(4), 1-162.
- Gfroerer, J. C., Larson, S. L., & Colliver, J. D. (2007). Drug use patterns and trends in rural communities. *Journal of Rural Health*, 23 Suppl, 10-15.
- Health Canada. (2011). *Supplementary Tables, Youth Smoking Survey 2010-11*. Ottawa, ON: Health Canada.
- Health Canada. (2012a). *Canadian Alcohol and Drug Use Monitoring Survey 2011*. Ottawa, ON: Health Canada.
- Health Canada. (2012b). *Canadian Alcohol and Drug Use Monitoring Survey 2011: Microdata User Guide*. Ottawa, ON: Health Canada.
- Kalant, H. (2004). Adverse effects of cannabis on health: an update of the literature since 1996. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 28(5), 849-863.
- Lambert, D., Gale, J. A., & Hartley, D. (2008). Substance abuse by youth and young adults in rural America. *Journal of Rural Health*, 24(3), 221-228.
- Martino, S. C., Ellickson, P. L., & McCaffrey, D. F. (2008). Developmental trajectories of substance use from early to late adolescence: a comparison of rural and urban youth. *Journal of Studies in Alcohol Drugs*, 69(3), 430-440.
- Public Health Agency of Canada. (2011). *The Chief Public Health Officer's Report on the State of Public Health in Canada*. Ottawa, ON: Public Health Agency of Canada.
- Scheer, S. D., Borden, L. M., & Donnermeyer, J. F. (2000). The relationship between family factors and adolescent substance use in rural, suburban, and urban settings. *Journal of Child and Family Studies*, 9(1), 105-115.
- Sibley, L. M., & Weiner, J. P. (2011). An evaluation of access to health care services along the rural-urban continuum in Canada. *BMC Health Services Research*, 11, 11-20.
- Statistics Canada. (2007). *2006 Census Dictionary*. Ottawa, ON: Statistics Canada.
- Statistics Canada. (2011). *2011 Canadian Census*. Ottawa, ON: Statistics Canada.
- Substance Abuse and Mental Health Services Administration. (2013). *Results from the 2012 National Survey on Drug Use and Health: Summary of National Findings*. NSDUH Series H-46. Rockville, MD.