

# Recreational use of prescription medications among Canadian young people: Identifying disparities

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## ABSTRACT

**OBJECTIVES:** While the recreational use of prescription medications is widely recognized as a growing public health issue, there are limited epidemiological studies on patterns of use in Canada, particularly studies identifying populations at highest risk. The objective of this study was to describe recreational prescription drug use among Canadian adolescents by age, sex, socio-economic, immigration and geographic status.

**METHODS:** Data were obtained from grade 9 and 10 students participating in the 2009/2010 cycle of the nationally representative Canadian Health Behaviour in School-aged Children study (n=10,429). Students were asked about past-year recreational use of pain relievers, stimulants and sedative/tranquilizer medications. Cross-tabulations and multi-level Poisson regression were conducted to evaluate the prevalence of use and to explore disparities.

**RESULTS:** Approximately 7% of students reported past-year recreational use of one or more prescription medication(s). Females reported 1.25 times the risk of recreational use of pain relievers as compared with males (95% confidence interval [CI]: 1.04-1.51). Students of lower socio-economic status (SES) were 2.41 times more likely to report recreational use of any type of medication (95% CI: 1.94-2.99). Recreational use of pain reliever medications was highest among rural youth living in close proximity to urban centres. Rates for all medications were similar between immigrant and non-immigrant students.

**CONCLUSIONS:** Recreational prescription drug use disproportionately affects certain subgroups of youth, including females, those of lower SES and those in some rural settings more than others. These results provide foundational data to inform preventive efforts aimed at management of the non-medical use and divergence of prescription medications.

**KEY WORDS:** Adolescence; epidemiology; substance abuse; prescription drug misuse

La traduction du résumé se trouve à la fin de l'article.

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The non-medical use of prescription medications is recognized as a pressing public health issue in Canada.<sup>1</sup> While there have been calls for research and intervention development to manage this issue,<sup>1</sup> there are limited epidemiological studies on patterns of use in Canada, particularly studies that identify populations at highest risk, including adolescents.

To date, knowledge about the patterns of recreational use of prescription medications in subpopulations of Canadian youth is very limited. Results from a US survey indicate a 212% increase in non-medical use of prescription drugs in adolescents aged 12-17 between 1992 and 2003.<sup>2</sup> This was 2.6-fold higher than the increase among adults, suggesting that adolescents are particularly vulnerable with regard to non-medical use of prescription drugs.<sup>2</sup> Reported rates of use among youth from grades 7 through 12 have varied from 5.9%,<sup>3</sup> to 15.5%.<sup>4</sup>

One established determinant of non-medical use of prescription drugs among youth is older age. Between the ages of 12 and 15, the risk of engaging in non-medical use of prescription drugs increases by between 88% and 130%.<sup>5,6</sup> Female sex is another commonly identified determinant, females having 17%-50% greater risk.<sup>7,8</sup> Low socio-economic status (SES) has also been significantly associated with non-medical use of prescription drugs, the odds ratios ranging from 1.2 to 1.5.<sup>5,7-9</sup> Moreover, Canada is a country where immigrant youth account for 9.2% of the population under 24 years.<sup>10</sup> While studies of alcohol and illicit drug use indicate disparities,<sup>11</sup> it is unknown whether non-medical prescription drug

use varies by whether a young person is Canadian-born or not or by length of residence in Canada.

The National Advisory Committee on Prescription Drug Misuse released a report in 2013 recommending a pan-Canadian strategy, including an emphasis on addressing knowledge gaps surrounding geographically remote and rural populations and the non-medical use of prescription drugs.<sup>1</sup> The focus on rural groups follows from studies from the US that identify rurality as an important risk factor for opioid pain relievers in particular, with odds ratios ranging from 1.22 to 5.69.<sup>5,8,12</sup>

A standard method for defining urban or rural areas for studies of geographic disparities in health does not exist. Population size

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**Conflict of Interest:** None to declare.

## RECREATIONAL USE OF PRESCRIPTION MEDICATIONS

and density are most commonly used, although there have been discussion and development of additional demarcation methods.<sup>13</sup> One study found that selected types of substance use increased with remoteness, for example, and not just with smaller or less dense rural populations.<sup>14</sup> To our knowledge, only one Canadian study has examined the role of geographic location in the non-medical use of prescription drugs among youth.<sup>4</sup> In that study, female adolescents who reported having used opioids non-medically had 1.95 times the odds of living in rural areas than in urban/suburban areas, as defined by population size.

The aim of this study was to characterize recreational prescription drug use in subgroups of Canadian youth by age, sex, SES, immigrant status and geographic location to identify disparities that may systematically place subgroups at further disadvantage with respect to their health. The definition of disparities here follows from Braveman's definition: a particular type of difference in or influence on one's health potentially shaped by policies.<sup>15</sup> The findings may help identify directions for improving prescription practices and highlight circumstances in which secure storage of medications is most warranted.

## METHODS

This was a descriptive, epidemiological study employing cross-sectional analyses of data describing reported experiences of young adolescents in Canada. The primary focus was on variations in recreational use of prescription medications in a disaggregated analysis by age, sex, SES, immigration status and geographic status. These factors reflect important health determinants that underlie potential disparities in the non-medical use of prescription medications. Medications of interest included pain relievers, stimulants and sedatives/tranquilizers.

### Data source and sample

Health Behaviour in School-aged Children (HBSC) is a health survey of young people primarily aged 11 through 15 conducted in 43 countries or regions in collaboration with the World Health Organization. The purpose is to understand health behaviours and determinants of health in young people.<sup>16</sup> The data source for the current study was Cycle 6 of the Canadian HBSC conducted during the 2009/2010 school year in all Canadian provinces and territories except Prince Edward Island and New Brunswick. The Canadian HBSC sample was obtained using a two-stage cluster sample design, in which schools were selected randomly and the class was the basic cluster. Response rates were 84.6% at the provincial/territorial level and 57.0% at the school level; 77.0% of eligible students who were approached participated in the study. Active or passive consent was obtained depending on the schools' or school boards' policies for conducting classroom-based research. The final sample comprised 10,429 Canadian students, primarily in grades 9-10. The study protocol received ethics approval from the Queen's University Research Ethics Board.

### Study variables

Students indicated their birth year and month, the date of survey completion, and their sex. A geographic location for each student was ascertained according to the school postal code. Their *geographic status* was then determined using Statistics Canada definitions.<sup>13</sup> Students were classified as living in "urban" areas if

**Table 1.** Characteristics of the 2009/2010 cycle of the Canadian Health Behaviour in School-Aged Children (HBSC) sample

	Characteristic	% (95% CI)
Age	≤14	35.0 (34.1-36.0)
	15	45.9 (44.9-46.8)
	≥16	19.1 (18.4-19.9)
Sex	Boys	48.3 (47.3-49.2)
	Girls	51.7 (50.8-52.7)
SES	High	55.2 (54.2-56.1)
	Average	35.7 (34.8-36.7)
	Low	9.1 (8.6-9.7)
Immigrant status	Born in Canada	76.0 (75.2-76.9)
	Immigrant >5 yrs	19.7 (19.0-20.5)
	Immigrant ≤5 yrs	4.3 (3.9-4.7)
Geographic status	Urban	77.1 (76.2-77.9)
	Strong MIZ	0.7 (0.6-0.9)
	Moderate MIZ	15.9 (5.2-16.6)
	Weak or no MIZ	6.3 (5.8-6.8)

CI = confidence interval; SES = socio-economic status; MIZ = Metropolitan Influenced Zone.

**Table 2.** Proportions and results from multiple Poisson regression analysis\* for recreational use of any type of prescription medication, by demographic characteristics, from the 2009/2010 Canadian HBSC

		Any medication % (95% CI)	RR (95% CI)
Age (years)	<b>Overall</b>	6.5 (6.0-7.0)	
	≤14	5.5 (4.6-6.4)	1.00
	15	6.7 (6.0-7.5)	1.23 (1.02-1.49)
	≥16	7.6 (6.5-8.9)	1.41 (1.12-1.78)
	p trend		<0.01
Sex	Boys	6.1 (5.4-6.8)	1.00
	Girls	6.8 (6.2-7.5)	1.13 (0.96-1.34)
SES	High	5.5 (4.9-6.1)	1.00
	Average	6.2 (5.5-7.1)	1.13 (0.95-1.32)
	Low	13.0 (11.1-15.6)	2.41 (1.94-2.99)
	p trend		<0.01
Immigrant status	Born in Canada	6.6 (6.1-7.2)	1.00
	Immigrant >5 yrs	6.5 (4.0-8.8)	1.02 (0.83-1.24)
	Immigrant ≤5 yrs	6.0 (5.4-7.6)	1.06 (0.69-1.61)
	p trend		0.79
Geographic status	Urban	6.6 (6.1-7.2)	1.00
	Strong MIZ	14.2 (7.0- 24.0)	2.39 (1.03-5.55)
	Moderate MIZ	5.4 (4.4- 6.7)	0.93 (0.66-1.29)
	Weak or no MIZ	6.5 (4.7- 8.7)	1.01 (0.67-1.51)
	p trend		0.79

\* Model was adjusted for age, sex, SES, immigrant and geographic status. CI = confidence interval; RR = relative risk; SES = socio-economic status; MIZ = Metropolitan Influenced Zone.

their school was in a census metropolitan (>100,000 population) or census agglomeration (>10,000 population) area. Students were identified as living in "rural or small town" areas if their school was not in an urban area. Rural and small towns were then further classified into Metropolitan Influenced Zones (MIZ). These are founded upon principles of distance, adjacency and accessibility between urban centres and rural and small town areas.<sup>13</sup> They measure the degree to which urban centres influence rural and small town municipalities, as determined by commuting flows. "Strong" Metropolitan Influenced Zones are census subdivisions in which 30%-50% of the employed labour force commutes to work in an urban centre. "Moderate" MIZ (5.0% to 30% commuting flow) and "Weak" MIZ (0.1% to <5.0%) were also identified. In a "No Metropolitan Influenced Zone", none of the employed labour force commuted to work. For the current study, Weak and No Metropolitan Influence Zones were combined into one group.

SES was determined at the individual student level using a 5-point student self-report Likert-like scale pertaining to how well

**Table 3.** Proportions and results of Poisson regression analysis\* for any recreational use of pain relievers, stimulants and sedative medications, by demographic characteristics, from the 2009/2010 Canadian HBSC

		Pain relievers		Stimulants		Sedatives	
		% (95% CI)	RR (95% CI)	% (95% CI)	RR (95% CI)	% (95% CI)	RR (95% CI)
Age (years)	<b>Overall</b>	5.1 (4.7-5.5)		2.4 (2.1-2.7)		1.4 (1.2-1.7)	
	≤14	4.3 (3.7-5.1)	1.00	2 (1.6-2.5)	1.00	1.3 (1.0-1.8)	1.00
	15	5.5 (4.8-6.2)	1.37 (1.09-1.72)	2.1 (1.7-2.5)	0.96 (0.69-1.34)	0.9 (0.6-1.2)	0.64 (0.41-0.99)
	≥16	5.5 (4.5-6.6)	1.49 (1.11-2.00)	3.9 (3.1-4.9)	1.66 (1.17-2.36)	2.9 (2.1-3.7)	1.97 (1.28-3.04)
	p trend	<0.01		<0.01		<0.01	
Sex	Boys	4.6 (4.0-5.2)	1.00	2.6 (2.1-3.1)	1.00	1.4 (1.1-1.8)	1.00
	Girls	5.5 (4.9-6.2)	1.25 (1.04-1.51)	2.2 (1.9-2.7)	0.86 (0.66-1.12)	1.4 (1.1-1.8)	1.02 (0.72-1.46)
SES	High	4.2 (3.7-4.8)	1.00	2.0 (1.6-2.5)	1.00	1.0 (0.8-1.3)	1.00
	Average	5.0 (4.3-5.8)	1.12 (0.91-1.36)	2.2 (1.7-2.5)	1.19 (0.89-1.60)	1.5 (1.2-2.0)	1.52 (1.03-2.23)
	Low	10.0 (8.2-12.3)	2.32 (1.81-2.98)	5.4 (3.1-4.9)	2.70 (1.91-3.81)	3.1 (2.1-4.5)	3.05 (1.92-4.88)
	p trend	<0.01		<0.01		<0.01	
Immigrant status	Born in Canada	5.1 (4.6-5.6)	1.00	2.4 (2.1-2.8)	1.00	1.4 (1.1-1.7)	1.00
	Immigrant >5 yrs	5.1 (3.5-8.2)	1.03 (0.82-1.30)	2.4 (1.3-4.7)	0.90 (0.64-1.26)	1.4 (1.1-4.3)	1.09 (0.71-1.68)
	Immigrant ≤5 yrs	5.5 (4.2-6.1)	1.27 (0.81-1.98)	2.4 (1.8-3.2)	1.14 (0.59-2.22)	2.2 (0.9-2.0)	1.71 (0.84-3.47)
	p trend	0.74		0.74		0.39	
Geographic status	Urban	5.0 (4.6-5.6)	1.00	2.5 (2.1-2.9)	1.00	1.5 (1.2-1.8)	1.00
	Strong MIZ	14.2 (7.5-24.7)	3.13 (1.23-8.01)	1.8 (0.2-8.4)	1.02 (0.14-7.39)	1.8 (0.1-8.4)	1.83 (0.24-14.19)
	Moderate MIZ	4.5 (3.6-5.7)	1.03 (0.70-1.52)	2.1 (1.4-2.9)	1.07 (0.62-1.84)	1.1 (0.6-1.7)	0.73 (0.35-1.52)
	Weak or no MIZ	5.7 (4.0-7.8)	1.16 (0.73-1.84)	2.2 (1.3-3.8)	1.00 (0.51-1.98)	1.5 (0.8-3.0)	1.12 (0.49-2.54)
	p trend	0.61		0.99		0.68	

\* Model was adjusted for age, sex, SES, immigrant and geographic status.

CI = confidence interval; RR = relative risk; SES = socio-economic status; MIZ = Metropolitan Influenced Zone.

off students perceived their family to be. Responses were then categorized into three groups: 1) Low (not at all well off and not very well off), 2) Average and 3) High (quite well off and very well off). This item has been employed and investigated in previous Canadian and international studies, has demonstrated reliability and validity based on other measures of SES,<sup>14</sup> and has been shown to be a stronger predictor of adolescent health outcomes than area level measures of SES.<sup>17</sup>

*Immigrant status* was determined by asking a student the country in which they were born and how long they had lived in Canada. Data corresponding to these items were categorized into Born in Canada; immigrant >5 years; or immigrant ≤5 years.

*Recreational use of prescription medications.* Using a categorical item with close-ended response categories, students were asked to indicate how frequently they had used pain relievers, stimulants and sedatives/tranquilizers “to get high” in the previous year. Specific examples of drugs within each classification were provided. Response categories ranged from never to 40 times or more. Responses were subsequently grouped into “no use” and “ever use”. Those who reported past-year recreational use of one or more medications ≥3 times were further categorized as frequent users, and those who reported using 1-2 times were categorized as infrequent users. This categorization has been previously used to identify problematic substance use in the Ontario Student Drug Use and Health survey.<sup>18</sup>

### Survey weights and statistical analysis

Data were weighted by grade and province/territory to ensure that the survey was nationally representative. If a specific grade group in a specific province or territory was over-represented, those student responses were given a weight of <1, and under-representation was corrected by weights of >1 (weights ranged from 0.017 to 3.655). Cross-tabulations were conducted to estimate the proportion of youth within predefined subgroups who reported recreational use of medications and to identify proportions of youth using more than one type of drug. Proportions of infrequent and frequent users by subgroups were also estimated. Multi-level and multivariable Poisson regression was used to estimate the

strengths of associations between the exposure variables of interest and reported prescription medication outcomes in a fully adjusted model. Adjusted relative risks (RRs) as well as corresponding 95% confidence intervals (CIs) were estimated. The model specified the hierarchical sampling design, accounting for the nested and clustered nature of the study sample, with students nested within schools. Random intercepts were assumed for schools and fixed effects for the determinants of interest.

## RESULTS

### Recreational use of prescription medication

A description of the study sample can be found in Table 1. Table 2 displays the proportion of youth who reported recreational use of any prescription medication in the previous year, adjusted RR estimates and a *p* test for linear trend in variables with more than two categories. Table 3 contains a breakdown of this information by specific medication types.

Older age was associated with increased risk of recreational use of prescription drugs. Proportions of past-year use of any drug were 5.5%, 6.7% and 7.6% for students ≤14 years old, 15 years old and ≥16 years old, respectively ( $p_{\text{trend}} < 0.01$ ). This difference was particularly notable for stimulant and sedative medications, for which risk of use among students 16 years and older was 1.7 and 2.0 times greater than for those in the youngest age group.

Girls reported greater use of pain relievers than boys (5.5% vs. 4.6%; RR 1.25, 95% CI: 1.04-1.51), whereas boys reported slightly higher use of stimulant medications than girls (2.6% vs. 2.2%). Sedative/tranquilizer use did not differ between the sexes.

Lower SES students reported higher overall use as compared with high SES students (13.0% versus 5.5%, RR 2.41, 95% CI: 1.94-2.99;  $p_{\text{trend}} < 0.01$ ). For pain relievers, 10.0% of low SES students reported past-year use, as compared with only 4.2% of high SES students (RR 2.32, 95% CI: 1.81-2.98;  $p_{\text{trend}} < 0.01$ ). Of low SES students 5.4% reported recreational use of stimulants, compared with 2.0% of their high SES counterparts (RR 2.70, 95% CI: 1.91-3.81;  $p_{\text{trend}} < 0.01$ ). Use of sedative/tranquilizer medications was least common; however, low SES students were 3.05 times more likely to

**Table 4.** Proportions and results of Poisson regression analysis\* for frequent recreational use of any prescription drug, by demographic characteristics, from the 2009/2010 Canadian HBSC

	Overall	Frequent use of any prescription drug	
		% (95% CI)	RR (95% CI)
Age (years)	≤14	51.1 (44.9-52.8)	1.00
	15	49.5 (42.3-56.7)	0.79 (0.28-2.22)
	≥16	44.3 (28.9-50.3)	0.89 (0.68-1.16)
	p trend	57.8 (61.2-81.3)	0.38
Sex	Girls	43.4 (38.4-48.8)	0.77 (0.61-0.97)
	Boys	55.6 (49.6-61.4)	1.00
SES	High	43.8 (38.1-49.6)	1.00
	Average	51.2 (44.6-58.1)	1.21 (0.94-1.57)
	Low	56.1 (46.5-65.1)	1.34 (0.99-1.81)
	p trend		0.04
Immigrant status	Born in Canada	50.6 (46.1-55.1)	1.00
	Immigrant >5yrs	40.2 (36.9-77.2)	0.77 (0.56-1.05)
	Immigrant ≤5 yrs	56.7 (31.9-49.6)	1.01 (0.58-1.76)
	p trend		0.13
Geographic status	Urban	48.7 (44.4-53.3)	1.00
	Strong MIZ	34.9 (13.7-72.6)	0.79 (0.28-2.23)
	Moderate MIZ	54.6 (43.0-64.6)	1.06 (0.77-0.46)
	Weak or no MIZ	42.1 (26.7-57.8)	0.88 (0.54-1.45)
	p trend		0.83

\* Model was adjusted for age, sex, SES, immigrant and geographic status. CI = confidence interval; RR = relative risk; SES = socio-economic status; MIZ = Metropolitan Influenced Zone

report using them recreationally than high SES students (95% CI: 1.92-4.88;  $p_{\text{trend}} < 0.01$ ). Proportions of use were similar among those born in Canada, new immigrants and those living in Canada for more than 5 years.

Compared with youth living in urban areas, those living in Strong Metropolitan Influenced Zones (with 30%-50% commuting) were 2.39 times more likely to use any prescription drug (95% CI: 1.03-5.55) and 3.13 times more likely to use pain relievers (95% CI: 1.23-8.01). Reports of recreational use of prescription drugs did not differ between the more remote geographic categories and urban areas.

Among youth who reported using prescription drugs recreationally, 15.9% reported using two types, and 11.4% reported using all three types of medication. Youth who used sedatives showed the highest proportion of co-use: 70.0% had also used pain relievers and 63.1% had also used stimulants. Of stimulant users, 53.4% had also used pain relievers and 36.8% had also used sedatives; 25% of youth who used pain relievers had also used stimulants, and 18.8% had used sedatives as well.

#### Frequent recreational use of prescription medications

Approximately half of students who reported using prescription medications recreationally had done so at least three times in the previous year, operationally defined as "frequent use" (see Tables 4 and 5). Of the medications used frequently, stimulants were the most common (57.6%) followed by sedatives (53.4%) and pain relievers (43.5%). Age was not associated with frequent use of prescription medications. Boys were more likely to report frequent recreational use of prescription medications than girls (43% girls vs. 56% boys, adjusted RR 0.77, 95% CI: 0.61-0.97). This gender-based pattern was most pronounced for stimulant medications (47% girls vs 68% boys; adjusted RR: 0.71, 95% CI: 0.49-0.99). Because of the complete or quasi-separation of geographic and immigrant status variables for both frequent stimulant and frequent sedative use, they were excluded from these models.

## DISCUSSION

Our study provides foundational information about the recreational use of prescription medications by Canadians in their early adolescent years. Older age, female sex, lower SES and living in rural areas with more metropolitan influence were independently associated with increased risk of reported recreational use of prescription drugs. Recreational use of pain relievers was almost twice that of stimulants and three times that of sedatives/tranquilizers.

Increasing reports of recreational prescription drug use by age confirm findings from earlier studies.<sup>3-6,8,19</sup> However, the prevalence of such use here was slightly lower than levels reported by previous studies of Canadian youth.<sup>4,6</sup> This may be because of our younger adolescent sample. There is a need to identify patterns specific to this young age group, as US evidence suggests that the mean age for initial non-medical prescription drug use may be as early as 13 years old.<sup>9</sup> Our examination of frequent use of these drugs was unique, however, and we did not identify strong age-related patterns. While age is an important predictor of drug experimentation,<sup>20</sup> substance abuse disorders may not emerge until early adulthood (19-21 years),<sup>21</sup> perhaps explaining why more problematic use was not apparent in our relatively youthful sample.

Reported patterns of recreational drug use by males and females differed by type of medication. Use of pain reliever medications was higher among females, whereas males reported slightly more use of stimulant medications. Females are more likely to be prescribed opioid medications than males<sup>22</sup> and therefore may use their own prescriptions recreationally more often.<sup>23</sup> Our gender-based finding for increased non-medical stimulant use is consistent with that of a study conducted in the Atlantic provinces, where males reported more non-medical use.<sup>24</sup>

Students of low SES reported the highest rates for using all three types of medication recreationally, supporting findings from a recent Canadian study of recreational opioid use among youth.<sup>4</sup> Youth living in poorer socio-economic conditions may confront greater barriers when faced with decisions about engaging in drug use, as they may have fewer opportunities for structured recreation, more deviant peers, less parental supervision and more stressful life events.<sup>25-28</sup>

The geographic patterns highlighted in this study point to substantial intra-rural variability with respect to non-medical use of opioid medications. Students living in rural areas subject to strong urban influence reported use of these drugs most commonly. While these results build upon earlier findings that emphasize rural drug use patterns,<sup>4,5,8</sup> the patterns highlighted here emphasize an urban-rural connection that possibly relates to access to prescription medications. Contrary to a past study that suggested an urban-rural gradient,<sup>29</sup> we found that the highest levels occurred in rural areas that were more proximal and accessible to urban settings.

There is some evidence that health service access and utilization by people in rural areas proximal to urban centres is different from those in other rural areas.<sup>30,31</sup> Others have reported that rural residents living adjacent to urban centres are more likely to have a regular medical doctor than those living more remotely (OR: 0.62, 95% CI: 0.53-0.74).<sup>30</sup> Rates of specialist physician consultations are also higher in these rural areas than in those further away.<sup>30</sup> Access to prescriptions for controlled medications may follow this pattern, so that such medications may be more readily available for rural

**Table 5.** Proportions and results of Poisson regression analysis\* of frequent recreational users of prescription drugs, by demographic characteristics, from the 2009/2010 Canadian HBSC

	Pain relievers		Stimulants		Sedatives	
	% (95% CI)	RR (95% CI)	% (95% CI)	RR (95% CI)	% (95% CI)	RR (95% CI)
Overall	43.5 (39.1-47.8)		57.6 (51.2-64.0)		53.4 (45.0-62.0)	
Age (years)						
≤14	45.1 (37.0-53.3)	1.00	60.1 (46.9-70.9)	1.00	55.7 (40.2-69.5)	1.00
15	41.5 (35.6-48.0)	0.92 (0.67-1.26)	48.3 (37.7-58.3)	0.77 (0.49-1.19)	52.4 (28.5-56.7)	0.95 (0.52-1.75)
≥16	45.9 (35.9-55.7)	1.00 (0.68-1.48)	67.4 (55.6-77.7)	1.01 (0.66-1.55)	52.0 (38.8-66.5)	0.72 (0.39-1.33)
p trend		0.97		0.51		0.52
Sex						
Girls	39.9 (34.2-45.8)	0.80 (0.60-1.05)	46.6 (37.8-56.4)	0.71 (0.49-0.99)	49.2 (37.0-60.5)	0.83 (0.51-1.36)
Boys	48.3 (41.5-55.3)	1.00	68.3 (59.4-76.6)	1.00	58.0 (46.3-70.8)	1.00
SES						
High	39.5 (33.1-46.1)	1.00	56.5 (47.1-66.2)	1.00	52.6 (38.0-65.5)	1.00
Average	47 (39.7-54.8)	1.19 (0.88-1.61)	55.6 (43.5-66.3)	0.98 (0.65-1.48)	57.3 (42.4-69.9)	0.85 (0.47-1.53)
Low	46.9 (36.0-57.5)	1.23 (0.84-1.79)	63.8 (47.3-75.7)	1.15 (0.74-1.80)	45.7 (29.2-67.7)	0.85 (0.42-1.72)
p trend		0.20		0.43		0.73
Immigrant status						
Born in Canada	46.3 (40.8-51.0)	1.00	57.6 (50.2-64.9)		51.5 (40.1-59.9)	
Immigrant >5yrs	30.9 (28.8-71.2)	0.69 (0.47-1.03)	53.5 (44.2-96.5)		44.8 (62.9-1.00)	
Immigrant 5 yrs	48.6 (22.6-41.5)	0.99 (0.53-1.86)	77.6 (38.2-67.6)		100 (26.0-64.4)	
p trend		0.07				
Geographic status						
Urban	43.1 (38.1-48.1)	1.00	58.5 (51.1-65.4)		53.3 (43.9-63.0)	
Strong MIZ*	34.9 (13.7-72.6)	0.84 (0.29-2.39)	100 (9.5-100.0)		100 (9.5-100.0)	
Moderate MIZ*	50.6 (38.1-61.9)	1.09 (0.74-1.59)	57.8 (39.4-74.1)		49.5 (23.9-71.5)	
Weak or no MIZ*	36.6 (21.3-53.8)	0.89 (0.50-1.58)	41.3 (18.8-70.4)		55.2 (20.1-79.9)	
p trend		0.94				

\* Model was adjusted for age, sex, SES, immigrant and geographic status.

CI = confidence interval; RR = relative risk; SES = socio-economic status; MIZ = Metropolitan Influenced Zone.

residents living adjacent to urban cores. This may also relate to the number and influence of illicit suppliers in urban areas.<sup>32</sup>

There are other explanations for the excess recreational use of prescription medications in certain types of geographic communities. First, because use of some medical services is greater in these proximal rural areas there may be a greater volume of unused medications in home medicine cabinets.<sup>30</sup> Second, older adults are the most likely group to receive controlled medications for chronic conditions and pain,<sup>33</sup> and therefore a greater volume of controlled medications may be present in some rural areas with their relatively older population structures. Third, when rural residents do obtain prescriptions, they may be more likely to save or stockpile excess amounts for future use because of higher dispensing fees in rural areas.<sup>34</sup> Fourth, rural youth may spend more of their time in unsupervised activities and thus may be at greater risk of drug use.<sup>35</sup> All of these ideas are speculative, and further investigation into the root causes of this geographic pattern is clearly warranted.

The strengths of this study include its use of a nationally representative sample that was of adequate size to detect most subgroup differences, the uniqueness of our data and our emphasis on disaggregation of the analysis by important subgroups of youth. The limitations also warrant comment. No differences in use were detected with respect to immigration status. This may be due to limitations with our available immigrant measure, resulting in cultural and religious heterogeneity within groups. Given the relative infrequency of use among immigrant youth, it would be challenging to detect subgroup differences by ethnicity or cultural heritage within the immigrant groups themselves. We relied on self-reported drug use, which may be subject to social desirability bias and result in some misclassification. We believe, however, that these possible biases would be non-differential among subgroups, thereby potentially underestimating, and not overestimating, effect estimates. Another limitation is that young people living on First Nations reserves, incarcerated youth, home-schooled students, students who did not have consent, those who were absent on the day of the survey and those attending private schools were excluded. This limits our comparisons of groups that may be particularly vulnerable to recreational use of these drugs. We also do

not have any information about the method or dose of drug administration, information that would be helpful in signalling more problematic use. All of these limitations point to the need for more refined study of this important and emerging public health issue for adolescent Canadians.

## CONCLUSIONS

The non-medical use of prescription medications is an important public health issue in Canada. Nearly 7% of Canadian youth reported recreational use of prescription medications in the previous year, and approximately half reported use of them three or more times. Recreational use of pain relievers was most common and was highest among youth living in rural areas proximal to urban centres. Findings from this study could help inform preventive interventions, such as efforts to promote parental vigilance and other strategies to restrict access to leftover medications, particularly in rural settings. Future research should consider the diversity of rural communities and particularly the risk factors that may be in place in vulnerable rural locations.

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## RÉSUMÉ

**OBJECTIFS :** L'usage récréatif des médicaments sur ordonnance est largement reconnu comme étant un problème de santé publique en croissance, mais il y a peu d'études épidémiologiques sur les types de consommation au Canada, tout particulièrement d'études axées sur les populations les plus à risque. Nous avons cherché à décrire la consommation de médicaments sur ordonnance à des fins récréatives chez les adolescents canadiens selon l'âge, le sexe, le statut socioéconomique, le statut d'immigrant et l'emplacement géographique.

**MÉTHODE :** Nos données sont celles des élèves de 9<sup>e</sup> et de 10<sup>e</sup> année ayant participé au cycle 2009-2010 de l'Étude sur les comportements de santé des jeunes d'âge scolaire au Canada (n=10 429). Ces élèves ont répondu à des questions sur leur usage récréatif d'analgésiques, de stimulants et de sédatifs ou de tranquillisants au cours de l'année antérieure. Des tabulations en croix et des régressions de Poisson à niveaux multiples ont permis d'évaluer la prévalence de la consommation et d'en explorer les disparités.

**RÉSULTATS :** Environ 7 % des élèves ont déclaré avoir consommé un ou plusieurs médicaments sur ordonnance à des fins récréatives au cours de l'année antérieure. Les filles ont été 1,25 fois plus susceptibles que les garçons de déclarer avoir consommé des analgésiques à des fins récréatives (intervalle de confiance [IC] de 95 % : 1,04-1,51). Les élèves de faible statut socioéconomique (SSE) ont été 2,41 fois plus susceptibles de déclarer avoir consommé n'importe quel type de médicament à des fins récréatives (IC de 95 % : 1,94-2,99). L'usage récréatif des analgésiques était le plus élevé chez les jeunes des milieux ruraux vivant tout près de centres urbains. Les taux de consommation de tous les médicaments étaient semblables chez les élèves immigrants et non immigrants.

**CONCLUSIONS :** La consommation de médicaments sur ordonnance à des fins récréatives touche démesurément certains sous-groupes de jeunes, dont les filles, les élèves de faible SSE et les jeunes vivant dans certains milieux ruraux. Ces résultats fournissent des données de base pour éclairer les efforts de prévention visant la prise en charge de l'usage non médical des médicaments sur ordonnance et la divergence de ces médicaments.

**MOTS CLÉS :** adolescence; épidémiologie; abus de substances; mésusage de médicaments sur ordonnance

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