Non-medical opioid use in youth: Gender differences in risk factors and prevalence

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Abstract

Background—Non-medical use (NMU) of prescription opioids in youth is of concern since they may continue this pattern into adulthood and become addicted or divert medications to others. Research into risk factors for NMU can help target interventions to prevent non-medical use of opioids in youth.

Method—The National Monitoring of Adolescent Prescription Stimulants Study (N-MAPSS) was conducted from 2008 to 2011. Participants 10-18 years of age were recruited from entertainment venues in urban, rural and suburban areas of 10 US cities. Participants completed a survey including questions on their use of prescription opioids. NMU was defined as a non-labeled route of administration or using someone else's prescription. Information on age, gender, alcohol, marijuana and tobacco use was also collected. Summary descriptive and chi-square statistics were calculated using SAS 9.4.

Results—Of the 10,965 youth who provided information about past 30 day prescription opioid use, prevalence of reported opioid use was 4.8% with 3.2% reported as NMU (n=345) and 1.6% as medical use (MU) only (n=180). More males than females (55.7% vs 44.4%) reported opioid NMU (p<0.0001). Logistic regression revealed that among males (comparing NMU to MU only), current smokers were 4.4 times more likely to report opioid NMU than non-smokers (95% CI: 1.8, 10.7). Among females (comparing NMU to MU only), current smokers and alcohol users were more likely to report opioid NMU than those who had never smoked or used alcohol (OR=3.2, 95% CI:1.4, 7.0 and OR=4.1, 95% CI: 1.7, 10.4, respectively).

Conclusions—These results suggest that further research on gender differences in opioid NMU is needed; interventions for opioid NMU may need to be gender specific to obtain the best results.

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Keywords

Non-medical opioid use; sex/gender differences; youth

1. Introduction

Non-medical use (NMU) of prescription opioids can lead to addiction and overdose, putting increased pressure on healthcare resources (Gruber et al, 2007; Manchikanti and Singh, 2008; Meyer et al, 2014). In addition, prescription opioid NMU has been identified as a risk factor for heroin use, which is also an important public health concern (Compton et al, 2016; Palamar et al, 2016; Cerdá, 2015). NMU includes use of higher doses or use longer than prescribed as well as use of someone else's medication. Prescription opioid use in accordance with prescribing guidelines and issued by a medical practitioner is considered medical use (MU) (McCabe et al, 2013).

The National Survey on Drug Use and Health (NSDUH), conducted in 2015 in the United States on 68,073 people 12 years of age and older, revealed that the prevalence of past year pain reliever NMU was 3.9% among 12-17 year olds (Hughes et al, 2016). The 2015 Monitoring The Future (MTF) survey among high school students revealed that older adolescents (12th graders) had the highest annual prevalence of OxyContin® and Vicodin® use (3.7% and 4.4% respectively), with the lowest annual prevalence seen in 8th graders (0.8% and 0.9%, respectively) (Johnston et al, 2016). Prevalence of past year prescription opioid NMU also increases with age in adolescents from the NSDUH, with a prevalence of 2.9% for youth aged 12-13 years and 9.4% for youth aged 16-17 years. Prescription opioid NMU was also slightly higher for females (6.7%) than males (5.6%) in these adolescents (Edlund et al, 2015). It is known that youth who use opioids, whether prescribed by a medical practitioner or used non-medically, are likely to continue opioid use in the future (McCabe et al, 2013). Analyses of data from the MTF survey have revealed that approximately one third of older adolescents (aged 18 years) with prescription opioid NMU will continue such use in the future (McCabe et al, 2014 and Miech et al, 2015).

Opioid NMU raises concern since there was an increase of nearly 3000 deaths in the United States between 2013 and 2014 from overdose of prescription opioids among all age groups (Centers for Disease Control and Prevention, 2016) and approximately 420,000 visits to the emergency department in 2011 that were attributed to prescription narcotic pain reliever non-medical use or abuse (Substance Abuse and Mental Health Services Administration, 2013b). As such, interventions to prevent opioid NMU in youth are vital to reduce non-medical use in the future.

Known risk factors for illicit drug use in youth (which includes prescription drug NMU) include older age: 16-17 year olds are more likely to be illicit drug users than younger children aged 12-13 years (Manchikanti and Singh, 2008). Gender is also a known risk factor for illicit drug use: males are more likely to be illicit drug users than females (Manchikanti and Singh, 2008). Employment has been identified previously as a protective factor for illicit drug use in adults: employed people are less likely to be illicit drug users than unemployed people (Manchikanti and Singh, 2008). However, employment has also

been associated with an increased risk of opioid NMU (Back et al, 2010). Marijuana use (Whiteside et al, 2013; McCabe et al, 2011), alcohol use (McCabe et al, 2011), tobacco use (McCabe et al, 2011) and poor school grades (Whiteside et al, 2013) have also been previously identified as risk factors for opioid NMU in youth. While these risk factors have been identified previously, they have not been studied by gender in youth.

Identifying areas where interventions can be implemented to prevent opioid NMU is important to help reduce the large burden of overdose that is leading to morbidity and mortality. Previous studies have evaluated gender differences in prevalence of opioid NMU in youth, however they have not investigated the gender differences in established risk factors for NMU in youth. As part of the National Monitoring of Adolescent Prescription Stimulants Study (N-MAPSS) we had the opportunity to assess the prevalence of and risk factors for prescription opioid NMU by gender in a national study of youth 10-18 years of age in urban, suburban, and rural US. In this study, we want to identify if there are specific risk factors which influence opioid NMU but not MU only.

2. Methods

2.1 Study design

The National Monitoring of Adolescent Prescription Stimulants Study (N-MAPSS) was a national study conducted in four waves from 2008 to 2011 (Cottler et al, 2013). This cross-sectional survey study design assessed MU and NMU of prescription stimulants, opioids and other prescription medications. To be eligible for the study, participants had to be 10 to 18 years of age and reside in an urban, suburban or rural zip code of one of ten cities. Those unaware of their zip code, non-English readers, those who were cognitively impaired and those in college were excluded from the study. Participants were recruited from entertainment venues (including shopping malls, movie theaters, sports and recreation centers, libraries, arcades, skate parks, and parks) in urban, suburban, and rural areas of 10 cities across the US. Cities included in the survey were selected from among the 10 Office of Management and Budget (OMB) regions coming from states with the highest rate of stimulant prescribing patterns (as identified from the IMS Health database), which was the intended primary purpose of the study. The cities were: Seattle, Los Angeles, Denver, St. Louis, Houston, Cincinnati, Tampa, Philadelphia, New York and Boston. Recruitment goals for urban, suburban, and rural areas were established in order to ensure adequate participation of youth from all areas. This venue intercept method proved effective in obtaining a representative sample of youth. Specifically, in N-MAPSS, we were able to obtain a sample distribution for age, gender, race and urban/rural composition comparable to the US Census data (Cottler et al, 2013). Detailed information on the methodology has been published elsewhere (Cottler et al, 2013).

Recruiters approached 21,444 youth during the four waves and invited them to participate in the study. Of 16,143 potentially eligible youth, 3,403 (21.1%) were found to be ineligible. Of 12,740 eligible youth, 1,272 did not stop to hear about the study and are noted as refusals (10.0%). In total, 11,048 youth completed the survey. Youth aged 10 and 11 years were offered an option for an interview to reduce errors due to problems with reading or reading comprehension. However, anonymity was maintained throughout and parents were not

present when the interview was conducted or completed to maintain privacy. Implied assent was obtained, indicated by survey completion. Parental permission was not solicited as per Washington University and University of Florida Human Protection Research Offices because all survey data were anonymous. The research protocol was approved by the Washington University Human Protection Research Office.

2.2 Measurements

Youth were given paper surveys to complete. Questions about prescription medications (including stimulants) were accompanied by pictures of the medications for ease of identification. In addition to the section on stimulants, prescription opioids were also elicited with photos for ease of recognition. The opioids examined in this analysis were: Vicodin®, hydrocodone, OxyContin® and oxycodone. Past 30-day use of these opioids was assessed near the end of the questionnaire using the following questions: "In the last 30 days, have you taken [Specific drug name]? Examples are pictured above" Participants were provided with pictures of both brand and generic versions of all drugs at various doses and were surveyed about drugs with the same active ingredient within the same question e.g. In the last 30 days, have you taken Vicodin or hydrocodone?

Sources of opioids were assessed by the question: "In the last 30 days, have you used [Specific drug name] that belonged to…[List of responses]". Assessed were: one of your parents, your brother or sister, a different family member, someone from school, someone from work, someone you don't know, someone not listed above? This question was designed to capture all use of prescription opioids that had been diverted from another source. Routes of administration were assessed by the question: "In the last 30 days, what are all the ways you used [Specific drug name]?". Routes of administration were: by mouth (oral), snorted or sniffed, smoked, other. Opioid NMU in the past 30 days was defined as a non-approved route of administration (non-labeled route of administration of medication rather than taken by the labeled oral route) or use that was not prescribed (use of someone else's prescription). In this study, information on dose of prescription opioids was not available and so this does not form part of the definition of NMU. MU in the past 30 days was defined as use with a prescription and no NMU.

Risk factors of interest were captured through questionnaire items like demographic characteristics (sex and age), living situation (living with both parents, separated parents and not living with parents), employment (including part-time work; yes or no) and school grades (A-B, C-D and F-Unknown). Gender was inferred by sex in this study. Information was also elicited on alcohol and marijuana use (never, ever use but not in past 30 days and past 30 days) and tobacco use (non-smoker, former smoker [smoked tobacco in the past but not currently] and current smoker). Past 30 day use was considered recent use for alcohol, marijuana and prescription opioid use.

2.3 Analysis

Those with missing values for recent opioid use were excluded from this analysis (83/11,048). Descriptive statistics summarized demographic, risk factor and opioid use data. Chi square tests were used to individually explore associations between potential risk factors

for opioid NMU. Logistic regression was used to compare non-use and opioid MU combined and opioid MU only to opioid NMU for each risk factor, adjusted for all other risk factors in the model. In order to compare study results to the NSDUH, a multinomial logistic regression could not be used as we needed to compare NMU to MU and non-use combined. As such, separate logistic regression models were used for each reference group (non-use and MU combined and MU only). Separate analyses were performed for males and females and model fit was assessed using the Hosmer- Lemeshow test to examine differences between the observed and predicted values of the response variable. Non-significance indicated adequate fit. All models reported were non-significant at p>0.05 for the Hosmer-Lemeshow test. Every risk factor that was pre-selected was included in the regression models rather than using step-wise elimination regression, because they were all considered to be important risk factors based on the literature. Risk factors controlled for in the analysis were age, gender, living situation (living with both parents, separated parents or not living with parents), employment (including part-time work; yes or no), school grades (A-B, C-D or F-Unknown), alcohol use (never, ever use but not in past 30 days or past 30 days), marijuana use (never, ever use but not in past 30 days or past 30 days) and tobacco use (non-smoker, former smoker or current smoker). All statistical analyses were conducted using SAS 9.4.

3. Results

Risk factors for opioid non-use, MU only and NMU

Of the 10,965 youth who provided information about recent prescription opioid use, 525 (4.8%) reported recent (past 30 day) opioid use, consisting of 3.2% (n=345) opioid NMU and 1.6% (n=180) MU (Table 1). The prevalence of opioid NMU in youth increased by age: 10-13 years=2.0%, 14-15 years=25.5% and 16-18 years=72.5% (p<0.0001).

While both no use and opioid MU were reported by females more often than males (52.4% vs 47.6%, respectively and 58.3% vs 41.7%, respectively), more opioid NMU was reported by males compared to females (55.7% vs 44.4%; p=0.003). In addition, a significantly higher proportion of non-users were not employed (74.5%) compared with MU (58.2%) and NMU (59.1%; p<0.0001). Current tobacco users and recent marijuana and alcohol users were most likely to report NMU (p<0.0001).

Gender differences in risk factors for opioid NMU compared to no use and opioid MU combined

After adjustment for other risk factors, a comparison of NMU to MU and non-use combined revealed gender differences in risk factors (Table 2). Among males, marijuana use, former smoking and recent alcohol use were also found to be associated with prescription opioid NMU. The strongest correlate of NMU for male youth was recent marijuana use (OR=9.3, 95% CI: 5.0, 17.5). Among females, marijuana use was also associated with prescription opioid NMU, in addition to lower school grades (grades C-D). Interestingly, the strongest correlate for NMU among all female youth remained the same as for female opioid users only—recent alcohol use (OR=5.3, 95% CI: 2.5, 10.9). When opioid NMU was compared to

non-use (excluding MU), the identified risk factors remained the same as for comparison to no use and MU combined (data not shown).

Gender differences in risk factors for opioid NMU, compared to MU only

After stratifying by gender and by opioid use, age group and employment were not significantly associated with reported opioid NMU (Table 3). Further, living situation (living with both parents, one parent or not living with parents) and school grades were not significantly associated with reported opioid NMU among males.

After adjustment for other risk factors among opioid users only, risk factors also differed by gender (Table 4). Specifically, among males who used opioids, NMU was significantly associated with only one factor after controlling for all others—being a current smoker (OR=4.4, 95% CI: 1.8, 10.7). However, among females who used opioids, prescription opioid NMU was significantly associated with current smoking and alcohol use. In this analysis, the strongest correlate of prescription opioid NMU for female youth using prescription opioids was recent alcohol use (OR=4.1, 95% CI: 1.7, 10.1).

4. Discussion

The prevalence of recent prescription opioid NMU in this study (3.2%) was concordant with that seen for past year NMU of pain relievers in youth in the NSDUH, conducted in 2015 in the United States (3.9%) (Hughes et al, 2016). The 2015 Monitoring the Future (MTF) survey found that prevalence of prescription opioid use increased with age among high school students (Johnston et al, 2016). The same pattern has also been seen previously for illicit drug use, including prescription opioid NMU (Manchikanti and Singh, 2008). A similar pattern is seen in our study for prescription opioid NMU in youth, where prevalence of NMU increases with age. Our results also found that opioid NMU is more prevalent in males than females, which has also been observed previously for illicit drugs (Manchikanti and Singh, 2008).

Gender differences in a wide variety of risk factors for prescription opioid NMU have not previously been investigated in youth in a nationally representative study. However, a study using data from the NSDUH examined gender differences in opioid NMU, though NMU was assessed in the past year rather than the past 30 days (Back et al, 2010). In addition, the Back et al study did not examine opioid NMU in youth alone, but only in combination with adults. Also, opioid NMU was only compared with MU and non-use combined (Back et al, 2010).

Stratification by gender in our study, comparing NMU to MU and non-use combined, indicated that only marijuana use, tobacco use and past 30 day alcohol use were significantly associated with opioid NMU among males after adjustment for other risk factors. In contrast, marijuana use, current tobacco use, alcohol use and school grades were significantly associated with opioid NMU among females. In comparison to results from the NSDUH, we found different patterns for the risk factors for opioid NMU in youth than those found for adults in the NSDUH study (Back et al, 2010). Participants were aged 12 years and over in the NSDUH study, while our population was aged 10 to 18 years. Past year

tobacco use was found to be a risk factor for past year opioid NMU among adult females from the NSDUH (Back et al, 2010); however, in our study we found that only current tobacco use was a risk factor for past 30 day opioid NMU among young females. Past year alcohol and marijuana use were risk factors for past year opioid NMU among both adult males and females in the NSDUH (Back et al, 2010); however, ever and past 30 day alcohol use was only found to be a risk factor for recent opioid NMU among young females in our study. Among males, past 30 day alcohol use was found to be a risk factor though. In addition, marijuana use was found to be a risk factor among both males and females. The NSDUH study did not examine school grades as a risk factor for NMU, however in our study we found that lower school grades (grades C-D) were associated with NMU among females only. It is possible that observed differences in results arise from the different time periods of NMU studied (past 30 days vs. past year), in addition to gender differences and age of the population studied (adults vs. youth). As such, it appears to be important to consider the time period for opioid NMU with age and gender when considering the risk factors for opioid NMU.

A limitation in the previous literature is that analyses of gender differences were conducted comparing NMU to MU and non-use combined. Considering that non-users are likely to be very different from medical users (given the reasons for needing to use opioids), we conducted a further analysis among opioid users only. Adjustment for potential confounding in the final logistic regression models among opioid users only revealed differences for males and females compared with the crude analyses and adjusted analyses examining the entire dataset. Among male opioid users, the only significant risk factor associated with opioid NMU was being a current tobacco smoker after adjustment for all other risk factors. However, among female opioid users, it was observed that current tobacco smoking and ever use of alcohol were significantly associated with increased odds of opioid NMU compared to those who never smoked or used alcohol. Marijuana was not found to be a risk factor for either males or females when comparing MU to NMU. As such, stratification of opioid users by gender revealed differences in risk factors for opioid NMU. This effect would have been lost without the separate analyses for males and females.

Future research is needed to further examine gender differences in risk factors for opioid NMU among youth, including other risk factors such as mental health comorbidities and social factors. These were not examined in the current analysis and while it is unlikely that these are modifiable risk factors where targeted interventions could be implemented, it would be important to consider these in future analyses.

4.1 Strengths and limitations

There are no follow up data available from this survey to allow examination of changing prevalence and risk factors for opioid NMU over time. In addition, it is not possible to establish temporality for risk factors and opioid NMU, so no causal interpretation can be made. However, these results provide a useful indication of risk factors to be studied in the future in relation to opioid NMU in youth. They also suggest that the time period for opioid NMU, age and gender need to be considered when identifying risk factors in future studies. An additional limitation in this study is that information on dose of prescription opioids was

not collected, although participants were shown pictures of the opioids at different doses, and so high doses cannot be assessed and form part of the definition of NMU. Also, we recognize that NMU can arise from use of a person's former but not current prescription or obtainment by another source (e.g. theft) which was not specifically asked on this questionnaire.

Under-reporting is possible in this study due to the self-reported design of the study; however, a strength of this study is that participants were recruited from entertainment venues and surveys were conducted outside of the home, unlike the NSDUH. As such, participants may have been more comfortable answering questions about the sensitive subject area of drug use, minimizing non-response. The survey was also completely anonymous and no identifying information was collected. In addition, parental consent was not required, unlike in the NSDUH and MTF studies. For this reason, participants may have been more likely to respond truthfully to questions about drug use as social desirability bias may be minimized.

4.2 Conclusion

In conclusion, children as young as 10 and no more than 18 years of age were more likely to report opioid NMU if they were male compared to females. They were also more likely to report opioid NMU if they reported current tobacco use, and past 30 day marijuana and alcohol use, compared to never use. Opioid NMU also increased with age. Among opioid users, males were more likely to report opioid NMU if they were current smokers. Females were more likely to report opioid NMU if they were current smokers or ever alcohol users. These results suggest that further research on gender differences in opioid NMU is needed; interventions for non-medical opioid use may need to be gender specific to obtain the best results.

Acknowledgments

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Highlights

- Children as young as 10 and no more than 18 years of age who used opioids non-medically, compared with their counterparts, were more likely to be male and to report current tobacco use, and past 30 day marijuana and alcohol use.

- Among opioid users, males were more likely to have non-medical opioid use if they were current smokers.

- Females were more likely to have non-medical opioid use if they were current smokers or ever alcohol users.

Table 1

Characteristics of non-users, medical users and non-medical users of any prescription opioids in the past 30 days (n=10,965)

Characteristic	Opioid use pattern			
	Not used (n, %) N=10440 (95.2%)	Medical use (n, %) N=180 (1.6%)	Non-medical use (n, %) N=345 (3.2%)	Chi^2 p-value
Age:				
10-13	2479 (23.8)	9 (5.0)	7 (2.0)	**<0.0001**
14-15	3125 (29.9)	40 (22.2)	88 (25.5)	
16-18	4836 (46.3)	131 (72.8)	250 (72.5)	
Gender:				
Male	4967 (47.6)	75 (41.7)	192 (55.7)	**0.003**
Female	5473 (52.4)	105 (58.3)	153 (44.4)	
Living situation:				
Live w/both parents	5790 (55.5)	104 (57.8)	146 (42.3)	**<0.0001**
Separated parents	3717 (35.6)	59 (32.8)	145 (42.0)	
Not living w/parents	930 (8.9)	17 (9.4)	54 (15.7)	
School grades:				
A-B	8022 (76.9)	126 (70.0)	188 (54.5)	**<0.0001**
C-D	2154 (20.7)	42 (23.3)	136 (39.4)	
F-Unknown	257 (2.5)	12 (6.7)	21 (6.1)	
Employed:				
No	7766 (74.5)	103 (58.2)	204 (59.1)	**<0.0001**
Yes	2657 (25.5)	74 (41.8)	141 (40.9)	
Marijuana use:				
Never	7630 (73.2)	69 (38.6)	42 (12.2)	**<0.0001**
Ever (not in past 30 days)	1224 (11.7)	39 (21.8)	60 (17.4)	
Recent	1573 (15.1)	71 (39.7)	243 (70.4)	
Tobacco use:				
Non-smoker	7949 (76.4)	98 (55.1)	76 (22.0)	**<0.0001**
Former smoker	1592 (15.3)	44 (24.7)	89 (25.8)	
Current smoker	870 (8.4)	36 (20.2)	180 (52.2)	
Alcohol use:				
Never	5894 (56.7)	59 (33.0)	29 (8.4)	**<0.0001**
Ever (not in past 30 days)	1910 (18.4)	29 (16.2)	43 (12.5)	
Recent	2589 (24.9)	91 (50.8)	273 (79.1)	

Table 2

Adjusted odds ratios for past 30-day non-medical use of prescription opioids by gender

Characteristic	Adjusted odds ratio for non-medical use (compared w/medical use and no use combined) (n=10,965)	
	Males **OR (95% CI)**	**Females** **OR (95% CI)**
Age (years)	1.0 (0.9, 1.2)	**1.1 (1.0, 1.2)**
Living situation:		
Live w/both parents	1.0	1.0
Separated parents	1.0 (0.7, 1.5)	1.2 (0.8, 1.7)
Not living w/parents	1.1 (0.7, 1.8)	1.0 (0.6, 1.7)
School grades:[#]		
A-B	1.0	1.0
C-D	1.0 (0.8, 1.5)	**1.7 (1.2, 2.5)**
Employed:		
No	1.0	1.0
Yes	1.1 (0.8, 1.6)	1.0 (0.7, 1.5)
Marijuana use:		
Never	1.0	1.0
Ever (not in past 30 days)	**5.0 (2.5, 9.9)**	**1.9 (1.0, 3.6)**
Recent	**9.3 (5.0, 17.5)**	**4.6 (2.7, 7.9)**
Tobacco use:		
Non-smoker	1.0	1.0
Former smoker	**1.9 (1.2, 3.1)**	1.4 (0.8, 2.3)
Current smoker	**4.5 (2.8, 7.0)**	**2.8 (1.7, 4.5)**
Alcohol use:		
Never	1.0	1.0
Ever (not in past 30 days)	1.3 (0.6, 2.5)	**2.3 (1.0, 5.1)**
Recent	**2.7 (1.5, 4.8)**	**5.3 (2.5, 10.9)**

[*] Adjusted for all other variables

[#] F and unknown grades not included in logistic regression model due to small numbers

Table 3

Gender differences in characteristics of medical users and non-medical users of any prescription opioids in the past 30 days (n=525)

	Patterns of Opioid Use					
	Males			Females		
Characteristic	Medical use (n, %) N=75	Non-medical use (n, %) N=192	Chi² p-value	Medical use (n, %) N=105	Non-medical use (n, %) N=153	Chi² p-value
Age:						
10-13	3 (4.0)	3 (1.6)	0.49*	6 (5.7)	4 (2.6)	0.31*
14-15	16 (21.3)	45 (23.4)		24 (22.9)	43 (28.1)	
16-18	56 (74.7)	144 (75.0)		75 (71.4)	106 (69.3)	
Living situation:						
Live w/both parents	39 (52.0)	85 (44.3)	0.32	65 (61.9)	61 (39.9)	**0.0023**
Separated parents	29 (38.7)	77 (40.1)		30 (28.6)	68 (44.4)	
Not living w/parents	7 (9.3)	30 (15.6)		10 (9.5)	24 (15.7)	
School grades:						
A-B	45 (60.0)	100 (52.1)	0.12	81 (77.1)	88 (57.5)	**0.0047**
C-D	22 (29.3)	80 (41.7)		20 (19.1)	56 (36.6)	
F-Unknown	8 (10.7)	12 (6.3)		4 (3.8)	9 (5.9)	
Employed:						
No	46 (63.0)	108 (56.3)	0.39	57 (54.8)	96 (62.8)	0.25
Yes	27 (37.0)	84 (43.8)		47 (45.2)	57 (37.3)	
Marijuana use:						
Never	22 (29.7)	15 (7.8)	**<0.0001**	47 (44.8)	27 (17.7)	**<0.0001**
Ever (not in past 30 days)	15 (20.3)	35 (18.2)		24 (22.9)	25 (16.3)	
Recent	37 (50.0)	142 (74.0)		34 (32.4)	101 (66.0)	
Tobacco use:						
Non-smoker	36 (48.7)	37 (19.3)	**<0.0001**	62 (59.6)	39 (25.5)	**<0.0001**
Former smoker	24 (32.4)	53 (27.6)		20 (19.2)	36 (23.6)	

	Patterns of Opioid Use					
		Males			**Females**	
Current smoker	14 (18.9)	102 (53.1)		22 (21.2)	78 (51.0)	<0.0001
Alcohol use:			<0.0001			
Never	25 33.8)	18 (9.4)		34 (32.4)	11 (7.2)	
Ever (not in past 30 days)	12 (16.2)	24 (12.5)		17 (16.2)	19 (12.4)	
Recent	37 (50.0)	150 (78.1)		54 (51.3)	123 (80.4)	

*
Fishers exact test p-value

Table 4

Adjusted odds ratios for past 30-day non-medical use of prescription opioids by gender

Characteristic	Adjusted odds ratio for non-medical use (compared w/medical use) (n=518)	
	Males **OR (95% CI)**	**Females** **OR (95% CI)**
Age (years)	0.9 (0.7, 1.1)	1.0 (0.8, 1.2)
Living situation:		
Live w/both parents	1.0	1.0
Separated parents	1.2 (0.7, 2.4)	1.6 (0.8, 3.0)
Not living w/parents	2.2 (0.8, 6.2)	1.7 (0.7, 4.4)
School grades:		
A-B	1.0	1.0
C-D	1.3 (0.6, 2.5)	1.6 (0.8, 3.3)
Employed:		
No	1.0	1.0
Yes	1.2 (0.6, 2.3)	0.6 (0.3, 1.2)
Marijuana use:		
Never	1.0	1.0
Ever (not in past 30 days)	1.8 (0.7, 5.2)	0.8 (0.3, 2.0)
Past 30 days	2.2 (0.8, 5.6)	1.7 (0.8, 3.9)
Tobacco use:		
Non-smoker	1.0	1.0
Former smoker	1.4 (0.7, 3.1)	1.8 (0.8, 3.9)
Current smoker	**4.4 (1.8, 10.7)**	**3.2 (1.4, 7.0)**
Alcohol use:		
Never	1.0	1.0
Ever (not in past 30 days)	1.6 (0.5, 4.6)	**3.0 (1.0, 8.6)**
Past 30 days	2.1 (0.8, 5.4)	**4.1 (1.7, 10.4)**

[*]
Adjusted for all other variables