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Sources of Prescriptions for Misuse by Adolescents: Differences in Sex, Ethnicity, and Severity of Misuse in a Population-Based Study

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Abstract

Objective—Epidemiological data indicate that adolescent prescription misuse rates have risen over the past decade. Despite this, little work has examined sources for opioids, tranquilizers and stimulants or evaluated gender or ethnic differences, or whether different sources correspond to differences in other risk behaviors.

Methods—Data from the 2005 and 2006 National Survey on Drug Use and Health (adolescent $n = 36,992$) were used to address these questions. Frequencies and percentages for source categories were calculated and potential gender and ethnic differences in medication source were evaluated using chi-square analyses; logistic regression analyses evaluated whether use of specific sources corresponded to a greater likelihood of concurrent substance use or depressive episodes.

Results—The most common source of medication was from friends or family, for free; other common sources included obtaining medication from a physician, purchasing medication, or theft (usually from friends or relatives). Gender differences were found, predominately for opioids: females were more likely to steal medication or obtain it for free; males were more likely to purchase medication or acquire it from a physician. Caucasian adolescents were more likely to purchase opioids, whereas African-American adolescents were more likely to misuse opioids obtained from a physician.

Conclusions—Across medication classes, adolescents who most recently acquired medication by purchasing it had the worst risk profile in terms of concurrent substance use and severity of prescription misuse. These results may help identify subgroups of adolescent prescription misusers who are most vulnerable to consequences from misuse or other substance use.

Keywords

Adolescent; Prescription Medications; Misuse; Source

INTRODUCTION

Numerous reports over the past five years have noted an increase in the prevalence of prescription misuse by adolescents.^{1–5} The rising rates of prescription misuse stand in stark contrast to the declines seen since 2000 in the rates of use of any illicit drug, alcohol or tobacco by adolescents.^{2, 3} Currently, only alcohol, tobacco and marijuana have higher rates of use/misuse by adolescents than prescription medications.³ Despite important medical uses for these medications, the misuse of opioid, stimulants, tranquilizers (benzodiazepines) and

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sedatives (barbiturates) poses significant risks, including the potential for physical and/or psychological dependence and overdose. To illustrate, over one-third of adolescents who misused a medication in the past year have developed one or more symptoms of a substance use disorder from prescription misuse, with the most notable correlates being a past year major depressive disorder, past year cocaine or inhalant misuse and 10 or more past year episodes of misuse.⁶ Careful exploration of the phenomenon of adolescent prescription misuse has great public health importance, as it could inform the development of prevention programs for adolescents at higher risk of misuse and treatment for those adolescents who have initiated misuse.

To this end, investigators have begun to evaluate the correlates or risk factors associated with the misuse of prescription medications.^{6–12} These investigations have made considerable progress in establishing the factors that mark those with a greater likelihood of misuse, identifying differences associated with gender, ethnicity, other addictive substance use, and psychopathology, including depressive symptoms and/or diagnosis. In addition, the characteristics of adolescents who divert stimulant medications are becoming better understood (for a review, please see¹³); diversion across medication classes has also been studied by Boyd and collaborators¹⁴ and by Daniel and collaborators.¹⁵ Outside of the characteristics of those who divert their medication or receive diverted medication, however, much less is known about the specific sources of prescription medications used by adolescents who misuse them.

McCabe, Boyd and collaborators^{16–18} conducted a series of studies using young adult undergraduate students and found that the most common sources of medications were friends or peers, followed by family. Fewer students obtained their medications from a drug dealer, and almost no students used the internet to acquire medications.^{16–18} It appears that male undergraduates were more likely to get opioid medication from peers or a drug dealer, whereas females were more likely to acquire opioids from family members;¹⁹ furthermore, those who obtained their medication from friends were more likely to have heavier use of other substances (e.g., binge alcohol use) than those who obtained their medication from family members.¹⁷ Finally, Caucasian undergraduates were more likely to use peer sources than African-American undergraduates, whereas African-Americans were more likely than Caucasians to use family sources.¹⁸

The published data on the sources used by adolescents to obtain prescription opioids comes from Boyd and colleagues,⁷ using participants from an urban secondary school in the Detroit, Michigan area. Of the 131 adolescents who endorsed lifetime opioid misuse, 93 (70%) answered a free-response question as to how they obtained the medication. The most common source was from family members (34% of those responding), followed by peers (17%) and a drug dealer or theft (14%); nearly half of students, however, gave an answer that was not coded because of difficulty in interpreting the response.⁷

Thus, data on the sources used by adolescents to obtain prescription medications are lacking. Also, it is unclear how gender or ethnic differences might operate to influence the use of particular sources by adolescents. Finally, it is not known whether use of a specific source might signal a greater likelihood of concurrent substance use (e.g., alcohol, tobacco) or more severe use of prescriptions among adolescents who misuse medications. This study attempted to fill these gaps in the literature through the use of data from the 2005 and 2006 versions of the National Survey on Drug Use and Health (NSDUH). This work extends our previous investigation⁶ that evaluated demographic, psychosocial and risk behavior correlates by examining similar correlates and risk behaviors based on the source used by the adolescent to obtain medication for misuse. To the best of our knowledge, this is the first investigation using nationally representative data to examine the sources by which

adolescent prescription misusers acquire opioid, stimulant and tranquilizer medication. Furthermore, we believe this is the first study to examine potential gender and ethnic differences in sources for prescription medication utilized by adolescents. We proposed to investigate the following research questions: First, do males and females differ in terms of sources utilized to obtain medication for misuse? Second, are there differences by ethnicity for sources utilized? Three, is the use of a specific source associated with a stronger concurrent risk profile, in terms of concurrent substance use and depression?

METHOD

Data were obtained from the 2005 and 2006 public use files of the NSDUH, which is a yearly in-home survey of the civilian, non-institutionalized US population. This survey has provided data for previous publications on the correlates of adolescent prescription misuse.^{6, 8, 10} Together, over 135,000 individuals were surveyed for the 2005 and 2006 versions NSUDH, with 111,184 included in the public use file after individuals were excluded for confidentiality reasons. Of those, 36,992 were adolescents between 12 and 17 years of age, inclusive. The NSDUH was designed to oversample adolescents, young adults, African-Americans and people of Hispanic/Latino ethnicity, and it used an independent, multistage area probability sample for all states and the District of Columbia. Households were selected for screening, and an in-person interview to identify individuals aged 12 and older was conducted. Following identification of eligible households, full interviews were conducted on a random sample.

The 2005 and 2006 versions of the NSDUH combined both interviewer-assisted computer survey methods and self-interview using audio computer-assisted methods. To begin the survey, the field interviewer set up the computer for participant use, which was followed by self-interview using audio computer-assisted methods to assess substance use and other psychosocial variables. During the self-interview using audio computer-assisted methods portion of the survey, the participant listened to the survey questions and the field interviewer remained out of view of the computer screen; these procedures were employed to preserve privacy and increase honest responding on sensitive questions. Once all audio computer-assisted self-interview questions were asked, the field interviewer returned to conduct the interviewer-assisted questions about demographic variables.^{20, 21}

Of the variables used here, illicit drug use, prescription medication misuse and depressive symptoms were asked in the self-interview format using audio computer-assisted methods.²¹ Age, race or ethnicity and gender were assessed using the interviewer-assisted method.²¹ The 2005 and 2006 versions of the NSDUH included automatic skip-outs and consistency checks based on previous responses; these were utilized to increase full responding and data consistency. In cases where a participant's responses remained inconsistent or missing, statistical imputation was used to reduce missing data. Imputation rates for prevalence data ranged from 1.8 to 0.6% of participant answers; data on sources did not use statistical imputation. Both versions were normed to the 2000 census and included a participant payment of \$30. Screening and full interview response rates for the 2005 NSDUH were 91% and 76%, respectively; for the 2006 NSDUH they were 91% and 74%, respectively. Data were weighted to create unbiased population-based estimates for assessed behaviors (for more information on the sampling procedures, methodology and questions used to assess behaviors, please see^{20, 21}).

As noted by Compton and Volkow,¹ research on prescription misuse is limited by a lack of common definitions. Given the need to clearly define terms, we will define misuse as: "as any intentional use of a medication with intoxicating properties outside of a physician's prescription for a bona fide medical condition, excluding accidental misuse." p. S4,¹ This

definition was selected, in part, due to its correspondence to the questions used in the NSDUH.²⁰

The Institutional Review Board of the Research Triangle Institute approved and oversaw the 2005 and 2006 NSDUH surveys. This research is considered exempt at Yale University School of Medicine.

Measures

Lifetime participant misuse of prescription medications was evaluated through the use of a specified list of medication names for each drug class. To aid recall, pictures of the medications were provided while participants answered questions concerning misuse.²² Participants who endorsed misuse within a medication class answered further questions, including the most recent source for the medication. Only those who endorsed past year misuse were queried as to their most recent source of medication for misuse. The ten choices for most recent source for medication were: “got from one doctor”, “got from more than one doctor”, “wrote fake prescription”, “stole from doctor's office, clinic, hospital or pharmacy”, “got from friend or relative for free”, “bought from friend or relative”, “took from friend or relative without asking”, “bought from drug dealer or other stranger”, “bought on the internet”, or “got some other way”.

These were recoded into the following collapsed categories: free from friend or relative (only “got from friend or relative for free”); purchased (bought from friend or relative”, “bought from drug dealer or other stranger”, or “bought on the internet”); from physician (“got from one doctor” or “got from more than one doctor”); stole/fake prescription (“took from friend or relative without asking”, “wrote fake prescription”, or “stole from doctor's office, clinic, hospital or pharmacy”); and other (only “got some other way”).

Other variables of interest were chosen based on previous investigations involving adolescent prescription misuse and medication sources used by college students.^{6, 17, 18} These included gender, ethnicity, past month cigarette smoking frequency, past month binge alcohol use, past month marijuana use, past year cocaine use, number of prescription misuse episodes in the past year, and past year Major Depressive Episode (MDE). For the substance use measures (daily cigarette use, past month binge alcohol use, past month marijuana use and past year cocaine use), participants were asked initially if they had ever used the substance in question. Participants who endorsed ever use of the substance were then asked a series of questions, including items assessing time since last use and frequency of use within the past year and past 30 days. For the question assessing most recent use, participants could endorse use within the last 30 days, use within the last year but not last 30 days or use at a point not in the past year. Frequency of use in the past month or year was a free response question in which participants entered the exact number of days the substance was used. For past month binge alcohol use, participants were asked to provide the number of days in which they consumed 5 or more drinks (defined to participants) in one occasion. Prevalence of a past year MDE was estimated using questions directly based on the DSM-IV criteria for this disorder;²³ similar measurements appear to have good reliability and validity.^{24, 25} Finally, the number of times a medication was misused in the past year was recoded into two categories based on previous work: fewer than 10 misuse events and 10 or more misuse episodes.⁶

DATA ANALYSIS

Frequencies and percentages of misuse sources for opioids, tranquilizers, stimulants and sedatives were calculated initially for all adolescents (including non-misusers) and then among adolescent misusers only. Due to the low rates of sedative misuse, data on sedatives

were excluded from all inferential analyses. Chi-square analyses were conducted to examine gender and ethnic differences in sources utilized to obtain medications for misuse. Analyses involving ethnicity included only Caucasian, African-American and Hispanic/Latino adolescents, as the Multiracial, Asian-American, Native American/Alaskan Native and Hawaiian/Pacific Islander categories contained too few adolescents with past year misuse for stable comparisons. All analyses investigating potential ethnic differences used Bonferroni-corrected *p*-values to reduce the chance of Type I error resulting from multiple pairwise comparisons. Finally, univariate logistic regressions were performed to investigate associations between source of prescription medications and substance use behaviors and presence of a past year MDE. Adjusted odds ratios (controlling for age and gender) and 95% confidence intervals were calculated. For these analyses, adolescents who misused medication obtained from a physician were set as the reference group; this group was chosen as the reference because it was expected that these individuals obtained their medication for a legitimate medical condition and used much of it to treat this condition. In contrast, individuals in the other groups specifically sought out medication from another, non-medical source, perhaps indicating that the medication was obtained specifically for misuse. All analyses used population-based weights in order to control for the effects of sampling bias. All analyses were conducted in SPSS version 14.2 (Chicago, IL).

RESULTS

Misuse Prevalence

Data from the combined 2005 and 2006 versions of the NSDUH indicated that the lifetime prevalence of misuse was 10.1% for the opioids, 3.0% for the tranquilizers, 3.4% for the stimulants and 0.9% for the sedatives; lifetime misuse prevalence for any medication in these classes was 12.1%. For past year misuse, the prevalence rates were 7.0%, 2.0%, 2.0%, 0.4%, and 8.3% respectively. For past month misuse, the prevalence rates were 2.7%, 0.6%, 0.7%, 0.1%, and 3.3% respectively.

Sources of Prescription Medications

These data are summarized in Table 1. Across all classes of medication, the most common source was from friends or relatives for free (33.4–49.7%). With the exception of the opioids, the second most common source was to obtain the medication by purchasing it (13.1%–29.7%). This was most commonly accomplished through purchases from friends or relatives, though between 4.6 and 12.0% of adolescents purchased medication for misuse from a drug dealer, depending on the medication examined. The second most common source for adolescents to acquire opioids was from a physician (22.2%), though this was a somewhat less common source of stimulants and tranquilizers (7.7% and 12.3%, respectively). Theft of medication for misuse was a less common, but significant source of medication, with between 9.2 and 10.9% of adolescents obtaining their medication in this way. In all, few adolescents reported that they obtained their medications through theft from a medical source (0.5%–1.0%), by forging a prescription (0%–0.5%) or through making a purchase from an internet source (0%–1.6%).

The 2006 version of the NSDUH includes data on the source of medication used by friends or family when the adolescent participant endorsed either as his or her most recent source of medication. Across medication classes, the most common source of a friend's or relative's medication was from a physician (56.9–81.3%). Except for the sedatives, the second most common source was for free from other friends or relatives (11.3–20.6%), followed by purchasing the medication (8.1–15.7%) and theft (3.0–8.9%). In the case of the sedatives, theft (12.5%) was the second most common source, with few participants (<2%) endorsing other sources.

Gender and Ethnic Differences

Significant gender differences existed within all of the sources adolescents used to obtain opioids except for the “other” category. Females were more likely to acquire opioids from friends or relatives for free ($\chi^2(1) = 5.23, p = .022$) or to steal opioids ($\chi^2(1) = 6.87, p = .009$) than were males. Conversely, males were more likely than females to purchase opioids ($\chi^2(1) = 7.06, p = .008$) or to obtain them from a physician ($\chi^2(1) = 10.7, p = .001$). The only other significant gender difference was that females tended to steal tranquilizers more often than males ($\chi^2(1) = 4.07, p = .04$). There was also a trend for males to be more likely to purchase tranquilizers than females ($\chi^2(1) = 2.82, p = .09$). No significant gender differences were found for the stimulants. These data are summarized in Table 2.

In terms of ethnic differences, African-Americans were more likely than Caucasian adolescents to acquire either opioids ($\chi^2(1) = 48.4, p < .001$) or tranquilizers ($\chi^2(1) = 8.36, p = .009$) from a physician. Similarly, African-American adolescents were more likely than Hispanic/Latino adolescents to obtain opioids from a physician ($\chi^2(1) = 5.4, p = .041$). African-American adolescents tended to steal stimulants more often than either Caucasian ($\chi^2(1) = 32.6, p < .001$) or Hispanic/Latino adolescents ($\chi^2(1) = 12.7, p < .001$). Caucasian adolescents, however were more likely to purchase opioids than were either African-American ($\chi^2(1) = 11.1, p = .002$) or Hispanic/Latino adolescents ($\chi^2(1) = 12.1, p = .001$). Caucasian adolescents also more commonly got opioids from friends or relatives for free than African-American adolescents ($\chi^2(1) = 17.5, p < .001$). Finally, Hispanic/Latino adolescents were more likely than Caucasian adolescents to acquire opioids from some “other” source ($\chi^2(1) = 9.12, p = .006$). Data concerning ethnic differences in sources of prescription medication are summarized in Table 3.

Prescription Medication Source, Substance Use and Depression

Regressions revealed that adolescents who purchased opioids, stole opioids, or got opioids from friends or relatives for free had an elevated likelihood of past month binge alcohol use, daily cigarette smoking, past month marijuana use, and past year cocaine use, but a lower risk for a past year MDE, when compared to adolescents who obtained opioids from a physician. Only adolescents who purchased opioids had greater odds of 10 or more past year prescription misuse episodes, when compared to adolescents who acquired them from a physician. The converse was true for adolescents who stole opioids or got them from a friend or relative for free, with a significantly lower likelihood of 10 or more misuse episodes.

Adolescents who purchased tranquilizers had a greater likelihood of past month binge alcohol use, past month marijuana use and past year cocaine use, when compared to adolescents who misused tranquilizers obtained from a physician. Similarly, comparisons of adolescents who obtained stimulants by purchasing them and those who obtained them from a physician revealed that stimulant purchasers had a greater likelihood of daily cigarette smoking, past month marijuana use and past year cocaine use. Adolescents who acquired stimulants from a friend or relative at no cost were more likely to have used marijuana in the past month than adolescents who obtained stimulants from a physician. That said, adolescents who got opioids, stimulants or tranquilizers from friends or relatives for free had lower odds of 10 or more prescription misuse episodes in the past year. These data are summarized in Table 4.

DISCUSSION

To the best of our knowledge, this was the first investigation to use nationally representative data to examine the sources that adolescents utilize to acquire prescription medication for

misuse. In all, these findings are relatively consistent with those of McCabe, Boyd and collaborators^{7, 17, 18} in their investigations of college students and adolescents. While methodological differences in data coding make comparisons inexact, it seems that friends and relatives serve as the most common source of medications for adolescents, with purchases from drug dealers and theft of medications (usually from friends or family) also somewhat common sources. As seen in the investigations of McCabe, Boyd and colleagues, few adolescents used the internet as a source of medication.

Gender and ethnic differences were primarily seen for sources of opioids, although the lack of differences for tranquilizer or stimulant sources should be interpreted conservatively, given the lower misuse rates of these medications. While males were more likely to purchase opioids or acquire them from a physician, females more often obtained them from friends or relatives for free or through theft. Caucasian adolescents appeared to be more likely to purchase medications, though the only significant difference was seen with the opioids. Conversely, African-Americans appeared more likely to obtain opioids and tranquilizers from a physician.

While adolescents who misused medication obtained from a physician appeared less likely to have concurrent substance use than those obtaining their medications from other sources, adolescents who obtained opioids from a physician had greater odds of a past year MDE. Furthermore, adolescents who misused medication obtained from a physician were more likely to have 10 or more misuse episodes than those who obtained the medication for free or those who stole it. They were less likely to have 10 or more misuse episodes than adolescents who purchased medication for misuse, however. Past work has indicated that having 10 or more misuse episodes in the past year is one of the strongest correlates among adolescents of experiencing consequences (i.e., symptoms of a substance use disorder) from prescription misuse;⁶ these results may signal an increased risk for dependence on a prescription medication among those who obtain medication from a physician or who purchase medication for misuse.

In comparing risk profiles, this study offers preliminary evidence that the group with greatest odds of concurrent other substance use may be those who purchased their medication for misuse from friends, family or drug dealers. In comparisons with adolescents who misused medication obtained from a physician, adolescents who buy medication are more likely to have endorsed binge alcohol use (opioids and tranquilizers), daily cigarette use (opioids and stimulants), past month marijuana use (all three classes examined), and past year cocaine use (opioids and stimulants). In all, adolescents who purchased their medications had the highest odds ratios for concurrent other substance use in 9 of the 12 possible categories (4 per substance: binge alcohol use, daily smoking, monthly marijuana use and past year cocaine use). Furthermore, adolescents who purchase opioids have a higher likelihood of 10 or more misuse episodes in the past year; as mentioned previously, this is associated with an increased likelihood of substance use disorder symptoms from prescription misuse. Nonetheless, these results should be interpreted cautiously, as pairwise comparisons were not performed, due to the high risk for type I error. Furthermore, the cross-sectional data provided by the NSDUH do not allow for an inference of causality. Simply, these appear to be robust associations that only offer a future direction for potential investigations.

Seven limitations of this work should be noted. First, the NSDUH asks for the most recent source of medications for misuse among participants, not the most commonly used source. Thus, some adolescents in one source group may actually use another source more regularly, though it is expected that this proportion would be relatively small. Second, given the cross-sectional nature of the NSDUH, only correlation can be established here. Future studies

should employ longitudinal sources to investigate temporal relationships between prescription misuse, source of medication and other high-risk behaviors. Third, the full response rates for the 2005 and 2006 editions of the NSDUH were 76% and 74%, respectively. Given that roughly one-quarter of those approached did not participate in the full survey, some self-selection bias may have occurred. Fourth, while the use of self-interview using audio computer-assisted methods was likely to have maximized honest reporting, the self-report nature of the data allow for biases based on misreporting of data by participants. Fifth, the query used by the NSDUH to determine whether an individual has misused a medication is somewhat complex, and this may have resulted in some cases of misclassification. Sixth, some items in the NSDUH appeared to have poor reliability and validity as assessments, namely assessments of Anxiety Disorder or Attention Deficit Hyperactivity Disorder diagnosis. These items were single-question items asking the participant if s/he ever had the condition or was diagnosed with this condition by a doctor. Because of the poor psychometrics of such items, these were left out of analyses, limiting potential analyses and findings. Finally, the questions used by the NSDUH to do not differentiate between those who obtained their medication for misuse from family and those who obtained it from friends, and the NSDUH does not differentiate between those who misuse medications for the feeling or “high” it causes and those who are self-medicating a condition. Evidence from college-aged samples^{17, 18} indicates that both may be important distinctions.

Clinically, these results have implications for physicians who prescribe these medications to adolescents. First, it is important to educate both adolescents taking these medications and their parents about the potentially addictive nature of the medication and the risks associated with misuse (e.g., overdose). Second, parents should be urged to monitor the medication used by their adolescent and should consider holding and dispensing the medication; this would directly limit the medication's misuse potential. Finally, parents should be urged to discuss prescription misuse and its dangers with their adolescents. In addition, physicians should screen all adolescent patients for prescription misuse, regardless of whether or not that physician has prescribed a commonly misused medication to that adolescent.

In all, these findings indicate that friends or family are the most common sources of medications, often giving the medication to adolescent misusers for free. Physicians, theft (often from friends and family) and obtaining the medication through purchases are also somewhat common. Males and Caucasian adolescents appear to be more likely to purchase medications for misuse, which females are more likely to obtain them from friends or family for free. Adolescents who purchase their medication may be a vulnerable subgroup of misusers, though this needs further investigation. Overall, these findings indicate that accounting for most recent source of prescription medication among misusers could be important in treatment programs, as associated levels of depression and substance use vary by source.

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Table 1

Source of prescription medications for misuse among adolescents

Source	Opioids			Tranquilizers			Stimulants			Sedatives		
	n	of full sample	%	n	of full sample	%	n	of full sample	%	n	of full sample	%
<i>Physician</i>	477	1.3	22.2	46	0.1	7.7	63	0.2	12.3	26	0.1	22.4
One	420		19.5	38		6.5	55		10.8	24		20.2
More than one	57		2.7	8		1.3	8		1.5	3		2.3
<i>Theft/Fake Prescription</i>	238	0.7	11.0	65	0.2	11.0	62	0.2	12.1	11	<0.1	9.7
Stole from Friend/Relative	222		10.3	57		9.6	56		10.9	11		9.2
Stole from Medical Source	11		0.5	6		1.0	4		0.8	1		0.5
Fake Prescription	4		0.2	2		0.4	2		0.5	0		0
<i>Free from Friend/Relative</i>	1010	2.8	47.0	281	0.8	47.2	254	0.7	49.7	39	0.1	33.4
<i>Purchased</i>	283	0.8	13.1	177	0.5	29.7	105	0.3	20.5	27	0.1	22.6
from Friend/Relative	183		8.5	104		17.5	60		11.8	19		6.0
from Drug Dealer/Stranger	98		4.6	71		12.0	36		7.1	8		6.6
from Internet	2		0.1	2		0.3	8		1.6	0		0
<i>Other Source</i>	144	0.4	6.7	26	0.1	4.4	27	0.1	5.3	14	<0.1	11.9
<i>No Misuse in Past Year</i>	33965	94.0		36049	98.4		36210	98.6		36597	99.7	

Table 2

Gender and sources of prescription medications for misuse

	Males		Females		Statistics
Source	n	%	n	%	
Opioids					
Physician	229	22.7%	212	17.6%	$\chi^2(1) = 10.7, p = .001$
Theft/Fake Rx	93	9.2%	145	12.7%	$\chi^2(1) = 6.87, p = .009$
Friend/Relative	449	44.3%	561	49.3%	$\chi^2(1) = 5.23, p = .022$
Purchased	154	15.2%	129	11.3%	$\chi^2(1) = 7.06, p = .008$
Other	61	6.0%	83	7.3%	$\chi^2(1) = 1.38, p = .24$
Tranquilizers					
Physician	24	9.6%	22	6.4%	$\chi^2(1) = 2.15, p = .14$
Theft/Fake Rx	20	8.0%	46	13.3%	$\chi^2(1) = 4.07, p = .04$
Friend/Relative	113	45.4%	167	48.8%	$\chi^2(1) = 0.42, p = .52$
Purchased	83	33.3%	93	27.0%	$\chi^2(1) = 2.82, p = .09$
Other	9	3.6%	17	4.9%	$\chi^2(1) = 0.60, p = .44$
Stimulants					
Physician	29	15.0%	34	10.7%	$\chi^2(1) = 2.05, p = .15$
Theft/Fake Rx	22	11.4%	40	12.6%	$\chi^2(1) = 0.17, p = .68$
Friend/Relative	95	49.2%	159	50.0%	$\chi^2(1) = 0.04, p = .84$
Purchased	33	17.1%	72	22.6%	$\chi^2(1) = 2.31, p = .13$
Other	14	7.3%	13	4.1%	$\chi^2(1) = 2.38, p = .12$

Table 3

Ethnicity and sources of prescription medications for misuse

	Caucasian (C)		African-American (A)		Hispanic/Latino (H)		Statistics*
Source	n	%	n	%	n	%	
<i>Opioids</i>							
Physician	259	17.5%	92	36.6%	81	27.2%	A > C: $\chi^2(1) = 48.4, p < .001$ A > H: $\chi^2(1) = 5.4, p = .041$
Theft/Fake Rx	163	11.0%	31	12.2%	27	9.0%	
Friend/Relative	747	50.3%	91	36.1%	134	45.4%	C > A: $\chi^2(1) = 17.5, p < .001$
Purchased	230	15.5%	19	7.6%	23	7.9%	C > H: $\chi^2(1) = 12.1, p = .001$ C > A: $\chi^2(1) = 11.1, p = .002$
Other	85	5.7%	19	7.6%	31	10.5%	H > C: $\chi^2(1) = 9.12, p = .006$
<i>Tranquilizers</i>							
Physician	34	6.8%	4	28.5%	6	10.4%	A > C: $\chi^2(1) = 8.36, p = .009$
Theft/Fake Rx	54	10.9%	3	21.4%	6	10.4%	
Friend/Relative	236	47.5%	5	30.1%	27	46.8%	
Purchased	151	30.4%	2	15.2%	16	28.4%	
Other	22	4.5%	1	4.9%	2	3.9%	
<i>Stimulants</i>							
Physician	44	10.9%	3	13.0%	13	19.6%	
Theft/Fake Rx	39	5.8%	11	51.5%	9	13.0%	A > C: $\chi^2(1) = 32.6, p < .001$ A > H: $\chi^2(1) = 12.7, p < .001$
Friend/Relative	209	52.1%	6	25.9%	31	46.7%	
Purchased	88	21.9%	2	8.3%	10	15.0%	
Other	22	5.5%	0	0.0%	4	5.6%	

Notes:

* = Pairwise comparisons are corrected for multiple comparisons using a Bonferroni procedure; only significant pairwise comparisons are noted.

Table 4

Medication source and risk-behavior correlates

	Binge Alcohol Use	Daily Smoking (Cigarette)	Monthly Marijuana Use	10 Prescription Misuse Episodes	Past Year MDE	Past Year Cocaine Use
Source						
<i>Opioids</i>						
Physician	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Theft/Fake Rx	2.03 (1.45–2.86) ***	2.25 (1.32–3.82) **	2.29 (1.61–3.24) ***	0.64 (0.47–0.88) **	0.34 (0.22–0.51) ***	2.97 (1.78–4.94) ***
Friend/Relative	1.75 (1.36–2.24) ***	2.60 (1.62–3.73) ***	1.74 (1.34–2.25) ***	0.63 (0.50–0.79) ***	0.51 (0.37–0.72) ***	1.80 (1.18–2.74) **
Purchased	3.55 (2.60–4.91) ***	6.44 (4.08–10.2) ***	3.75 (2.70–5.21) ***	1.74 (1.25–2.41) ***	0.52 (0.34–0.80) **	5.08 (3.22–8.01) ***
Other	1.90 (1.27–2.83) **	2.94 (1.64–5.27) ***	1.58 (1.04–2.41)	0.84 (0.57–1.22)	0.65 (0.39–1.11)	2.49 (1.36–4.54) **
<i>Tranquilizers</i>						
Physician	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Theft/Fake Rx	2.42 (1.09–5.37)	1.91 (0.76–4.81)	1.39 (0.65–2.99)	0.59 (0.24–1.43)	0.99 (0.40–2.41)	2.12 (0.72–6.20)
Friend/Relative	2.08 (1.07–4.05)	1.08 (0.48–2.40)	1.02 (0.54–1.93)	0.32 (0.15–0.67) **	1.66 (0.77–3.61)	1.62 (0.63–4.15)
Purchased	3.86 (1.91–7.79) ***	1.51 (0.67–3.42)	2.24 (1.15–4.37) **	0.99 (0.44–2.20)	1.47 (0.65–3.32)	3.27 (1.27–8.44) **
Other	2.58 (0.94–7.08)	5.24 (1.75–15.7) **	1.03 (0.39–2.72)	0.83 (0.26–2.62)	0.96 (0.30–3.05)	5.99 (1.75–20.5) **
<i>Stimulants</i>						
Physician	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)	1.00 (Ref.)
Theft/Fake Rx	2.01 (0.94–4.32)	2.63 (0.93–7.46)	2.47 (1.14–5.31)	0.60 (0.29–1.26)	0.44 (0.18–1.06)	0.63 (0.21–1.95)
Friend/Relative	1.57 (0.86–2.89)	1.85 (0.75–4.57)	3.06 (1.63–5.74) ***	0.53 (0.29–0.97)	0.55 (0.26–1.19)	1.05 (0.47–2.35)
Purchased	1.97 (0.99–3.91)	4.79 (1.87–12.3) ***	3.35 (1.67–6.75) ***	1.54 (0.75–3.16)	0.56 (0.24–1.31)	3.02 (1.30–7.02) **
Other	1.42 (0.53–3.82)	3.91 (1.21–12.7)	1.81 (0.69–4.75)	1.36 (0.48–3.86)	1.60 (0.38–6.79)	1.72 (0.56–5.33)

Notes:

MDE = Major Depressive Episode

** = $p < .01$;*** = $p < .001$;