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## Motives for Medical Misuse of Prescription Opioids among Adolescents

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### Abstract

This study examined the motives for medical misuse of prescription opioids among adolescents, and assessed differences in motives by demographic characteristics, substance abuse, and diversion behaviors. A survey was conducted in 2011–2012 and the sample consisted of 2,964 adolescents (51% female). Thirteen percent reported past-year medical use of prescription opioids. Among those prescribed opioids in the past-year ( $n = 393$ ), 17.9% reported medical misuse (e.g., using too much, to get high, or to increase alcohol or other drug effects). The most prevalent motives for medical misuse were “to relieve pain” (84.2%) and “to get high” (35.1%). Multivariate analyses indicated that the motives differed by race, and that different motives were associated with different substance abuse and diversion behaviors. The odds of past-year substance abuse among medical misusers motivated by non-pain relief were over *fifteen* times greater than for nonusers (AOR = 15.2, 95% CI = 6.4 – 36.2,  $p < .001$ ). No such differences existed between nonusers and appropriate medical users, or between nonusers and medical misusers motivated by pain relief only. These findings improve our understanding of opioid medication misuse among adolescents and indicate the need for enhanced education about appropriate medical use, pain management, and patient communication with prescribers.

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## Keywords

Prescription; opioid; medication; medical use; medical misuse; nonmedical use; pain; motivations; adolescents; substance abuse; diversion; epidemiology

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Although recent increases in the medical and nonmedical use of prescription opioids among adolescents and young adults have garnered a great deal of attention in the United States, there has been much less attention given to the medical *misuse* of prescription opioids<sup>2,16,27,30,36,41</sup> For the purposes of this investigation, *medical misuse* of prescription opioids is defined as the use of prescribed opioids by a patient with a prescription for an opioid analgesic and who uses the prescription in a manner *not* intended by the prescriber (e.g. higher or more frequent doses, using intentionally to get high, or co-ingesting with alcohol or other drugs). For the purposes of this investigation, *nonmedical use* of prescription opioids is defined as the use of someone else's prescription opioids. Surprisingly, the largest national epidemiological studies conducted in the United States fail to distinguish between individuals who engage in medical misuse of prescription opioids from those who engage in nonmedical use of prescription opioids. And thus, these individuals are often combined in national estimates for studies such as the *Monitoring the Future Study*, *National Comorbidity Study*, *National Epidemiologic Survey on Alcohol and Related Conditions*, and the *National Survey on Drug Use and Health*. As a result, considerable gaps in knowledge remain due to limitations in measures and study designs.<sup>4,8,9,14,47</sup>

While the majority of adolescents who are prescribed opioids use them appropriately, at least one study has found that approximately 20% of adolescents prescribed opioids in the past year reported medical misuse.<sup>33</sup> While several past studies have examined the motives associated with nonmedical use of prescription opioids among adolescents and young adults,<sup>5,24,26,28</sup> the motives associated with medical misuse have not been investigated to date. Several commentaries have encouraged an improved understanding of the motives associated with medical misuse and nonmedical use of prescription opioids.<sup>4,8,9,47</sup>

Motives for nonmedical use of prescription opioids have been examined among college students,<sup>28</sup> Detroit area secondary school districts,<sup>5</sup> and high school seniors nationally.<sup>24,26</sup> Pain relief was the leading motive for nonmedical use of prescription opioids in college students (63%), the Detroit area sample (79%) and one of the leading motives among high school seniors nationally.<sup>5,26,26,28</sup> Across these studies, other common motives included to get high, to experiment, to relax or relieve tension, and to help sleep. In general, those who reported nonmedical use *only* to relieve pain did not differ from those who did not report nonmedical use with regard to other substance use and abuse. By contrast, the odds of other substance use and abuse were considerably higher among those who reported nonmedical use for non-pain relief motives compared to those who did not report nonmedical use. While previous studies have shown that a history of substance abuse is associated with increased opioid medication misuse in patients treated for chronic pain,<sup>37,39</sup> no studies have examined the motives for medical misuse of prescription opioids in the general population and whether such motives are associated with demographic characteristics, substance abuse, and diversion behaviors. Therefore, the main objectives of this study were to 1) determine the past-year prevalence of motives for medical misuse of prescription opioids among adolescents in two school districts in the metropolitan Detroit, Michigan area; and 2) assess the associations of motives for medical misuse with gender, race/ethnicity, substance abuse, and diversion behaviors.

## Methods

This study was conducted during a five-month period from December 2011 to April 2012, drawing on the entire population of middle and high school students in two public school districts in the Detroit metropolitan area (7<sup>th</sup> – 12<sup>th</sup> grades). The study received approval from the University of Michigan Institutional Review Board and a Certificate of Confidentiality was obtained from the National Institutes of Health. All parents in the school district were sent letters requesting permission for their children to participate in the Secondary Student Life Survey (SSLS), explaining that participation was voluntary, describing the relevance of the study, and assuring that all responses would be kept confidential. All participants were informed that a private research firm, unaffiliated with the school district, was contracted to set up the Web survey as well as store and maintain data to ensure that responses were kept confidential. Informed consent was obtained from each parent and assent was obtained from each respondent.

The Web survey was maintained on a hosted secure Internet site running under the secure sockets layer (SSL) protocol to ensure that the survey data were safely transmitted between the respondent's browser and the server. The survey took approximately 40 minutes to complete and administration was supervised by staff from the University of Michigan and a private research firm. The final response rate for this Web-based survey was 71%, based on guideline #2 (RR2) of the American Association for Public Opinion Research. The final response rate mirrors the overall response rate (71%) from a 2011 national school-based study of secondary school students using comparable data collection procedures.<sup>11</sup>

## Measures

The SSLS assesses demographic characteristics and bullying behaviors, and also includes items from national studies of alcohol and other drug use.<sup>11,17,41</sup> Standard measures of substance use and abuse were included, such as cigarette use, binge drinking, nonmedical use of prescription medications, marijuana and other drug use in the past year, the Drug Abuse Screening Test, short form (DAST-10) and the CRAFFT screening instrument.<sup>17,18,40</sup>

*Medical use of prescription opioids* was measured using the following question: "The following questions are about the use of prescribed medicines. We are not interested in your use of over-the-counter medicines that can be bought in drug or grocery stores without a prescription, such as aspirin, Sominex®, Benadryl®, Tylenol PM®, cough medicine, etc. On how many occasions in [separate questions were asked for (1) your lifetime and (2) the past 12 months] has a doctor, dentist, or nurse prescribed the following types of medicine for you?" A separate question was asked for several classes of controlled medications including "prescribed pain medication (e.g., opioids such as Vicodin®, OxyContin®, Tylenol 3® with codeine, Percocet®, Darvocet®, morphine, hydrocodone, oxycodone)." The response scale ranged from (1) 0 occasions to (7) 40 or more occasions. For purposes of analysis, two binary indicator variables (1= yes/0 = no) were created for indicating use of prescription pain medication in the past year or in the lifetime.

*Medical misuse of prescription opioids* was assessed by asking about the following behaviors as they relate to prescribed use of opioid analgesics: "On how many occasions (if any) in the past 12 months have you... 1) ...used too much (e.g., higher doses, more frequent doses) of your prescribed medication?" 2) ...intentionally gotten high with your prescribed medication or used it to increase other drug or alcohol effects?" The response scale for each question and coding was identical to that previously described for medical use.

*Motives for medical misuse of prescription opioids* were assessed by asking respondents who reported medical misuse of prescription opioids to respond to the following statement:

“Please provide the reason(s) why you used too much (e.g., higher doses, more frequent doses) of your prescribed pain medication.” Respondents were asked to select all that apply from a list of motives based on previous research (i.e., because it relieves pain, because it gives me a high, because it helps me sleep, because it helps decrease anxiety, because of experimentation, because it counteracts the effects of other drugs, because it is safer than street drugs, because I am addicted, and other specify).<sup>5,16,28,31</sup> The motive “because it gives me a high” for medical misuse also included participants who positively endorsed the following behavior: “...intentionally gotten high with your prescribed medication or used it to increase other drug or alcohol effects.”

*Nonmedical use of prescription opioids* was assessed with the following question: “On how many occasions in the past 12 months have you used the following types of medicines, not prescribed to you? Pain medication (e.g., opioids such as Vicodin®, OxyContin®, Tylenol 3® with codeine, Percocet®, Darvocet®, morphine, hydrocodone, oxycodone).” The response scale and coding were identical to that for medical use.

*Motives for nonmedical use of prescription opioids* were assessed by asking respondents who reported nonmedical use of prescription opioids to respond to the following statement: “Please provide the reason(s) why you used pain medication not prescribed to you.” Respondents were asked to select all that apply from a list of motives that was identical to the list of motives for medical misuse.

*The Drug Abuse Screening Test, Short Form (DAST-10)* is a self-report instrument that can be used in clinical and non-clinical settings to screen for probable drug abuse or dependence on a wide variety of substances other than alcohol, including prescription medications.<sup>40</sup> Respondents who used drugs other than alcohol in the past 12 months were asked whether they had experienced any of 10 drug-related problems in the past 12 months. Based on previous research, if a respondent positively endorsed three or more DAST items, this was considered a “positive” screening test result, denoting risk for probable drug abuse or dependence.<sup>7,40</sup> The DAST-10 has been shown to have good reliability and temporal stability and identifies individuals who need more intensive assessment for substance abuse problems.<sup>7</sup> Evidence for concurrent validity comes from previous work based on these data, which showed that the DAST-10 was positively correlated with frequency of illicit drug use and negatively correlated with age of onset of illicit drug use.<sup>23</sup> Maisto et al.<sup>20</sup> evaluated the DAST-10 using DSM-IV drug use disorder diagnoses as the criterion and found levels of sensitivity and specificity of .70 and .80, respectively, when using a cut-point of three.

*The CRAFFT* is a six-item, self-report, brief alcohol and other drug screening test developed specifically for adolescents.<sup>18</sup> *CRAFFT* is a mnemonic based on the following six yes/no questions: “Have you ever ridden in a *car* driven by someone (including yourself) who was high or had been using alcohol or drugs?” “Do you ever use alcohol or drugs to *relax*, feel better about yourself, or fit in?” “Do you ever use alcohol or drugs while you are by yourself (*alone*)?” “Do you *forget* things you did while using alcohol or drugs?” “Do your family or *friends* ever tell you that you should cut down on your drinking or drug use?” “Have you ever gotten into *trouble* while you were using alcohol or drugs?” The *CRAFFT* has good reliability ( $\alpha = .79$ ) and is highly correlated ( $r = 0.84$ ) with the Personal Involvement with Chemicals Scale (PICS), the criterion standard for alcohol and other drug screening.<sup>18</sup> A score of 2 or higher on the *CRAFFT* had a sensitivity and specificity of 0.80 and 0.86, respectively, for detecting any substance abuse or dependence; similarly, a score of 2 or higher has been shown to have a sensitivity and specificity of 0.92 and 0.80, respectively, for detecting substance dependence.<sup>19</sup>

*Diversion of prescription opioids* was assessed by asking respondents who reported any prescribed use of prescription opioids the following questions: “On how many occasions (if any) in your lifetime have you ever...1) “...been approached to sell, trade, or give away your prescription medication?” 2) “...given or loaned your prescription medication to someone?” 3) “...traded your prescription medication for something else (e.g., other medications, other drugs, clothes, etc.)?” The response scale for each question and the coding were identical to that for medical use.

## Statistical Analysis

Data analyses included 2,964 respondents who completed the questions that form the basis of this paper, and all statistical analyses were performed using the SPSS 20.0 software.<sup>15</sup> Chi-square tests were used to compare the prevalence of motives for past-year medical misuse of prescription opioids between different subgroups based on (1) gender, (2) race, and (3) frequency of medical misuse. Chi-square tests and multiple logistic regression models were used to compare the odds of substance abuse and diversion behaviors across the following four mutually exclusive groups of past-year prescription opioid medical users and misusers: (1) no medical use or misuse, (2) appropriate medical use only, (3) medical misuse to relieve pain only, and (4) medical misuse for other non-pain relief motives. Multiple logistic regression models used “no medical use or misuse” as the reference group and included gender, race/ethnicity, school district, and grade level as covariates. Adjusted odds ratios (AOR) and 95% confidence intervals (95% CI) for the AORs were reported to describe adjusted contrasts between the subgroups.

## Results

### Sample Demographics

The sample consisted of 2,964 middle and high school students (51% female and 49% male). The distribution of grade level was 12.0% in 7th grade, 14.8% in 8th grade, 18.4% in 9th grade, 20.5% in 10th grade, 18.1% in 11th grade, and 16.1% in 12th grade. The racial/ethnic distribution was 64.7% White, 29.9% African American, 3.3% Asian, 1.7% Hispanic and 0.5% from other racial/ethnic categories. The family status of the sample included 74% students who lived in the same household with both parents. Approximately 72% of the sample had at least one parent or guardian complete college.

### Medical Use and Misuse of Prescription Opioids

The estimated lifetime prevalence of medical use of prescription opioids was 24.2%, and the estimated past 12-month prevalence of medical use was 13.3%. The leading opioid analgesics that were prescribed in the past 12 months (among the  $n = 393$  past-year medical users) were codeine (37.9%), hydrocodone (18.3%), and oxycodone (9.2%), morphine (7.1%), fentanyl (1.0%), propoxyphene (1.0%), tramadol (0.8%), hydromorphone (0.8%), and meperidine (0.5%). Notably, 30.8% of medical users did not recall the name of the pain medications they were prescribed. Among those prescribed opioid analgesics in the past 12 months, 17.9% reported medical misuse of prescription opioids (defined as using their opioid medications too much, intentionally to get high, or to increase alcohol or other drug effects). Among past-year nonmedical users of prescription opioids who also provided a valid motive for nonmedical use ( $n = 145$ ), approximately 50% of had been prescribed opioid analgesics in their lifetime while about 33% had been prescribed opioid analgesics in the past-year.

### Motives for Medical Misuse of Prescription Opioids

As presented in Table 1, the most prevalent motive associated with medical misuse of prescription opioids was “because it relieves pain” (84.2%) which was also the most prevalent motive associated with nonmedical use of prescription opioids (87.6%). The second most prevalent motive associated with medical misuse of prescription opioids was “because it gives me a high” which was also the second most prevalent motive associated with nonmedical use of prescription opioids. While we found that the majority of medical misusers of prescription opioids (52.6%) were motivated solely by pain relief, nearly one-third (31.6%) were motivated by pain relief and other non-pain relief motives and about one-sixth were motivated by non-pain relief motives only (15.8%).

### Motives for Medical Misuse as a Function of Demographic Characteristics

Among past-year medical misusers of opioid analgesics providing a valid motive for the medical misuse ( $n = 57$ ), approximately 73.7% reported misuse on 1 or 2 occasions, 12.3% on 3 to 9 occasions, and 14.0% on 10 more occasions. There were no significant associations between past-year frequency of medical misuse and motives for past-year medical misuse of opioid analgesics. Although females prescribed opioid analgesics ( $n = 243$ ) were more likely to report medical misuse of prescription opioids than males prescribed opioid analgesics ( $n = 143$ ), regardless of motive (21.8% vs. 11.2%, chi-square = 6.9,  $df = 1$ ,  $p < 0.01$ ), there were no gender differences in the prevalence of motives for past-year medical misuse of prescription opioids. In contrast, there were racial differences in the prevalence and motives for past-year medical misuse of prescription opioids. African-Americans prescribed opioid analgesics ( $n = 111$ ) were more likely than Whites prescribed opioid analgesics ( $n = 259$ ) to report medical misuse of prescription opioids (24.3% vs. 13.9%, chi-square = 6.0,  $df = 1$ ,  $p = 0.01$ ), and nearly three out of every four African-American medical misusers were motivated solely by pain relief (72%) while about a third of White medical misusers (37.5%) were motivated solely by pain relief (chi-square = 6.7,  $df = 1$ ,  $p = 0.01$ ).

### Substance Abuse as a Function of Motives for Medical Misuse

The associations between past-year medical misuse status (nonusers, appropriate medical users, medical misusers to relieve pain only, and medical users for non-pain relief motives) and substance abuse were examined using chi-square analysis and revealed several strongly significant associations ( $p < 0.001$ ). As presented in Table 2, higher prevalence rates of substance abuse were observed among adolescents who misused their own medication for non-pain relief motives as compared to those who used their medications appropriately and compared to those who did not use or misuse prescription opioids in the past year. For example, the prevalence of a positive CRAFFT screening for substance abuse was 51.9% among medical misusers for non-pain relief motives, 13.3% among medical misusers for pain relief motives only, 12.3% among appropriate medical users, and 11.0% among nonusers.

For purposes of these analyses, we combined adolescents who reported (1) medical misuse for pain relief and non-pain relief motives and (2) medical misuse for non-pain relief motives only. The prevalence rates of a positive CRAFFT and DAST-10 screening for substance abuse were similar for these two subgroups. In particular, the prevalence of a positive lifetime CRAFFT screening for substance abuse was 55.6% among medical misusers for pain relief and non-pain relief motives and 44.4% among medical misusers for non-pain relief motives only, while the prevalence of a positive past-year DAST-10 screening for substance abuse was 50.0% among medical misusers for pain relief and non-pain relief motives and 44.4% among medical misusers for non-pain relief motives only.

As presented in Table 2, multiple logistic regression results indicated that the odds of positive lifetime (CRAFFT) and past-year (DAST-10) screens for substance abuse for medical misusers motivated by non-pain relief motives were over *eight* and *15* times greater than for nonusers after adjusting for the relationships of gender, race/ethnicity, school, and grade level with substance abuse, respectively. In contrast, no such differences existed between nonusers and appropriate medical users, or between nonusers and medical misusers motivated by pain relief only.

### Diversion Behaviors as a Function of Motives for Medical Misuse

The associations between past-year motives for medical misuse and diversion of prescription opioids were also examined using chi-square analysis and revealed significant associations ( $p < 0.001$ ). In general, medical misusers for non-pain relief motives reported higher prevalence rates of diversion than medical users who used their medications appropriately, or medical misusers motivated solely by pain relief ( $p < 0.001$ ). As presented in Table 3, approximately 65.4% of medical misusers for non-pain relief motives were approached to divert their medication as compared to 6.6% of medical users who used their medications appropriately, and 13.3% of medical misusers motivated solely by pain relief. Multiple logistic regression results also indicated that the odds of all three diversion behaviors for medical misusers for non-pain relief motives were significantly greater than appropriate medical users after adjusting for relevant covariates ( $p < 0.001$ ). Furthermore, the odds of only one of the three diversion behaviors (i.e., Have you ever given or loaned your opioid medication to someone?) for medical misusers motivated by pain relief only were significantly greater than appropriate medical users after adjusting for relevant covariates ( $p < 0.01$ ).

### Discussion

This is the first study that we are aware of to assess the motives for medical misuse of prescription opioids and examine whether motives for medical misuse are associated with demographic characteristics, diversion behaviors, and substance abuse among adolescents. One of the most notable findings was that pain relief was the most prevalent motive for medical misuse among adolescents from two Midwestern school districts in the United States. Indeed, pain relief motivated more than 4 in every 5 adolescents who misused their pain medications either medically or nonmedically. The present study also found that among the 393 adolescents receiving prescription opioid analgesics, more than four in every five (82%) used their opioid medications appropriately while approximately 18% reported medical misuse in the past year; this is nearly identical to the prevalence rate for medical misuse of prescription opioids (20%) found in a previous study of secondary school students.<sup>33</sup> We also found that the number of individuals who reported past-year nonmedical use of prescription opioids was nearly three times greater than the number of individuals who reported past-year medical misuse. This finding was notable because national epidemiological studies in the United States fail to distinguish between medical misuse and nonmedical use of prescription opioids and these individuals are often combined in national estimates.

Although the majority of past-year medical misusers and nonmedical users of prescription opioids were motivated solely by pain relief, approximately 47% of medical misusers and 30% of nonmedical users were motivated by non-pain relief motives, such as “to get high” (e.g., approximately 35% of medical misusers and 14% of nonmedical users reported “to get high”). These findings indicate heterogeneous motives associated with medical misuse of prescription opioids and reinforce the importance of considering motives when examining medical misuse and nonmedical use of prescription opioids.<sup>5,24,26,28,46</sup> The survey provided an open-ended response for individuals to describe the reason(s) associated with medical

misuse of prescription opioids in more detail. The following was a typical response associated with medical misuse for pain relief: “I had surgery and I needed more than prescribed to stop the pain.” This quote and other findings from this study suggest that clinicians and parents should educate adolescents about appropriate medical use, pain management, and communication with prescribers. Patients should be educated to consult with their prescribers before adjusting their own dosages to reduce medical misuse, avoid therapeutic error, and enhance pain management.

Although the present study found that females were almost twice as likely as males to report past-year medical misuse of prescription opioids, there were no gender differences in the prevalence of motives for past-year medical misuse of prescription opioids. At least one study has found similar gender differences in lifetime medical and nonmedical use of prescription opioids among adolescents.<sup>25</sup> There is a large literature demonstrating gender variations in pain experience<sup>12,43</sup> and more research is needed to examine the extent to which such differences are associated with gender differences in prevalence of medical use, medical misuse, and nonmedical use of opioid medications among adolescents. In contrast, we found that African-American medical users were more likely than White medical users to report past-year medical misuse of prescription opioids and nearly three out of every four African-American medical misusers were motivated solely by pain relief as compared to about a third of White medical misusers. Previous work has documented racial differences in prescribing patterns of prescription opioids and barriers for receiving prescription opioids among African-American patients.<sup>1,6,13,34</sup> The racial differences in medical misuse for pain relief observed in this study have important clinical implications and could be related to inadequate pain management, poor communication, insufficient availability, and/or under-prescribing among African-American patients. Clearly, additional research is warranted to further examine potential racial differences in the prevalence of medical misuse and motives for medical misuse of prescription opioids.

The present study found that appropriate medical use of prescription opioids was *not* associated with an increased risk for substance abuse and this adds to a growing body of knowledge.<sup>21,28,33</sup> Previous work reveals that substance abuse is more prevalent among adolescents who misuse prescription opioids either medically or nonmedically.<sup>21,28,33</sup> National, regional and case-report data document a wide range of chronic and acute adverse consequences that can occur as a result from prescription opioid misuse including substance abuse, unintentional overdose and death.<sup>3,10,38,42,44,45,46</sup> The present study contributes new knowledge regarding the role of motives for medical misuse of prescription opioids when assessing risk for substance use disorders. Medical misuse to only relieve pain was not associated with increased risk for substance abuse, while medical misuse for non-pain relief motives was associated with significantly greater odds of substance abuse. These findings are consistent with past studies examining motives for nonmedical use of prescription opioids among secondary school and college students.<sup>5,24,26,28</sup> Notably, about half of medical misusers for non-pain relief motives screened positive for lifetime or past-year substance abuse, while less than one in seven medical misusers for pain relief only, appropriate medical users, and nonusers screened positive for lifetime or past-year substance abuse. The results suggest that health professionals should conduct routine screening for substance use disorders, especially among adolescents who have a history of medical misuse or nonmedical use of prescription opioids for non-pain relief motives. Medical misusers who screen positive for substance abuse should be referred for a more in-depth substance use disorder assessment.

The results of this study also indicated that medical misusers motivated by non-pain relief were more likely than appropriate medical users or medical misusers motivated solely by pain relief to divert their prescription opioids. The diversion of prescription opioids



facilitates access to these medications for those without a prescription, especially since the primary source of diversion among adolescents who report nonmedical use of prescription opioids is same-age peers and leftover opioid medications from previous prescriptions.<sup>17,22,28,31,32</sup> In addition, misusing or diverting opioid medication could result in non-adherence or lack of a therapeutic effect, since these medications are not being taken as prescribed. Furthermore, we found that approximately 50% of past-year nonmedical users of prescription opioids had been prescribed opioid analgesics in their lifetime, and recent work indicates that leftover opioid medication from previous prescriptions is associated with subsequent nonmedical use of opioid medications among adolescents.<sup>17,32</sup> For instance, a national study of high school seniors in the United States found that 37% of past-year nonmedical users of prescription opioids obtained these opioid medications from their own previous prescriptions.<sup>32</sup> Therefore, careful monitoring could facilitate improved therapeutic effect and reductions in medical misuse, nonmedical use, and diversion of prescription opioids among adolescents.

The present study has some limitations which need to be considered when evaluating the implications for future clinical practice and research. First, the study did not assess the exact dosage and pain diagnoses among adolescents who were prescribed opioid analgesics in the past 12 months. Further, approximately 3 in every 10 medical users could not recall the specific name of the pain medications they were prescribed in the past 12 months, which raises some questions about how much detail is feasible when collecting medical use information via self-administered surveys among adolescents. Second, the results should not be generalized to other adolescent populations, because our sample was drawn from secondary school students in two Detroit metropolitan area school districts. Furthermore, differential nonresponse may have introduced bias in the estimates reported in the present study because individuals who had dropped out or who were absent from school on the days of the survey administration were not included. Future research in this area should examine motives for medical misuse of prescription opioids and other classes of scheduled medications in a national sample of adolescents, including those not attending secondary school. Future research should also investigate the “type of pain” for which adolescents are attempting to “self-treat.” Fourth, individuals who did not dispose of their prescription opioids properly and subsequently used their own leftover medication to self-treat a new episode of pain were not captured by the measures in this study. Thus, the prevalence of medical misuse and nonmedical use may have been underestimated based on the high percentage of adolescents who report using leftover prescription opioids found in a recent study.<sup>32</sup> In addition, the motive “because it gives me a high” for medical misusers also included individuals who endorsed “to increase other drug or alcohol effects.” This approach likely contributed to the higher prevalence of “because it gives me a high” among medical misusers as compared to nonmedical users, based on the high rates of co-ingestion of prescription opioids and other drugs among adolescents and young adults observed in other studies.<sup>29,35</sup> Finally, the data are subject to the potential bias introduced when collecting sensitive substance use behaviors via voluntary self-report surveys. Although previous follow-up studies have shown no significant differences in prevalence rates of alcohol use, binge drinking, cigarette smoking and other problem health behaviors between respondents and non-respondents in a similar web-based survey,<sup>21,28</sup> it is certainly plausible that medical misuse of prescription opioids was more or less prevalent among the 29% of students who did not participate in the web survey.

In summary, this study found that the majority of medical misuse of prescription opioids was motivated solely by pain relief among adolescents in two Midwestern school districts. Strong associations were found between motives for medical misuse of prescription opioids, substance abuse, and diversion behaviors. The findings indicate the need for close

monitoring of opioid medications among adolescents and the importance of detecting unusual patterns of opioid medication use.

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**Perspective**

This article represents the first investigation to examine the motives associated with medical misuse of prescription opioids among adolescents. The results indicate that the majority of medical misuse is associated with pain relief. This information could be used to develop strategies to reduce opioid medication misuse among adolescents.

**Table 1**

Motives for medical misuse and nonmedical use of pain medication in the past 12 months

| Motives   | Medical misuse in past 12 months (n=57) | Nonmedical use in past 12 months (n=145) |
|---|---|--|
|   | n (%)                                   | n (%)                                    |
| Because it relieves pain                          | 48 (84.2%)                              | 127 (87.6%)                              |
| Because it gives me a high <sup>a</sup>           | 20 (35.1%)                              | 20 (13.8%)                               |
| Because it helps me sleep                         | 7 (12.3%)                               | 12 (8.3%)                                |
| Because it helps decrease anxiety                 | 6 (10.5%)                               | 12 (8.3%)                                |
| Because of experimentation                        | 4 (7.0%)                                | 11 (7.6%)                                |
| Because it counteracts the effects of other drugs | 4 (7.0%)                                | 3 (2.1%)                                 |
| Because it is safer than street drugs             | 3 (5.3%)                                | 8 (5.5%)                                 |
| Because I am addicted                             | 2 (3.5%)                                | 5 (3.4%)                                 |
| Other (Specify)                                   | 4 (7.0%)                                | 7 (4.8%)                                 |

Note: Participants could endorse more than one motive. Four medical misusers were missing data on the motive variables, eight medical misusers selected “rather not say” on the motive variables, and nine nonmedical users selected “rather not say” on the motive variables.

<sup>a</sup>The motive “because it gives me a high” for medical misuse also included participants who positively endorsed the following item: “... intentionally gotten high with your prescribed medication or used it to increase other drug or alcohol effects.”

**Table 2**

Substance abuse as a function of motive for medical misuse of prescription opioids

| Past-year medical use and misuse status    | CRAFFT (+ screen) lifetime <sup>a</sup> |                           | DAST-10 (+ screen) in the past year <sup>b</sup> |                           |
|--|---|---------------------------|--|---------------------------|
|  | CRAFFT %                                | AOR <sup>c</sup> (95% CI) | DAST-10 %  | AOR <sup>c</sup> (95% CI) |
| No medical use or misuse (n=2,561)         | 11.0                                    | Ref                       | 5.7  | Ref                       |
| Appropriate medical use only (n=317)       | 12.3                                    | 1.0 (0.7–1.4)             | 6.3  | 0.9 (0.6–1.5)             |
| Medical misuse for pain relief only (n=30) | 13.3                                    | 1.0 (0.3–2.8)             | 13.3   | 2.5 (0.8–7.8)             |
| Medical misuse for non-pain relief (n=27)  | 51.9                                    | 7.8 (3.3–18.3)***         | 48.1   | 15.2 (6.4–36.2)***        |

Ref = Reference group for each model was respondents who did not report nonmedical use of prescription opioids. Respondents who endorsed both pain relief and non-pain relief motives were coded as “medical misuse for non-pain relief.”

\* p < 0.05.

\*\* p < 0.01.

\*\*\* p < 0.001

<sup>a</sup> A cutpoint score of two or more was used for the CRAFFT.

<sup>b</sup> A cutpoint score of three or more was used for the DAST-10.

<sup>c</sup> Adjusted odds ratios (AOR) are adjusted for gender, race/ethnicity, school district, and grade level (odds ratios for these variables are not shown).

**Table 3**

Diversion behaviors as a function of motives for medical misuse of prescription opioids

| <b>Lifetime Diversion Behaviors</b>                        | <b>Past-year medical use only (n = 317) No. (%)</b> | <b>Past-year medical misuse to relieve pain only (n = 30) No. (%)</b> | <b>Past-year medical misuse for non-pain relief motives (n = 27) No. (%)</b> | <b><sup>2</sup> (2), Associations<sup>a</sup></b> |
|--|---|---|--|---|
| Have you been approached to divert your opioid medication  | 6.6%  | 13.3%   | 65.4%  | 83.2(2), p<0.001                                  |
| Have you given or loaned your opioid medication to someone | 7.6%  | 31.0%   | 40.0%  | 35.2(2), p<0.001                                  |
| Have you traded your opioid medication for something else  | 1.3%  | 0.0%  | 25.0%  | 48.4(2), p<0.001                                  |

<sup>a</sup> p<0.001 for all comparisons.