



## Treatment use and barriers among adolescents with prescription opioid use disorders

Li-Tzy Wu <sup>a,\*</sup>, Dan G. Blazer <sup>a</sup>, Ting-Kai Li <sup>a</sup>, George E. Woody <sup>b</sup>

<sup>a</sup> Department of Psychiatry and Behavioral Sciences, Duke University Medical Center, USA

<sup>b</sup> Department of Psychiatry, University of Pennsylvania and Treatment Research Institute, USA

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### ABSTRACT

**Background:** This study examined national trends, patterns, correlates, and barriers to substance abuse treatment use by adolescents aged 12–17 years who met at least one of the past-year criteria for prescription opioid abuse or dependence (N = 1788).

**Methods:** Data were from the 2005–2008 National Surveys of Drug Use and Health (NSDUH). Past-year substance use disorders, major depression, and treatment use were assessed by audio computer-assisted self-interviewing.

**Results:** About 17% of adolescents with opioid dependence (n = 434) and 16% of those with opioid abuse (n = 355) used any substance abuse treatment in the past year compared with 9% of subthreshold users, i.e., adolescents who reported 1–2 prescription opioid dependence criteria but no abuse criteria (n = 999). Only 4.2% of adolescents with opioid dependence, 0.5% of those with abuse, and 0.6% of subthreshold users reported a perceived need for treatment of nonmedical opioid use. Self-help groups and outpatient rehabilitation were the most commonly used sources of treatment. Few black adolescents used treatment (medical settings, 3.3%; self-help groups, 1.7%) or reported a need for treatment (1.8%). Talking to parents/guardians about dangers of substance use increased the odds of treatment use. Barriers to treatment use included “wasn’t ready to stop substance use,” “didn’t want others to find out,” and “could handle the problem without treatment.”

**Conclusions:** Adolescents with prescription opioid use disorders markedly underutilize treatment. Non-financial barriers are pervasive, including stigma and a lack of perceived treatment need.

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### 1. Introduction

Multiple indicators show a substantial increase in nonmedical use of prescription opioids, opioid-related mortality, and admissions to substance abuse treatment (Manchikanti, 2007; Zacny et al., 2003). After cannabinoids, opioids are the second most commonly used illicit/nonmedical drugs, and prescription opioid use disorders (OUD) constitute the second most prevalent drug use disorder in the U.S. (Substance Abuse and Mental Health Services Administration [SAMHSA], 2010; Wu et al., in press). Approximately 10% of adolescents aged 12–17 years have ever used nonmedical opioids (Wu, Ringwalt, Mannelli, & Patkar, 2008), and many adolescents consider prescription opioids safer than illicit drugs and experience peer pressure to use them (Office of National Drug Control Policy [ONDCP], 2007). Prescription opioids are also seen as easier to get than illicit drugs, and adolescents often endorse reasons other than

getting high for using them (relieve pain, anxiety, sleeplessness) (Boyd, Esteban-McCabe, & Teter, 2006). Parents’ medicine cabinets, family members, or friends are reported as primary sources (Schepis & Krishnan-Sarin, 2009).

Little is known about use of substance abuse treatment among adolescents with OUD. Recent data showed that 16% of past-year nonmedical opioid users aged 12–17 years met criteria for DSM-IV OUD, and another 20% exhibited subthreshold dependence (Wu, Ringwalt, et al., 2008). Subthreshold substance users (meeting 1–2 dependence criteria but no abuse criteria) could be good targets for early case identification and interventions because longitudinal data show that they escalate into substance use disorders (SUD) (Shankman et al., 2009). Similarly, adolescent-onset substance use predicts SUD and greater treatment need (Gfroerer & Epstein, 1999). Because substances of abuse act by altering neurotransmission in the brain, substance use may have long-lasting adverse effects on the developing brain (National Institute on Drug Abuse, 2007). Adolescence is hence a critical time for intervention to prevent serious addiction and its consequences. This is particularly applicable to opioids as they have a high abuse potential, are associated with the highest rate of drug-related overdose/mortality, and often require long-term treatment (Paulozzi, Budnitz, & Xi, 2006;

\* Corresponding author at: Department of Psychiatry and Behavioral Sciences, Duke University School of Medicine, Duke University Medical Center, Box 3419, Durham, NC 27710, USA. Tel.: +1 919 668 6067; fax: +1 919 668 5418.

E-mail addresses: litzzy.wu@duke.edu, litzzywu@yahoo.com (L.-T. Wu).

**Table 1**  
Twelve-month prevalence of substance abuse treatment use among symptomatic nonmedical prescription opioid users aged 12–17 years (N = 1788).

Location of treatment received: % (SE)	All symptomatic opioid users	SU: subthreshold use	A: abuse	D: dependence	$\chi^2$ (2) p value
Sample size	N = 1788	n = 999	n = 355	n = 434	
Any treatment service <sup>a</sup>	12.4 (1.10)	8.9 (0.99)	16.1 (2.97)	17.4 (2.26)	SU < D, $p = 0.002$
Any medical setting <sup>b</sup>	8.1 (0.91)	5.2 (0.72)	12.8 (2.92)	11.0 (1.79)	SU < A, D, $p = 0.001$
Any non-medical setting <sup>c</sup>	6.1 (0.91)	3.5 (0.71)	10.5 (2.73)	8.6 (1.89)	SU < A, D, $p = 0.002$
Self-help group	5.5 (0.82)	3.2 (0.68)	8.9 (2.35)	8.0 (1.78)	SU < A, D, $p = 0.003$
Outpatient, rehabilitation	4.9 (0.68)	3.1 (0.55)	8.0 (2.54)	6.6 (1.39)	SU < D, $p = 0.014$
Inpatient, hospital	3.3 (0.60)	1.5 (0.34)	6.5 (2.35)	6.0 (1.35)	SU < A, D, $p < 0.001$
Inpatient, rehabilitation	3.6 (0.52)	1.8 (0.46)	7.8 (2.26)	4.5 (0.96)	SU < A, $p = 0.008$
Outpatient mental health center	3.2 (0.61)	2.5 (0.59)	4.5 (2.01)	3.6 (0.96)	NS
Emergency room	2.9 (0.57)	1.2 (0.40)	4.9 (2.06)	5.4 (1.39)	SU < D, $p = 0.007$
Private doctor's office	1.7 (0.41)	0.9 (0.31)	1.9 (1.27)	3.5 (1.14)	NS, $p = 0.088$
Prison or jail	1.5 (0.43)	0.9 (0.27)	2.7 (1.75)	1.8 (0.80)	NS

All results are weighted estimates except for sample sizes, which are unweighted.

SE: standard error.

NS:  $p > 0.05$ .

<sup>a</sup> Any treatment includes treatment services received at any of the eight locations listed.

<sup>b</sup> Any medical setting includes treatment services received at a hospital, substance abuse rehabilitation facility, mental health center, or private doctor's office.

<sup>c</sup> Any non-medical setting includes treatment services received at a jail, prison, or self-help group.

Veilleux, Colvin, Anderson, York, & Heinz, 2010). Thus, an understanding of treatment use among subthreshold users relative to threshold groups could provide useful information to guide early screening and intervention.

We report treatment use, perceived treatment need, and barriers to treatment use among adolescents who endorsed a pattern of symptoms consistent with DSM-IV criteria for past-year OUD and subthreshold use (endorsing 1–2 prescription opioid dependence criteria and no abuse criteria) using data from the National Survey on Drug Use and Health (NSDUH). We took into consideration Andersen's behavioral model of health service utilization, which states that treatment use varies by demographic/predisposing characteristics and that enabling/resource and need/health characteristics may promote treatment use (Andersen, 1995; Wu, Pilowsky, Schlenger, & Hasin, 2007). Because adolescents rely on adults to initiate treatment, we examined whether communication with their parents/guardians about substance use increases treatment use. We also explored trends in treatment use, given substantially increased reports of nonmedical opioid use and abuse among adolescents (Manchikanti, 2007).

Three main questions were addressed: 1) What is the prevalence of treatment use and perceived need by opioid use status? 2) To what extent are demographic/predisposing (age, gender, race/ethnicity), enabling/resource (income, insurance status, parent-adolescent communication, population density), and need/health characteristics (substance use disorders, self-rated health, major depression, criminal justice involvement) associated with treatment use and perceived need? 3) What are adolescents' perceived barriers to treatment? No such research has been conducted on adolescents before.

## 2. Method

### 2.1. Data source

NSDUH provides national estimates on substance use and SUD in the U.S. population. Approximately 67,500 unique persons aged  $\geq 12$  years are interviewed annually (SAMHSA, 2008). This study examined adolescents (N = 72,561) from public-use files of the 2005–2008 NSDUH. There was little variation in gender (51% male) and race/ethnicity (60% white) across these four years.

### 2.2. Sampling

The target population includes residents of households from 50 states plus the District of Columbia (including shelters, rooming houses, and group homes) and civilians residing on military bases. They are

selected by multistage area probability methods to ensure that each independent cross-sectional sample is representative of persons aged  $\geq 12$  years.

### 2.3. Data collection

Sociodemographic items are administered by interviewers using computer-assisted personal interviewing. Questions related to substance use, SUD, treatment, and mental health are administered with audio computer-assisted self interviewing, which provides respondents with a highly confidential means of responding to questions to increase honest reporting of sensitive behaviors. Respondents read questions on the computer screen, or questions are read to them through headphones, and they enter responses directly into a computer.

### 2.4. Study variables

Nonmedical opioid use was defined as any self-reported use of prescription pain relievers that were not prescribed for the respondent or that the respondent took only for the experience or feeling they caused (SAMHSA, 2008; Wu, Ringwalt, et al., 2008). To reduce false-positive responses, all respondents were read the following: "These questions are about prescription pain reliever use. We are not interested in your use of over-the-counter pain relievers that can be bought in stores without a doctor's prescription." The survey used discrete questions and showed pictures of tablets to assess respondents' nonmedical use, age of first use, and number of days of use in the past year.

Past-year nonmedical opioid users then were asked a set of fully structured questions designed to operationalize DSM-IV criteria for past-year prescription opioid abuse (four criteria: role interference, hazardous use, problems with the law, relationship problems) and dependence (seven criteria: tolerance, withdrawal, taking larger amounts/longer, inability to cut down, time spent obtaining substance or recovering from its effects, giving up activities, and continued use despite problems). Consistent with DSM-IV (American Psychiatric Association, 2000), three mutually exclusive groups of symptomatic users were defined: dependence included users who met at least three dependence criteria in the past year, irrespective of abuse status; abuse applied to users who met at least one abuse criterion but did not meet criteria for opioid dependence; subthreshold use included users who met 1–2 dependence criteria but did not endorse any abuse criterion (Wu, Pilowsky, & Patkar, 2008; Wu, Ringwalt, et al., 2008).

Substance users were asked additional questions about treatment use and settings. Treatment use was defined as having received counseling specifically related to alcohol or drug use in the past 12 months. Substance

**Table 2**  
Adjusted odds ratios (AOR) of substance abuse treatment use among symptomatic nonmedical prescription opioid users aged 12–17 years (N = 1788).

Logistic regression model <sup>a</sup>	Any treatment <sup>b</sup>		Medical settings <sup>c</sup>		Self-help groups	
	AOR	95% CI	AOR	95% CI	AOR	95% CI
Gender (vs. female)						
Male	1.26	0.82–1.94	1.14	0.74–1.75	0.88	0.49–1.56
Age group (vs. 16–17 years)						
12–13 years	0.97	0.44–2.14	0.53	0.14–2.04	2.16	0.67–6.97
14–15 years	0.83	0.51–1.35	0.73	0.41–1.29	1.19	0.58–2.42
Race/ethnicity (vs. white)						
Black, non-Hispanic	0.74	0.34–1.61	0.49	0.20–1.20	0.26 <sup>d</sup>	0.06–1.10
Hispanic	0.87	0.44–1.71	0.63	0.31–1.28	<b>0.24<sup>e</sup></b>	<b>0.07–0.80</b>
Other	1.67	0.83–3.36	1.27	0.50–3.22	2.21	0.79–6.15
Health insurance (vs. private)						
Public	<b>1.99<sup>f</sup></b>	<b>1.24–3.20</b>	<b>2.04<sup>f</sup></b>	<b>1.27–3.27</b>	2.01 <sup>d</sup>	0.99–4.07
None	<b>2.44<sup>e</sup></b>	<b>1.05–5.64</b>	1.72	0.61–4.84	1.12	0.31–4.04
Population density (vs. large metro)						
Small metro areas	0.79	0.52–1.21	0.92	0.55–1.56	0.64	0.34–1.20
Non-metro areas	<b>0.41<sup>f</sup></b>	<b>0.23–0.75</b>	<b>0.40<sup>f</sup></b>	<b>0.21–0.79</b>	<b>0.28<sup>f</sup></b>	<b>0.12–0.65</b>
Talking to parents/guardians about danger of substance use (vs. no)						
Yes	<b>1.56<sup>e</sup></b>	<b>1.08–2.25</b>	<b>1.61<sup>e</sup></b>	<b>1.06–2.44</b>	1.65 <sup>d</sup>	0.97–2.80
Prescription opioid use disorder (vs. subthreshold use)						
Abuse <sup>g</sup>	1.28	0.75–2.18	<b>1.92<sup>e</sup></b>	<b>1.05–3.51</b>	2.00 <sup>d</sup>	0.94–4.28
Dependence	1.35	0.85–2.13	1.34	0.74–2.40	1.36	0.71–2.60
Criminal justice system involvement (vs. no)						
Yes	<b>2.58<sup>h</sup></b>	<b>1.66–4.02</b>	<b>3.18<sup>h</sup></b>	<b>1.90–5.30</b>	<b>4.54<sup>h</sup></b>	<b>2.28–9.02</b>
Nicotine dependence (vs. no)						
Yes	<b>2.06<sup>f</sup></b>	<b>1.30–3.27</b>	<b>2.90<sup>h</sup></b>	<b>1.72–4.87</b>	1.67	0.88–3.18
Alcohol use disorder (vs. no)						
Yes	1.54 <sup>d</sup>	0.97–2.45	1.22	0.64–2.31	1.08	0.54–2.16
Other drug use disorders (vs. no)						
Yes	<b>3.49<sup>h</sup></b>	<b>2.12–5.74</b>	<b>3.05<sup>f</sup></b>	<b>1.46–6.40</b>	<b>8.07<sup>h</sup></b>	<b>3.38–19.28</b>
Survey year (vs. 2005)						
2006	<b>1.73<sup>e</sup></b>	<b>1.05–2.87</b>	1.42	0.75–2.68	1.40	0.69–2.86
2007	1.49	0.73–3.03	1.31	0.73–2.35	1.57	0.72–3.42
2008	1.15	0.68–1.95	0.88	0.44–1.74	0.65	0.27–1.54

All results are weighted estimates except for sample sizes, which are unweighted.

CI: confidence interval.

<sup>a</sup> The adjusted logistic model included all the variables listed in the first column; other variables that were not associated with treatment use in the bivariate analysis were not included in the adjusted models.

<sup>b</sup> Any treatment includes treatment services received at any of the eight locations.

<sup>c</sup> Any medical setting includes treatment services received at a hospital, substance abuse rehabilitation facility, mental health center, or private doctor's office.

<sup>d</sup> 0.05 < *p* < 0.08.

<sup>e</sup> 0.01 < *p* < 0.05.

<sup>f</sup> 0.001 < *p* < 0.01.

<sup>g</sup> There were no differences in treatment use (any, medical, self-help settings) between the abuse and dependence groups.

<sup>h</sup> *p* < 0.001.

users also were asked if they needed treatment or counseling related to a specific substance and whether they needed additional treatment or counseling for use of a specific substance in the past 12 months. Perceived need was present if respondents reported that they needed treatment or needed additional treatment for alcohol or drug use in the past 12 months. Respondents who reported a perceived need for treatment then were asked to identify their reasons for not seeking treatment.

Adolescents' self-rated health, criminal justice system involvement, nicotine dependence, other SUD, and major depression were examined as need/health variables (Andersen, 1995; Mojtabai, 2005; Wu et al., 2007). Nicotine dependence included respondents who met the Nicotine Dependence Syndrome Scale or Fagerstrom Test of Nicotine Dependence criteria for dependence in the past month (Heatherton, Kozlowski, & Frecker, 1991; Shiffman, Waters, & Hickcox, 2004). Criminal justice system involvement was defined as being arrested or booked in the past year (excluding minor traffic violations). Other past-year DSM-IV SUD included inhalant, marijuana, cocaine/crack, heroin, hallucinogen, sedative, tranquilizer, and stimulant abuse or dependence. Past-year DSM-IV major depressive episodes were assessed by questions adapted from National Comorbidity Survey-Replication (Kessler & Merikangas, 2004). Other DSM-IV disorders were not assessed.

Age, gender, and race/ethnicity were included as predisposing variables; family income, health insurance status, parent-adolescent communication, and geographic location of residence were included as

enabling variables (Andersen, 1995; Mojtabai, 2005; Wu et al., 2007). Parent-adolescent communication about substance use (yes vs. no) was assessed with the following questions: "During the past 12 months, have you talked with at least one of your parents about the dangers of tobacco, alcohol, or drug use? By parents, we mean your biological parents, adoptive parents, stepparents, or adult guardians – whether or not they live with you." Parent-adolescent communication about serious problems was determined by asking the adolescent if he/she wanted to talk to someone about a serious problem, would he/she turn to parents/guardians (yes vs. no).

## 2.5. Data analysis

The distributions of study variables and treatment use by location were examined, but due to its low prevalence, treatment use was combined into use at any location or in any medical setting. Logistic regression procedures were conducted to examine correlates of treatment use for any location, any medical setting (excluding jail/prison and self-help groups), and self-help groups, as well as correlates of perceived need for treatment. Correlates for treatment use in jail/prison were not examined due to a low rate (2%). Bivariate associations between each study variable and treatment use were determined first. To take into account the parsimony of the logistic regression model and stability of odds ratios, variables with *p* < 0.15 from the bivariate analysis were

**Table 3**  
Perceived need for substance abuse treatment among symptomatic nonmedical prescription opioid users aged 12–17 years (N = 1788).

Perceived need for treatment for use related to: % (SE)	All symptomatic opioid users N = 1788	SU: Subthreshold use n = 999	A: Abuse n = 355	D: Dependence n = 434	$\chi^2$ (2) p value
Sample size	N = 1788	n = 999	n = 355	n = 434	
Alcohol or drugs <sup>a</sup>	4.9 (0.63)	2.6 (0.66)	3.9 (1.25)	10.9 (1.74)	SU, A < D; $p < 0.001$
Any drug class <sup>a</sup>	3.7 (0.53)	2.3 (0.65)	2.0 (0.88)	8.1 (1.45)	SU, A < D; $p = 0.001$
Alcohol	2.1 (0.45)	0.9 (0.33)	2.4 (0.98)	4.6 (1.44)	SU < D; $p = 0.024$
Prescription opioids	1.5 (0.30)	0.6 (0.33)	0.5 (0.37)	4.2 (0.84)	SU, A < D; $p < 0.001$
Marijuana	1.3 (0.34)	0.9 (0.38)	0.6 (0.35)	2.8 (1.01)	NS
Cocaine	0.6 (0.29)	0.6 (0.29)	0.2 (0.24)	0.9 (0.44)	NS
Prescription tranquilizers	0.6 (0.17)	0.2 (0.20)	0	1.9 (0.51)	NS
Prescription stimulants	0.5 (0.18)	0	0.3 (0.24)	1.6 (0.50)	NS
Prescription sedatives	0.4 (0.13)	0.3 (0.21)	0.2 (0.24)	1.6 (0.51)	NS
Hallucinogens	0.3 (0.13)	0.2 (0.20)	0.4 (0.26)	0.5 (0.17)	NS
Heroin	0.2 (0.13)	0.3 (0.21)	0.2 (0.24)	0.2 (0.20)	NS
Inhalants	0.2 (0.10)	0.02 (0.02)	0.2 (0.21)	0.6 (0.38)	NS

All results are weighted estimates except for sample sizes, which are unweighted.

SE: standard error; NS:  $p > 0.05$ .

<sup>a</sup> Including use of marijuana, cocaine, inhalants, hallucinogens, heroin, or prescription drugs (opioids, tranquilizers, stimulants, and sedatives).

included in adjusted logistic regression models (Hosmer & Lemeshow, 2000). Finally, barriers to treatment use in the subsample that reported perceived treatment need were determined. Analyses were conducted with SUDAAN, taking into account NSDUH's complex designs such as weighting and clustering (Research Triangle Institute, 2006). All results reported here are weighted estimates, except for samples sizes (unweighted).

### 3. Results

#### 3.1. Study sample

Of all adolescents, 10% ( $n = 7503$ ) and 7% ( $n = 5141$ ) reported lifetime and past-year nonmedical opioid use, respectively. Of the 5141 past-year users, 16% ( $n = 789$ ) endorsed a pattern of symptoms consistent with DSM-IV criteria for past-year opioid abuse (7%) or dependence (9%), and another 20% ( $n = 999$ ) were subthreshold users. The following analyses focused on the subsample of all symptomatic users ( $n = 1788$ ; 36% of past-year nonmedical opioid users). There was no difference in age of first opioid use (mean = 13.3 years) by diagnostic status, but the dependence group reported a greater number of days using opioids in the past year (mean = 83.8 days) than the abuse (mean = 53.6 days) and subthreshold (mean = 43.9 days) groups (F-test,  $p < 0.001$ ). The total number of the 11 abuse and dependence criteria endorsed then was examined: the dependence group (mean = 5.1 criteria) met more criteria for OUD than the abuse (mean = 2.4 criteria) and subthreshold (mean = 1.3 criteria) groups (F-test,  $p < 0.001$ ). Past-year use of other substances was common among the 1788 symptomatic users: alcohol (75%), cigarettes/tobacco (63%), marijuana (54%), tranquilizers (32%), hallucinogens (28%), inhalants (26%), stimulants (23%), cocaine (18%), sedatives (7%), and heroin (2%).

#### 3.2. Treatment use by setting (Table 1)

Overall, 12.4% ( $n = 218$ ) of all symptomatic users used any substance abuse treatment in the past year (medical settings, 8.1%; nonmedical settings, 6.1%). Self-help groups (5.5%) and outpatient rehabilitation (4.9%) were the commonly used settings. Those meeting dependence criteria (17.4%) resembled the abuse group (16.1%) in any treatment use, and both used more treatment than subthreshold users (8.9%). Regarding specific settings, those meeting criteria for dependence and abuse used self-help and inpatient hospitals more than subthreshold users. Compared with subthreshold users, the dependence group used more outpatient rehabilitation and emergency room treatment, and the abuse group used more inpatient rehabilitation.

#### 3.3. Treatment use by study variables (online-only eTable)

Adolescents aged 12–13 years used any treatment (6.1% vs. 15.5%) and medical treatment (2.0% vs. 10.8%) less often than 16–17-years-old. Fewer blacks than whites used medical treatment (3.3% vs. 9.4%) and self-help groups (1.7% vs. 6.6%). Adolescents who did not talk to parents/guardians about substance use used less treatment than those who did (medical, 6.5% vs. 9.7%; nonmedical, 4.2% vs. 6.8%). Criminal justice system involvement (30.4%) and each of the other SUDs (20.8–25.7%) were associated with greater use of any treatment.

#### 3.4. Logistic regression of treatment use (Table 2)

##### 3.4.1. Any treatment

Having public or no health insurance (vs. private), residence in a large metropolitan area (vs. non-metropolitan), talking to parents/guardians about substance use, criminal justice system involvement, nicotine dependence, and other drug use disorders were associated with increased odds of any treatment use. Odds of any treatment use also were elevated in 2006 (vs. 2005).

##### 3.4.2. Medical settings

Correlates of medical treatment use were similar to those of any treatment use, except that survey year and lacking health insurance (vs. private) were not associated with medical treatment use, and opioid abuse (vs. subthreshold use) was associated with increased odds of treatment use.

##### 3.4.3. Self-help groups

Being white (vs. Hispanic), residence in a large metropolitan area, criminal justice system involvement, and other drug use disorders increased the odds of using self-help groups. Being black marginally reduced the odds ( $p = 0.07$ ), while public health insurance ( $p = 0.053$ ), talking to parents/guardians about substance use ( $p = 0.06$ ), and opioid abuse ( $p = 0.07$ ) marginally increased odds of using self-help groups.

#### 3.5. Perceived need for treatment (Table 3)

Among adolescents with symptoms of OUD, 4.9% ( $n = 89$ ) reported perceived need for any treatment in the past 12 months, and only 1.5% ( $n = 27$ ) reported need specifically for treatment of nonmedical opioid use. The dependence group (10.9%) was more likely than the abuse (3.9%) and subthreshold (2.6%) groups to report perceived need, whether for alcohol (4.6% vs.  $\leq 3\%$ ), prescription opioids (4.2% vs.  $\leq 1\%$ ), marijuana (2.8% vs.  $\leq 1\%$ ), or other drugs (1–2% vs.  $\leq 1\%$ ).



**Table 4**

Adjusted odds ratios (AOR) of perceived need for substance abuse treatment in the past 12 months among symptomatic nonmedical prescription opioid users aged 12–17 years (N = 1788).

Perceived need	Prevalence % (SE)	AOR <sup>a</sup>	95% CI
<b>Race/ethnicity</b>			
White	5.2 (0.74) <sup>b</sup>	1.00	
Black, non-Hispanic	1.8 (1.01)	0.58	0.19–1.80
Hispanic	5.5 (2.38)	1.12	0.42–2.96
Other	6.9 (2.34)	1.68	0.52–5.46
<b>Talking to parents/guardians about danger of substance use</b>			
Yes	4.1 (0.87)	1.00	
No	5.8 (0.99)	<b>1.85<sup>c</sup></b>	<b>1.03–3.32</b>
<b>Talking to parents/guardians about a serious problem</b>			
Yes	3.3 (0.83) <sup>b</sup>	1.00	
No	6.0 (0.93)	1.20	0.65–2.24
<b>Prescription opioid use disorder</b>			
Subthreshold use	2.6 (0.66) <sup>c</sup>	1.00	
Abuse <sup>d</sup>	3.9 (1.25)	1.07	0.45–2.54
Dependence	10.9 (1.74)	<b>3.38<sup>b</sup></b>	<b>1.75–6.54</b>
<b>Major depression</b>			
Yes	6.9 (1.26) <sup>e</sup>	1.12	0.63–1.99
No	4.3 (0.75)	1.00	
<b>Criminal justice system involvement</b>			
Yes	9.3 (2.37) <sup>b</sup>	1.69	0.87–3.28
No	4.0 (0.57)	1.00	
<b>Alcohol use disorder</b>			
Yes	8.8 (1.34) <sup>c</sup>	<b>2.40<sup>e</sup></b>	<b>1.11–5.16</b>
No	2.6 (0.63)	1.00	
<b>Other drug use disorder</b>			
Yes	8.1 (1.10) <sup>c</sup>	1.49	0.69–3.23
No	2.7 (0.73)	1.00	

All results are weighted estimates except for sample sizes, which are unweighted.

CI: confidence interval; SE: standard error.

<sup>a</sup> The adjusted logistic model included all the variables listed in the first column; other variables that were not associated with treatment use in the bivariate analysis were not included in the adjusted model.

<sup>b</sup>  $\chi^2$  test:  $0.01 < p < 0.05$ .

<sup>c</sup>  $\chi^2$  test:  $p < 0.001$ .

<sup>d</sup> Adjusted odds ratios for dependence vs. abuse = 3.17 (1.43–7.02),  $p = 0.005$ .

<sup>e</sup>  $\chi^2$  test:  $p = 0.09$ .

### 3.6. Correlates of perceived need for treatment (Table 4)

Few blacks (1.8%) reported perceived need for treatment, while adolescents who had not talked with parents/guardians about serious problems (6.0%), met criteria for opioid dependence (10.9%), were involved with the criminal justice system (9.3%), or had alcohol (8.8%) or other drug use disorders (8.1%) had comparatively high rates of perceived need. In the adjusted analysis, *not* talking to parents/guardians about substance use, opioid dependence (vs. subthreshold use or abuse), and alcohol use disorder were associated with increased odds of perceived need.

### 3.7. Barriers to treatment use

Of adolescents with perceived need for treatment ( $n = 89$ ), 13% reported any use of substance abuse treatment or services in the past year. Reasons for not seeking treatment services reported by the 89 adolescent with perceived need included: wasn't ready to stop using (34%), didn't want others to find out (22%), treatment might cause neighbors to have negative opinions (22%), could handle the problem without treatment (21%), didn't need treatment (18%), insurance didn't cover treatment or cost concern (10%), didn't know where to get it (8%), didn't think treatment would help (8%), and didn't have time (8%). Other reasons (<8%) were: couldn't afford it, treatment programs unavailable, treatment might have negative effects on job, lacked transportation, or programs lacked openings. These reasons did not differ across the three groups.

## 4. Discussion

These results highlight several public health issues. First, the majority of adolescents who endorsed a pattern of symptoms consistent with opioid dependence (83%), abuse (84%), or subthreshold use (91%) did not receive any substance abuse service or treatment; an even higher proportion (89%, dependence; 96%, abuse; 97%, subthreshold) reported no perceived need for treatment. These estimates are of concern because they suggest that adolescents meeting criteria for OUD are unlikely to use treatments even when they are available. Prior research also shows that family income and private insurance are not associated with substance abuse treatment use (Mojtabai, 2005), but having public health insurance is associated with treatment use (Wu, Kouzis, & Schlenger, 2003). Reasons for a low rate of treatment use by privately insured adolescents were unclear. Future studies should examine the kinds of treatment offered privately vs. publicly, and whether privately insured patients differentially seek treatment for mental problems rather than substance use, or are less likely to have substance abuse treatment supported by their insurance plans.

Another issue concerns *stigma* (didn't want others to find out; concerned with negative opinions) and *not perceiving having problems* (wasn't ready to stop using; could handle the problem; didn't need treatment). Failure to seek treatment therefore might be attributed to fears of stigma and lacking knowledge about dangers of drug use. Additionally, the ease of availability of prescription opioids from family members/friends plus the perception that legal "prescription" opioids are safer than "illicit" drugs (ONDCP, 2007) might affect motivation to seek help. As shown here, few adolescents meeting criteria for dependence (4%), abuse (1%), or subthreshold use (1%) reported perceived need for treatment. Nevertheless, while studies have shown that adolescents with mental health concerns often "thought or hoped that the problem would go away," "did not know where to get help," and "were reluctant to disclose mental or substance use concerns to their doctors" (Klein, McNulty, & Flatau, 1998; Samargia, Saewyc, & Elliott, 2006), this study suggests the encouraging message by showing that parents' communications with adolescents about dangers of substance use are associated with increased odds of substance abuse treatment use and with decreased odds of reports of unmet need for treatment. Such communication might improve adolescents' understanding of health risks from drug use or increase willingness to disclose health concerns by lessening worries of rejection.

Further, blacks, Hispanics, and adolescents in non-metropolitan areas may face additional barriers to treatment and need continued research and outreach efforts to improve their treatment use. For example, black and Hispanic adolescents have been found to be more likely than white adolescents to report being socially isolated and not wanting to get help for substance use (Windle, Miller-Tutzauer, Barnes, & Welte, 1991). However, in adult studies, findings have suggested that blacks are as or more likely than whites to use substance abuse treatment (Wu et al., 2003; Wu & Ringwalt, 2004). One direction for future research is to determine whether whites tend to use treatment from mental health sectors while blacks differentially receive treatment through the criminal justice system as they age (National Center on Addiction and Substance Abuse, 2010; Wells, Klap, Koike, & Sherbourne, 2001). Therefore, drug use among adolescent blacks seems to differ from their adult counterparts, and efforts for reducing drug use during adolescence are critically important.

Overall, need factors (comorbid SUD, criminal justice system involvement) increase treatment use, although adolescents also report psychological barriers to treatment use (stigma, lacking insight, unaware of sources of help). It appears that only when adolescents develop severe or externalizing problems (e.g., legal) do they come to the attention of adults and trigger treatment entry. Lastly, self-help groups are a common source of help; thus, research is recommended to evaluate the degree to which they respond to adolescents' needs (Kelly & Myers, 2007).

These findings should be interpreted with caution. NSDUH relies on self-reports, which can be influenced by memory errors and under-reporting. Institutionalized and homeless adolescents were not included in NSDUH; the findings do not apply to them. Additionally, data on quality of care and motives for nonmedical use are not collected by NSDUH. Further, like other national surveys, SUDs in NSDUH are based on fully standardized questions designed to operationalize DSM-IV criteria for SUDs, and they have not been validated by clinicians. Prior research shows that the NSDUH methodology generates rates of substance use and dependence similar to estimates from the National Comorbidity Survey (Kandel, Chen, Warner, Kessler, & Grant, 1997). A recent study using an interview–re-interview methodology indicates a good-to-excellent level of agreement for respondents' reports of measures for substance use, SUD, and treatment used in NSDUH (SAMHSA, 2009). Lastly, the small sample size of adolescents with an OUD and perceived need for treatment is a limitation of the study, and it constrains the power to identify between-group differences and to conduct detailed analyses of barriers to treatment use (e.g., whether barriers to treatment use differ by type of drugs used). Hence, *p*-values have not been conservatively adjusted for multiple comparisons.

NSDUH data have strengths unavailable in small-scale studies. It has high response rates (85–87%) in adolescents, uses computer-assisted self-administration interviewing and anonymous data collection to enhance privacy, includes detailed probes and color pictures of prescription drugs to assess substance use behaviors, and applies the 2000 census to improve sample weight calibration (SAMHSA, 2009). These features improve respondents' reporting of substance use behaviors and the quality of the data (SAMHSA, 2009). The results from this national sample of adolescents also have a higher level of generalizability than those of a convenient or regional sample. Given opioids' risk for chronic addiction, HIV risk, overdose, and adverse interactions with depressants (Paulozzi et al., 2006; Veilleux et al., 2010), this first study of its kind in adolescents provides new, timely information to elucidate barriers to treatment use.

In conclusion, about 36% of adolescents aged 12–17 years who reported nonmedical prescription opioid use in the past year experienced symptoms of OUD, but the vast majority meeting criteria for an OUD reported no need for treatment. Efforts to increase knowledge about adverse effects of nonmedical prescription use and to reduce stigma associated with admission of a substance problem are needed if treatments are to be made truly available. Studies have shown that effective parenting (communication, parental warmth) is associated with decreased odds of adolescent substance use and that adolescents' reluctance and difficulty in communicating their health concerns to adults serves an important barrier to treatment (Cleveland, Gibbons, Gerrard, Pomery, & Brody, 2005; Klein et al., 1998; Samargia et al., 2006). Modifiable parenting factors hence deserve research to identify effective targets for intervention, and they appear to be especially beneficial to disadvantaged black adolescents (Cleveland et al., 2005). Primary care providers who customarily see adolescents for periodic checkups can also play an important role in screening for nonmedical prescription drug use and early intervention (Winters & Kaminer, 2008). School-based substance use prevention programs should consider including components about the dangers of nonmedical prescription drug use. Campaigns that educate people about adverse consequences of nonmedical drug use and provide treatment information might be helpful. Lastly, the scarcity of treatment research reveals that randomized trials for adolescents with OUD are critically needed and can be clinically useful (Woody et al., 2008).

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#### Contributors

Dr. Wu contributed to the study design and data analyses, and wrote the initial draft of the paper. Drs. Wu, Li, Blazer, and Woody contributed to interpretations of results and critical revisions.

#### Conflicts of interest

GE Woody is a member of the RADARS post-marketing study scientific advisory group, whose job is to assess abuse of prescription medications. Denver Health administers RADARS, and pharmaceutical companies support its work. The other authors have no conflicts of interest to disclose.

#### Ethical approval

The study was exempt from Duke Institutional Review Board review due to the data being available in the public domain without any identification of personal information.

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