

Prevalence and Correlates of Prescription Stimulant Use, Misuse, Use Disorders, and Motivations for Misuse Among Adults in the United States

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Objective: The authors sought to simultaneously examine the prevalence and correlates of prescription stimulant use, misuse, use disorders, and motivations for misuse in the U.S. adult population.

Method: This was a nationally representative household population study of adults age 18 or older from the 2015 and 2016 National Surveys on Drug Use and Health (N=102,000). Measurements included prescription stimulant use, use without misuse, misuse without use disorders, and misuse with use disorders, as well as sociodemographic characteristics, health conditions, and mental health factors.

Results: Among U.S. adults, 6.6% (annual average) used prescription stimulants overall; 4.5% used without misuse, 1.9% misused without use disorders, and 0.2% had use disorders. Adults with past-year prescription stimulant use disorders did not differ from those with misuse without use disorders in any of the examined sociodemographic characteristics and in many of the examined substance use

problems. The most commonly reported motivations for misuse were to help be alert or concentrate (56.3%). The most likely source of misused prescription stimulants was by obtaining them free from friends or relatives (56.9%). More frequent prescription stimulant misuse and use disorder were associated with an increased likelihood of obtaining medications from physicians or from drug dealers or strangers and less likelihood of obtaining them from friends or relatives.

Conclusions: Approximately 16.0 million U.S. adults used prescription stimulants in the preceding year (annual average), 5.0 million misused prescription stimulants, and 0.4 million had use disorders. Cognitive enhancement was the most commonly reported reason for misusing prescription stimulants. Patients who are using their medication for cognitive enhancement or diverting their medication to others present a high risk.

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Management of prescription stimulants can be complicated by risk for misuse; patients may use without a prescription, for a reason other than as directed by a physician, or in greater amounts, more often, or longer than prescribed (1). Understanding how use of these medications relates to misuse is important because stimulant misuse is common, with 0.5 million youths and 4.8 million adults (including 2.5 million young adults, 18–25 years of age) reporting misuse in 2015 (1), and because adverse effects from stimulant use are not uncommon and can include loss of appetite, anxiety, paranoia, hallucinations, insomnia, increased heart rate, and death (2, 3). While much attention has focused on misuse of stimulants by youths (4, 5) and young adults (6–8), less work has focused on the overall adult population (9–11). Yet, total prescription stimulant sales for adults have surpassed those for youths (12, 13), suggesting the need to examine misuse among the U.S. adult

population. Fifty-five percent of total prescriptions in 2015 were to adults age 20 and older (12), and increases for adults have outpaced those for youths over the past decade (14, 15).

Studying adults with stimulant use disorders is also important because this subgroup of stimulant misusers is at higher risk for clinically significant complications compared with misusers without use disorders. Furthermore, understanding the source of prescription stimulants that are misused and the motivations for such misuse is essential for prevention and clinical practice. One study examined the source of prescription stimulants among those who misuse them but did not assess motivations for misuse (16). A few studies have examined motivations for misusing prescription medications based on local data (9–11) or national samples of high school seniors (17–19). To our knowledge, no study has simultaneously examined the prevalence of prescription stimulant use (i.e., overall use, including

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both misuse and medical use), misuse, use disorders, and motivations for misuse in a nationally representative sample of the U.S. adult population.

In this study, based on data from the 2015 and 2016 National Surveys on Drug Use and Health (NSDUH), we examined the following questions:

1. What is the 12-month prevalence of any prescription stimulant use, use without misuse, misuse without use disorders, and use disorders?
2. How do sociodemographic characteristics, health conditions, and mental health status distinguish prescription stimulant use without misuse, misuse without use disorders, and use disorders?
3. What are the main motivations for misuse? What sociodemographic and mental health characteristics are associated with specific motivations for prescription stimulant misuse?
4. What is the source of prescription stimulants obtained for most recent misuse among adults who misuse them?

By describing the patterns and correlates of prescription stimulant misuse and use disorders in comparison to persons reporting medical use of these medications, clinicians may be able to intervene earlier and more successfully with their patients. The ultimate goal is to facilitate identification of and interventions for adults who are at increased risk for prescription stimulant misuse and develop effective clinician training programs, public health policies, programs, and public messages to prevent misuse and reduce the harms associated with misuse.

METHOD

Study Population

We examined data from adults age 18 or older who participated in the 2015–2016 NSDUH, which used face-to-face surveys conducted by the Substance Abuse and Mental Health Services Administration. Since 2015, NSDUH has been collecting nationally representative data on prescription stimulant use overall, misuse, and motivations for misuse among the non-institutionalized U.S. civilian population age 12 or older (20, 21).

NSDUH data collection was approved by the Institutional Review Board at RTI International. Verbal informed consent was received from each study participant. Data were collected by interviewers in personal visits to households and noninstitutional group quarters. Audio computer-assisted self-administered interviewing was used, providing respondents with a private, confidential way to record answers. The annual average weighted response rate for the 2015–2016 NSDUH was 54.3% (21). Details regarding NSDUH methods are available elsewhere (21).

Measures

NSDUH collected data on past-year use and misuse of prescription stimulants, including frequency of prescription stimulant misuse in the past month among those reporting any past-month misuse. NSDUH defined prescription stimulant

misuse as use “in any way that a doctor did not direct you to use them, including 1) use without a prescription of your own, 2) use in greater amounts, more often, or longer than you were told to take them, or 3) use in any other way a doctor did not direct you to use them” (1, 21). Among respondents who reported past-year prescription stimulant misuse, NSDUH asked about the main motivation for misusing prescription stimulants the most recent time: to help lose weight, to help concentrate, to help be alert or stay awake, to help study, to experiment or see what it’s like, to feel good or get high, to increase or decrease effects of other drugs; is “hooked” or has to have it; or other reason (1, 21). NSDUH collected data on the source of prescription stimulants obtained for the most recent misuse: given by a friend or relative for free, prescribed by a physician, stolen from a friend or relative, bought from a friend or relative, bought from a drug dealer or a stranger, or stolen from a doctor’s office or a clinic. If respondents reported their source as “given by friends or relatives for free,” NSDUH asked them where the friends or relatives obtained prescription stimulants.

NSDUH collected data on lifetime and past-year use of tobacco, alcohol, cannabis, cocaine, heroin, hallucinogens, and inhalants and lifetime and past-year use and misuse of prescription sedatives or tranquilizers and of opioids. NSDUH provided estimates on past-year major depressive episode and specific substance use disorders (alcohol, cannabis, cocaine, heroin, hallucinogens, inhalants, and prescription opioids, sedatives/tranquilizers, and stimulants) based on assessments of individual diagnostic criteria from DSM-IV (22). Nicotine dependence among cigarette smokers was assessed using the Nicotine Dependence Syndrome Scale (23). These measures have demonstrated good reliability and validity (24, 25).

NSDUH asked all adult respondents about suicidality: “At any time during the past 12 months, did you seriously think about trying to kill yourself?” NSDUH asked respondents about medical diagnoses (e.g., hypertension, heart disease, diabetes mellitus, chronic obstructive pulmonary disease (COPD), asthma, cancer, and kidney disease) that they ever received from a physician or other health care professional. NSDUH captured respondents’ self-rated health and the number of past-year emergency department visits and collected data on age, sex, race/ethnicity, educational attainment, employment status, family income, marital status, and health insurance.

Statistical Analysis

Among adults, we first estimated the national annual prevalence of any prescription stimulant use, use without misuse, misuse without use disorders, and use disorders as well as the frequency distributions of past-month prescription stimulant misuse by sociodemographic characteristics, health conditions, and mental health status. Second, bivariable and multivariable multinomial logistic regression models were applied to examine how the above-listed factors distinguish these outcomes.

Third, we estimated the main motivations for the most recent misuse of prescription stimulants and the source of

prescription stimulants obtained for the most recent misuse among adults with past-year misuse by the frequency of past-month misuse of prescription stimulants and the status of prescription stimulant use disorders. Fourth, among adults with past-year prescription stimulant misuse, bivariable and multivariable multinomial logistic regression models were applied to examine whether and how characteristics were associated with specific motivations for prescription stimulant misuse. We examined four major clustered categories of motivations: weight loss, helping to study, being alert or helping to concentrate, and substance-use related. Multicollinearity (using variance inflation factors) and potential interaction effects between examined factors were assessed and were not identified in the final multivariable models. All of our analyses were conducted in SUDAAN, version 11.0.1 (26) to account for the complex sample design and sample weights of NSDUH. Reported population and percentage prevalences are weighted estimates, but reported sample sizes are the numbers of sampled adult participants who completed the 2015–2016 NSDUH.

RESULTS

Past-Year Prevalence of Prescription Stimulant Use Without Misuse, Misuse Without Use Disorders, and Use Disorders

Based on the 102,000 sampled persons age 18 or older from the 2015–2016 NSDUH (Ns are rounded to the nearest 100, in accordance with the Substance Abuse and Mental Health Services Administration requirements for descriptions of overall sample sizes based on the restricted-use data files, to minimize potential disclosure risk), we estimated that among U.S. adults in the past year (annual average), approximately 6.6% (or 16.0 million) used prescription stimulants (including both use without misuse and misuse), 4.5% (or 11.0 million) used prescription stimulants without misuse, 2.1% (or 5.0 million) misused prescription stimulants at least once, and 0.2% (or 0.4 million) had prescription stimulant use disorders (Table 1; see also Table S1 in the online supplement). Among adults with any prescription stimulant use in the past 12 months, 31.2% misused prescription stimulants at least once and 2.7% had prescription stimulant use disorders. Among adults with prescription stimulant misuse, 8.7% had prescription stimulant use disorders.

Characteristics Distinguishing Prescription Stimulant Use Without Misuse, Misuse Without Use Disorders, and Use Disorders

Among adults, the 12-month prevalence of prescription stimulant use without misuse, prescription stimulant misuse without use disorders, and prescription stimulant use disorders varied by most of the examined sociodemographic characteristics (Table 1). The prevalence of any prescription stimulant use was higher in 2016 than in 2015. Adults in the 18- to 49-year age range had a higher prevalence of prescription stimulant use without misuse, misuse without use

disorders, and use disorders than those age 50 or older. Racial/ethnic minorities had a lower prevalence of prescription stimulant use without misuse, misuse without use disorders, and stimulant use disorders than did non-Hispanic whites. The prevalence of stimulant misuse without use disorders and stimulant use disorders was higher among adults with Medicaid only than among those with private insurance only, among divorced, separated, or never married adults than among married adults, among part-time employed or unemployed adults than among full-time employed adults, and among those with an annual family income less than \$20,000 than among those with an income of \$75,000 or more.

Among adults, the 12-month prevalence of prescription stimulant use without misuse, misuse without use disorders, and use disorders varied by some of the examined medical conditions and all of the examined mental health characteristics (Table 2). The prevalence of prescription stimulant use without misuse, misuse without use disorders, and use disorders was higher among adults with major depressive episode, with suicidal ideation, and with substance use problems compared with adults without the corresponding problem.

Table S2 in the online supplement presents the frequency distributions of prescription stimulant misuse in the past month among U.S. adult prescription stimulant misusers by sociodemographic characteristics, health conditions, and mental health status. Among adults who misused prescription stimulants, 68.3% misused in the past year but not in the past month, 16.4% misused 1–2 days in the past month, 9.1% misused 3–6 days in the past month, and 6.2% misused 7 or more days in the past month. High-frequency misuse (≥ 7 days of past-month misuse) was associated with being in the 30- to 49-year age range, being non-Hispanic white, having less than a high school education, being disabled for work, being divorced or separated, having three or more past-year emergency department visits, having COPD, having a major depressive episode in the past year, having past-year cocaine or heroin use disorder, having past-year inhalant use or use disorder, and having past-year prescription sedative/tranquilizer or opioid misuse or use disorder.

Multivariable results (Table 3) show that prescription stimulant use without misuse (compared with past-year nonuse of prescription stimulants) was positively associated with being in the 18- to 49-year age range, being female, being non-Hispanic white, having less than a high school education, having private health insurance only, having good, fair, or poor self-rated health, having past-year emergency department visits, having asthma, having a major depressive episode, having past-year or lifetime tobacco, cannabis, and hallucinogen use, having a past-year alcohol use disorder, having a past-year cannabis use disorder, having past-year cocaine use or use disorder, having a past-year hallucinogen use disorder, and having past-year prescription sedative/tranquilizer or opioid misuse or use disorder.

Misuse without use disorders (compared with past-year use without misuse) was positively associated with being in

TABLE 1. Twelve-Month Prevalence of Any Use of Prescription Stimulants, Prescription Stimulant Use Without Misuse, Misuse Without Use Disorders, and Use Disorders Among U.S. Adults, by Sociodemographic Characteristic (N=102,000)^a

Characteristic	Any Prescription Stimulant Use		Prescription Stimulant Use Without Misuse		Prescription Stimulant Misuse Without Use Disorders		Prescription Stimulant Use Disorders	
	Weighted %	95% CI	Weighted %	95% CI	Weighted %	95% CI	Weighted %	95% CI
Overall	6.6	6.35–6.79	4.5	4.34–4.70	1.9	1.77–1.97	0.2	0.16–0.20
Year								
2015 (reference)	6.3	6.07–6.61	4.4	4.14–4.63	1.8	1.67–1.94	0.2	0.13–0.20
2016	6.8	6.52–7.09	4.7	4.43–4.91	1.9	1.80–2.08	0.2	0.16–0.25
Age range (years)								
18–29	13.0	12.47–13.47	6.5	6.22–6.85	6.0	5.66–6.37	0.4	0.36–0.51
30–49	6.7	6.33–6.98	5.1	4.79–5.36	1.4	1.26–1.56	0.2	0.13–0.23
≥50 (reference)	3.5	3.20–3.80	3.2	2.89–3.47	0.3	0.19–0.35	0.1	0.04–0.12
Sex								
Male	6.3	6.07–6.62	4.0	3.77–4.23	2.2	2.01–2.31	0.2	0.15–0.24
Female (reference)	6.8	6.52–7.06	5.0	4.78–5.26	1.6	1.49–1.73	0.2	0.13–0.21
Race/ethnicity								
Non-Hispanic white (reference)	7.7	7.45–7.98	5.3	5.04–5.49	2.2	2.09–2.36	0.2	0.19–0.27
Non-Hispanic black	3.9	3.41–4.36	3.1	2.72–3.59	0.7	0.54–0.82	0.1	0.03–0.14
Hispanic	4.9	4.50–5.39	3.4	3.01–3.77	1.5	1.26–1.66	0.1	0.08–0.16
Non-Hispanic other	4.5	4.00–5.14	2.8	2.40–3.34	1.6	1.35–1.93	0.1	0.04–0.17
Education								
<High school (reference)	5.0	4.27–5.83	3.9	3.25–4.71	0.9	0.72–1.19	0.2	0.07–0.34
High school	5.2	4.74–5.66	3.6	3.25–4.08	1.4	1.19–1.61	0.2	0.10–0.25
Some college	8.2	7.71–8.80	5.5	5.03–5.96	2.5	2.29–2.81	0.2	0.17–0.30
College graduate	6.0	5.50–6.56	4.1	3.70–4.58	1.8	1.56–2.05	0.1	0.06–0.18
Health insurance								
Private only (reference)	7.7	7.44–8.03	5.1	4.89–5.38	2.4	2.28–2.59	0.2	0.14–0.21
Uninsured	6.7	6.17–7.28	4.1	3.65–4.54	2.3	2.04–2.63	0.3	0.20–0.49
Medicaid only	6.7	6.19–7.21	4.7	4.30–5.22	1.7	1.45–1.89	0.3	0.21–0.39
Other	3.9	3.55–4.34	3.3	2.92–3.65	0.6	0.48–0.71	0.1	0.04–0.15
Marital status								
Married (reference)	4.2	3.89–4.61	3.6	3.25–3.93	0.6	0.52–0.75	0.04	0.02–0.06
Widowed	3.5	0.66–4.702	3.1	0.24–4.172	0.4	0.21–0.86	0.1	0.02–0.17
Divorced or separated	6.5	5.71–7.35	5.1	4.44–5.93	1.1	0.83–1.44	0.3	0.14–0.47
Never married	11.0	10.44–11.59	5.9	5.45–6.31	4.8	4.42–5.15	0.4	0.28–0.47
Employment status								
Full-time (reference)	6.8	6.54–7.10	4.6	4.33–4.81	2.1	1.97–2.24	0.1	0.12–0.18
Part-time	8.5	7.98–9.08	5.1	4.68–5.56	3.2	2.83–3.49	0.3	0.19–0.39
Disabled for work	8.2	7.26–9.31	7.0	6.07–8.02	1.0	0.67–1.40	0.2	0.15–0.54
Unemployed	8.1	7.29–9.06	5.2	4.46–5.94	2.5	2.12–3.03	0.5	0.27–0.74
Other	4.7	4.32–5.03	3.6	3.30–3.96	0.9	1.97–2.24	0.1	0.09–0.20
Family income								
<\$20,000	7.8	7.25–8.29	4.7	4.29–5.05	2.7	2.44–3.08	0.4	0.27–0.48
\$20,000–\$49,999	6.0	5.67–6.33	4.2	3.95–4.54	1.6	1.47–1.77	0.1	0.10–0.20
\$50,000–\$74,999	6.0	5.58–6.50	4.4	4.00–4.85	1.5	1.30–1.68	0.1	0.09–0.20
≥\$75,000 (reference)	6.7	6.37–7.09	4.7	4.43–5.07	1.8	1.69–2.01	0.1	0.10–0.18

^a The N of 102,000 is the unweighted sample size, the denominator for the percentages. It is rounded to the nearest 100, in accordance with the Substance Abuse and Mental Health Services Administration requirements for descriptions of overall sample sizes based on the restricted-use data files, to minimize potential disclosure risk. Estimates in boldface are significantly different ($p < 0.05$) from the corresponding reference group within each column.

TABLE 2. Twelve-Month Prevalence of Any Use of Prescription Stimulants, Prescription Stimulant Use Without Misuse, Misuse Without Use Disorders, and Use Disorders Among U.S. Adults, by Health Conditions and Mental Health Status (N=102,000)^a

Characteristic	Any Prescription Stimulant Use		Prescription Stimulant Use Without Misuse		Prescription Stimulant Misuse Without Use Disorders		Prescription Stimulant Use Disorders	
	Weighted %	95% CI	Weighted %	95% CI	Weighted %	95% CI	Weighted %	95% CI
Health conditions								
Self-rated health								
Excellent (reference)	6.1	5.74–6.54	3.9	3.62–4.27	2.1	1.89–2.29	0.1	0.07–0.17
Very good	6.9	6.53–7.20	4.4	4.10–4.66	2.3	2.15–2.52	0.2	0.13–0.21
Good	6.6	6.23–6.95	4.8	4.53–5.17	1.5	1.40–1.70	0.2	0.15–0.27
Fair or poor	6.5	5.91–7.09	5.1	4.63–4.27	1.1	0.88–1.26	0.3	0.19–0.41
Past-year emergency department visits								
0 (reference)	6.0	5.76–6.21	4.0	3.85–4.24	1.8	1.69–1.92	0.1	0.11–0.18
1	7.3	6.81–7.91	5.2	4.68–5.65	2.0	1.75–2.23	0.2	0.16–0.31
2	9.2	8.40–10.08	6.3	5.62–7.07	2.6	2.22–2.95	0.3	0.21–0.55
≥3	9.9	8.75–11.14	7.5	6.41–8.66	2.0	1.62–2.54	0.4	0.24–0.66
Hypertension								
Yes	5.1	4.63–5.58	4.4	3.95–4.84	0.6	0.45–0.72	0.1	0.09–0.23
No (reference)	7.0	6.72–7.19	4.6	4.38–4.75	2.2	2.08–2.33	0.2	0.16–0.22
Heart disease								
Yes	4.8	4.18–5.41	4.0	3.45–4.60	0.6	0.42–0.74	0.2	0.11–0.39
No (reference)	6.8	6.58–7.01	4.6	4.41–4.77	2.0	1.92–2.15	0.2	0.15–0.21
Diabetes mellitus								
Yes	4.6	4.01–5.28	4.1	3.53–4.75	0.4	0.28–0.59	0.1	0.04–0.21
No (reference)	6.8	6.59–7.03	4.6	4.39–4.76	2.1	1.94–2.16	0.2	0.16–0.22
Cancer								
Yes	4.9	4.07–5.85	4.1	3.31–4.96	0.7	0.50–1.06	0.1	0.04–0.27
No (reference)	6.7	6.48–6.90	4.6	4.38–4.73	2.0	1.84–2.06	0.2	0.16–0.22
Asthma								
Yes	10.3	9.60–11.09	7.2	6.60–7.88	2.8	2.50–3.23	0.3	0.18–0.39
No (reference)	6.2	5.98–6.40	4.2	4.07–4.42	1.8	1.67–1.88	0.2	0.14–0.21
Chronic obstructive pulmonary disease								
Yes	8.0	6.85–9.40	6.6	5.50–7.86	1.1	0.79–1.55	0.4	0.18–0.65
No (reference)	6.5	6.30–6.72	4.4	4.26–4.60	1.9	1.80–2.02	0.2	0.15–0.20
Kidney disease								
Yes	4.7	3.49–6.29	4.2	3.03–5.70	0.5	0.27–0.90	0.04	0.01–0.20
No (reference)	6.6	6.41–6.83	4.5	4.36–4.70	1.9	1.80–2.01	0.2	0.16–0.22
Mental health problems								
Major depressive episode								
Yes	16.6	15.47–17.70	10.9	9.95–11.88	4.6	4.13–5.19	1.1	0.79–1.40
No (reference)	5.8	5.63–6.04	4.1	3.89–4.23	1.7	1.56–1.77	0.1	0.10–0.14
Suicidal ideation								
Yes	17.3	15.93–18.85	9.9	8.74–11.11	6.2	5.48–7.06	1.3	0.90–1.76
No (reference)	6.1	5.92–6.32	4.3	4.13–4.47	1.7	1.59–1.79	0.1	0.11–0.16
Substance use problems								
Tobacco use or disorder								
Past-month nicotine dependence	10.3	9.66–10.91	6.0	5.46–6.53	3.6	3.29–4.00	0.7	0.53–0.85
Past-year tobacco use	11.3	10.80–11.89	6.2	5.85–6.65	4.8	4.43–5.15	0.3	0.25–0.40

continued

TABLE 2, *continued*

Characteristic	Any Prescription Stimulant Use		Prescription Stimulant Use Without Misuse		Prescription Stimulant Misuse Without Use Disorders		Prescription Stimulant Use Disorders	
	Weighted %	95% CI	Weighted %	95% CI	Weighted %	95% CI	Weighted %	95% CI
Substance use problems								
Lifetime use, but no past-year use	5.6	5.31–5.97	4.5	4.21–4.81	1.1	0.94–1.17	0.1	0.05–0.12
Never tobacco use (reference)	3.5	3.22–3.74	3.0	2.75–3.24	0.5	0.38–0.53	0.04	0.02–0.08
Alcohol use or disorder								
Past-year alcohol use disorder	18.3	17.22–19.41	7.6	6.89–8.46	9.2	8.44–9.98	1.5	1.17–1.84
Past-year use, but no use disorder	6.8	6.58–7.10	4.8	4.60–5.04	1.9	1.80–2.04	0.1	0.08–0.13
Lifetime use, but no past-year use	4.6	4.18–5.07	4.0	3.64–4.48	0.5	0.34–0.63	0.1	0.06–0.20
Never alcohol use (reference)	2.6	2.25–2.91	2.4	2.10–2.76	0.1	0.07–0.19	0.04	0.01–0.11
Cannabis use or disorder								
Past-year cannabis use disorder	29.1	26.54–31.70	9.8	8.31–11.55	16.2	14.30–18.33	3.0	2.26–4.04
Past-year use, but no use disorder	17.3	16.51–18.07	8.0	7.46–8.58	8.6	8.06–9.19	0.7	0.53–0.84
Lifetime use, but no past-year use	6.9	6.56–7.32	5.5	5.19–5.88	1.3	1.14–1.41	0.1	0.10–0.19
Never cannabis use (reference)	3.2	3.05–3.44	2.9	2.75–3.14	0.3	0.24–0.34	0.02	0.01–0.04
Cocaine use or disorder								
Past-year cocaine use disorder	32.5	27.08–38.53	9.9	6.76–14.40	14.7	11.23–19.10	7.9	5.16–11.79
Past-year use, but no disorder	41.2	38.49–44.01	11.9	10.25–13.76	27.1	24.67–29.73	2.2	1.59–3.04
Lifetime use, but no past-year use	11.1	10.40–11.76	7.0	6.40–7.56	3.7	3.34–4.07	0.4	0.31–0.56
Never cocaine use (reference)	5.1	4.87–5.24	4.0	3.79–4.13	1.0	0.96–1.10	0.1	0.05–0.09
Heroin use or disorder								
Past-year heroin use or use disorder	34.0	28.94–39.52	13.0	9.46–17.58	15.7	12.31–19.81	5.3	3.44–8.21
Lifetime use, but no past-year use	14.3	12.25–16.52	6.7	5.24–8.42	6.5	5.24–7.99	1.1	0.61–2.00
Never heroin use (reference)	6.3	6.13–6.54	4.5	4.29–4.62	1.7	1.64–1.84	0.1	0.12–0.17
Hallucinogen use or disorder								
Past-year use or use disorder	42.9	40.46–45.39	12.0	10.56–13.53	28.0	25.94–30.24	2.9	2.22–3.80
Lifetime use, but no past-year use	12.8	12.14–13.50	7.9	7.30–8.45	4.4	4.09–4.81	0.5	0.39–0.66
Never hallucinogen use (reference)	4.7	4.51–4.88	3.8	3.60–3.95	0.9	0.79–0.93	0.1	0.05–0.09
Inhalant use or use disorder								
Past-year inhalant use or use disorder	34.2	29.45–39.26	9.5	7.09–12.69	22.0	18.25–26.22	2.7	1.50–4.76

continued

TABLE 2, *continued*

Characteristic	Any Prescription Stimulant Use		Prescription Stimulant Use Without Misuse		Prescription Stimulant Misuse Without Use Disorders		Prescription Stimulant Use Disorders	
	Weighted %	95% CI	Weighted %	95% CI	Weighted %	95% CI	Weighted %	95% CI
Substance use problems								
Lifetime use, but no past-year use	14.6	13.70–15.57	8.2	7.51–8.92	5.6	5.09–6.22	0.8	0.61–1.04
Never inhalant use (reference)	5.6	5.44–5.84	4.1	3.96–4.31	1.4	1.31–1.49	0.1	0.09–0.13
Prescription sedative or tranquilizer misuse or disorder								
Past-year misuse or use disorder	34.1	31.99–36.32	12.0	10.64–13.58	19.2	17.57–20.84	2.9	2.31–3.74
Lifetime misuse, but no past-year misuse	15.6	13.95–17.32	8.7	7.40–10.10	6.2	5.31–7.32	0.7	0.40–1.09
Never misuse (reference)	5.5	5.32–5.71	4.2	4.02–4.35	1.3	1.16–1.33	0.1	0.07–0.11
Prescription opioid misuse or disorder								
Past-year misuse or use disorder	25.8	24.31–27.25	10.7	9.62–11.85	13.1	12.06–14.26	2.0	1.53–2.48
Lifetime misuse, but no past-year misuse	13.7	12.64–14.71	7.6	6.79–8.47	5.6	4.97–6.24	0.5	0.34–0.70
Never misuse (reference)	5.1	4.92–5.31	4.0	3.83–4.17	1.0	0.97–1.12	0.1	0.05–0.09

^a The N of 102,000 is the unweighted sample size, the denominator for the percentages. It is rounded to the nearest 100, in accordance with the Substance Abuse and Mental Health Services Administration requirements for descriptions of overall sample sizes based on the restricted-use data files, to minimize potential disclosure risk. Estimates in boldface are significantly different ($p < 0.05$) from the corresponding reference group within each column.

the 18- to 49-year age range, being male, being in the non-Hispanic other racial/ethnic category, being a college graduate, having private health insurance only, having an annual family income less than \$20,000, having excellent self-rated health, having no past-year emergency department visits, having no major depressive episode, having lifetime or past-year alcohol use, having a past-year alcohol use disorder, having lifetime or past-year cannabis use, having a past-year cannabis use disorder, having lifetime or past-year cocaine use, having a past-year cocaine use disorder, having past-year hallucinogen use or use disorder, having past-year prescription sedative/tranquilizer misuse or use disorder, having lifetime or past-year prescription opioid misuse, and having a past-year prescription opioid use disorder. Adults with past-year prescription stimulant misuse without use disorders did not differ from adults with use disorders in most of the examined sociodemographic characteristics and health conditions and in many of the examined substance use problems. Compared with past-year prescription stimulant misuse without use disorders, past-year prescription stimulant use disorders were positively associated with being age 50 or older and having a major depressive episode and were negatively associated with being in the non-Hispanic other racial/ethnic category and having past-year alcohol use without use disorders.

Motivations for Prescription Stimulant Misuse

Among U.S. adults with prescription stimulant misuse, 56.3% (Table 4) reported that the motivation for their most recent misuse was to help be alert or concentrate, followed by to help study (21.9%) and to get high or being hooked, to adjust other drug effects, or to experiment (15.5%). Fewer reported misuse for weight loss (4.1%). Compared with past-year stimulant misusers without past-month misuse, high-frequency misusers (with ≥ 7 days of misuse in the past month) were more likely to misuse stimulants to help be alert or concentrate (69.5% compared with 54.4%) and were less likely to misuse them to help study (11.5% compared with 24.6%). Compared with adults without stimulant use disorders, those with stimulant use disorders were more likely to misuse stimulants for substance-use-related reasons (to get high or being hooked, to adjust other drug effects, or to experiment) (23.6% compared with 14.8%) or for losing weight (7.9% compared with 3.8%) and were less likely to misuse stimulants to help study (9.2% compared with 23.1%).

Source of Misused Prescription Stimulants

Among adults with past-year prescription stimulant misuse, the most commonly reported sources for prescription stimulants for their most recent misuse included friends or relatives for free (56.9%) and buying or stealing from friends or relatives

TABLE 3. Multivariable Multinomial Logistic Regression Model Showing Correlates of Prescription Stimulant Use Without Misuse, Misuse Without Use Disorders, and Use Disorders Among U.S. Adults (N=102,000)^a

Characteristic	Prescription Stimulant Use Without Misuse Versus Nonuse (N=98,500)		Prescription Stimulant Misuse Without Use Disorders Versus Use Without Misuse (N=8,700)		Prescription Stimulant Use Disorders Versus Misuse Without Use Disorders (N=3,500)	
	Adjusted Odds Ratio	95% CI	Adjusted Odds Ratio	95% CI	Adjusted Odds Ratio	95% CI
Age range (years)						
18–29	2.1	1.83–2.39	5.0	3.46–7.08	0.3	0.11–0.54
30–49	1.5	1.33–1.73	2.1	1.42–3.00	0.5	0.21–0.96
≥50 (reference)	1.0		1.0		1.0	
Sex						
Male	0.7	0.66–0.78	1.2	1.04–1.36	0.8	0.56–1.24
Female (reference)	1.0		1.0		1.0	
Race/ethnicity						
Non-Hispanic white (reference)	1.0		1.0		1.0	
Non-Hispanic black	0.6	0.51–0.70	0.6	0.45–0.78	0.9	0.39–1.85
Hispanic	0.7	0.57–0.75	1.0	0.84–1.29	0.8	0.49–1.27
Non-Hispanic other	0.6	0.47–0.68	1.5	1.13–1.92	0.4	0.21–0.80
Education						
<High school (reference)	1.0		1.0		1.0	
High school	0.8	0.61–0.98	1.4	0.95–2.09	1.0	0.36–2.57
Some college	1.0	0.81–1.26	1.4	0.98–2.06	0.9	0.35–2.25
College graduate	0.9	0.67–1.09	1.9	1.25–2.73	0.8	0.28–2.26
Health insurance						
Private only (reference)	1.0		1.0		1.0	
Uninsured	0.7	0.61–0.81	0.9	0.74–1.12	1.4	0.80–2.45
Medicaid only	0.8	0.65–0.86	0.8	0.62–0.97	1.2	0.71–2.17
Family income						
<\$20,000	1.0	0.84–1.11	1.4	1.16–1.74	1.1	0.65–1.93
\$20,000–\$49,999	0.9	0.80–1.00	0.9	0.75–1.08	0.8	0.49–1.38
\$50,000–\$74,999	0.9	0.80–1.02	0.8	0.65–0.99	1.0	0.55–1.88
≥\$75,000 (reference)	1.0		1.0		1.0	
Self-rated health						
Excellent (reference)	1.0		1.0		1.0	
Very good	1.0	0.92–1.14	0.9	0.80–1.10	1.1	0.62–1.87
Good	1.3	1.11–1.41	0.6	0.50–0.74	1.5	0.91–2.57
Fair or poor	1.4	1.17–1.63	0.6	0.43–0.73	1.9	0.99–3.66
Past-year emergency department visits						
0 (reference)	1.0		1.0		1.0	
1	1.2	1.05–1.33	0.8	0.66–0.97	1.1	0.71–1.71
2	1.4	1.21–1.60	0.7	0.58–0.88	1.2	0.68–2.18
≥3	1.4	1.19–1.74	0.6	0.42–0.81	1.1	0.55–2.16
Asthma						
Yes	1.4	1.24–1.55	0.9	0.75–1.08	0.9	0.57–1.48
No (reference)	1.0		1.0		1.0	
Major depressive episode						
Yes	1.8	1.63–2.08	0.7	0.59–0.86	2.2	1.44–3.41
No (reference)	1.0		1.0		1.0	
Tobacco use or disorder						
Past-month nicotine dependence	1.1	0.93–1.29	1.3	1.00–1.81	1.1	0.38–3.14
Past-year tobacco use	1.3	1.13–1.47	1.2	0.94–1.59	0.7	0.28–1.91

continued

TABLE 3, *continued*

Characteristic	Prescription Stimulant Use Without Misuse Versus Nonuse (N=98,500)		Prescription Stimulant Misuse Without Use Disorders Versus Use Without Misuse (N=8,700)		Prescription Stimulant Use Disorders Versus Misuse Without Use Disorders (N=3,500)	
	Adjusted Odds Ratio	95% CI	Adjusted Odds Ratio	95% CI	Adjusted Odds Ratio	95% CI
Lifetime use, but no past-year use	1.2	1.03–1.34	1.0	0.75–1.30	0.8	0.28–2.10
Never use (reference)	1.0		1.0		1.0	
Alcohol use or disorder						
Past-year use disorder	1.3	1.05–1.60	4.0	2.36–6.71	0.3	0.09–1.18
Past-year use, but no use disorder	1.2	1.00–1.40	2.8	1.68–4.65	0.1	0.04–0.49
Lifetime use, but no past-year use	1.2	1.00–1.47	1.9	1.06–3.43	0.3	0.08–1.21
Never use (reference)	1.0		1.0		1.0	
Cannabis use or disorder						
Past-year use disorder	1.5	1.18–1.92	3.2	2.21–4.58	2.4	0.78–7.22
Past-year use, but no use disorder	1.5	1.30–1.72	3.2	2.45–4.26	1.2	0.44–3.40
Lifetime use, but no past-year use	1.3	1.19–1.50	1.6	1.25–2.14	1.7	0.63–4.72
Never use (reference)	1.0		1.0		1.0	
Cocaine use or disorder						
Past-year use or use disorder	1.7	1.35–2.06	1.7	1.32–2.14	1.2	0.71–2.01
Lifetime use, but no past-year use	1.1	0.97–1.28	1.3	1.05–1.57	1.0	0.59–1.59
Never use (reference)	1.0		1.0		1.0	
Heroin use or disorder						
Past-year use or use disorder	1.0	0.63–1.53	0.8	0.47–1.23	2.0	1.00–3.94
Lifetime use, but no past-year use	0.7	0.55–0.97	1.2	0.86–1.80	0.9	0.45–1.95
Never use (reference)	1.0		1.0		1.0	
Hallucinogen use or disorder						
Past-year use or use disorder	1.9	1.58–2.37	1.5	1.16–1.84	1.1	0.63–1.82
Lifetime use, but no past-year use	1.3	1.15–1.49	1.0	0.81–1.19	1.0	0.61–1.68
Never use (reference)	1.0		1.0		1.0	
Prescription sedative or tranquilizer misuse or disorder						
Past-year misuse or use disorder	1.6	1.34–1.95	1.8	1.44–2.25	1.3	0.86–2.09
Lifetime misuse, but no past-year misuse	1.2	0.95–1.42	1.2	0.88–1.56	1.0	0.54–1.99
Never misuse (reference)	1.0		1.0		1.0	
Prescription opioid misuse or disorder						
Past-year misuse or use disorder	1.7	1.42–1.93	1.8	1.44–2.20	1.3	0.73–2.17

continued

TABLE 3, *continued*

Characteristic	Prescription Stimulant Use Without Misuse Versus Nonuse (N=98,500)		Prescription Stimulant Misuse Without Use Disorders Versus Use Without Misuse (N=8,700)		Prescription Stimulant Use Disorders Versus Misuse Without Use Disorders (N=3,500)	
	Adjusted Odds Ratio	95% CI	Adjusted Odds Ratio	95% CI	Adjusted Odds Ratio	95% CI
Lifetime misuse, but no past-year misuse	1.1	0.98–1.33	1.5	1.17–1.84	1.0	0.56–1.71
Never misuse (reference)	1.0		1.0		1.0	

^a The N of 102,000 is the overall unweighted sample size; the Ns in the column headings are the unweighted sample size for those columns. Ns are rounded to the nearest 100, in accordance with the Substance Abuse and Mental Health Services Administration requirements for descriptions of overall sample sizes based on the restricted-use data files, to minimize potential disclosure risk. All results are based on weighted data. Estimates in boldface are significantly different ($p < 0.05$) from the corresponding reference group. Variables that are presented in Tables 1 and 2 but not here were not significantly associated with the outcomes and were removed from the final multivariable logistic regression model.

(21.8%) (Table 4). Among those who obtained prescription stimulants from friends or relatives for free, 83.9% reported that their friend or relative received the prescription stimulants from one physician. Moreover, compared with past-year stimulant misusers without past-month misuse, high-frequency misusers (≥ 7 days of misuse in the past month) were less likely to obtain stimulants from their friends or relatives for free (44.9% compared with 58.8%) and were more likely to obtain them from one or more physicians (25.2% compared with 10.1%) or from drug dealers or strangers (9.2% compared with 4.0%). Similarly, compared with adults without stimulant use disorders, those with stimulant use disorders were less likely to obtain stimulants from friends or relatives for free (30.9% compared with 59.2%) and were more likely to obtain them from one or more physicians (37.7% compared with 8.6%) or from drug dealers or strangers (8.7% compared with 3.9%).

Characteristics Associated With Specific Motivations for Misuse

We found that sociodemographic and mental health characteristics were associated with specific motivations for misusing prescription stimulants (Table 5). Compared with the most common motivation (to be alert or concentrate), weight loss as the motivation for misusing prescription stimulants was positively associated with being female, being non-Hispanic black, being Hispanic, being uninsured, and lifetime but no past-year misuse of prescription sedatives or tranquilizers. Using prescription stimulants to help to study was positively associated with being in the 18- to 29-year age range, being male, being Hispanic, being in the non-Hispanic other racial/ethnic category, being employed part-time, having private health insurance only, having a family income between \$20,000 and \$49,999, having excellent self-rated health, having past-year alcohol use or use disorders, and never having misused prescription opioids. Substance-use-related motivation (to experiment, to get high, being hooked, or to adjust for other drug effects) was positively associated with being male, being non-Hispanic black, being non-Hispanic other, being unemployed, having excellent

self-rated health, having past-year suicidal ideation, and having cannabis, cocaine, or heroin use problems.

DISCUSSION

In 2015 and 2016, a large number of adults in the United States (annual average: 6.6% or 16.0 million) used prescription stimulants, of whom many (31.2% or 5.0 million) misused the medications at least once and a smaller percentage (2.7% or 0.4 million) had prescription stimulant use disorders. Because stimulants are most commonly prescribed for persons with attention deficit hyperactivity disorder (ADHD), who are at greater risk for academic problems (27), it may not be surprising that prescription stimulant use without misuse was more common among persons 18–49 years of age than among those age 50 or older, and among those with some college education than among college graduates. Consistent with the results from a previous study on children (28), our study found that prescription stimulant use without misuse was more common among non-Hispanic white adults than among non-Hispanic black adults. Similar to prescription opioid use without misuse (29), we found that use of prescription stimulants without misuse was more common among persons with private health insurance than among uninsured adults, because the latter often lacked access to health care. Perhaps reflecting a common etiology of ADHD (i.e., the reason for medical use) and comorbid disorders (30, 31), prescription stimulant use without misuse was associated with worse self-rated health, having a major depressive episode, and having several use disorders related to illicit substances.

Despite some shared characteristics, adults with stimulant misuse without use disorders differed across a range of correlates from users who did not misuse. Misusers were more likely to be younger, male, and in lower income brackets and to report both licit and illicit substance use problems, which is somewhat consistent with the pattern of correlates seen in overall drug use disorders (32). However, in contrast to the pattern seen in substance use disorders, misusers were more likely to have private health insurance only and to report

TABLE 4. Main Motivation for and Source of Prescription Stimulants Misused Most Recently, by Frequency of Past-Month Misuse and by Past-Year Prescription Stimulant Use Disorders, Among U.S. Adults With Past-Year Prescription Stimulant Misuse (Weighted Percentages)^a

Measure	Any Past-Year Misuse (N=3,500)	Number of Days of Misuse in Past Month				Misuse by Past-Year Prescription Stimulant Use Disorder	
		0 days (N=2,400)	1–2 days (N=600)	3–6 days (N=300)	≥7 days (N=200)	Without Disorder (N=3,200)	With Disorder (N=300)
Main motivation							
Lose weight	4.07	4.22	3.20	4.71	3.85	3.75 ^b	7.93
Help be alert or concentrate	56.34	54.42	57.09	60.28	69.52 ^c	56.33	56.21
Help study	21.88	24.60	17.93 ^c	15.86 ^c	11.47 ^c	23.07 ^b	9.21
Get high, is hooked, adjust other drug effects, or experiment	15.53	14.91	18.80	14.84	14.78	14.76 ^b	23.63
Other	2.17	1.85	2.97	4.31	— ^d	2.09	3.02
Source							
Free from friend or relative	56.87	58.77	56.76	50.94	44.90 ^c	59.23 ^b	30.87
Bought or stole from friend or relative	21.77	20.92	26.39 ^c	24.39	15.06	22.28	16.12
One or more physicians	11.09	10.09	6.50	17.18 ^c	25.23 ^c	8.55 ^b	37.70
Drug dealer or stranger	4.33	4.00	3.97	4.13	9.17 ^c	3.90 ^b	8.73
Other	5.94	6.21	6.38	3.35	5.64	6.04	6.58

^a The Ns in the column headings are the unweighted sample size for those columns. They are rounded to the nearest 100, in accordance with the Substance Abuse and Mental Health Services Administration requirements for descriptions of overall sample sizes based on the restricted-use data files, to minimize potential disclosure risk.

^b Estimate is significantly different ($p < 0.05$) from that for lowest-frequency misusers (0 day in the past month).

^c Estimate is significantly different ($p < 0.05$) from that for misusers with prescription stimulant use disorders.

^d Estimate suppressed because of low statistical precision.

excellent self-rated health and were less likely to report a major depressive episode. Since persons with misuse represent a broad range of severity, future research needs to examine specific subtypes of misusers and related prospective outcomes.

While prescription stimulant use disorder is a more severe condition than misuse without disorder, it was relatively uncommon. Compared with adults with prescription stimulant misuse without disorders, adults with use disorders had a higher likelihood of reporting major depressive episode, nicotine dependence, a cannabis use disorder, and a sedative/tranquilizer use disorder and a lower likelihood of reporting alcohol use without an alcohol use disorder. However, the two groups did not differ in most of the examined demographic or health characteristics. The multiple characteristics in common for those misusing prescription stimulants without use disorders and those having use disorders suggests that these groups may be related (33). For some, misuse without disorder may be an early expression of a trajectory toward stimulant use disorder. Thus, clinicians should be vigilant for misuse and screen for stimulant use disorder in all patients for whom they prescribe stimulants.

The most common reasons for misuse, reported by about 78%, were for the direct stimulant effects to improve performance (i.e., for alertness, for concentration, or as a study aid). While less common, 15.5% reported illicit drug use-type motivations (i.e., to experiment, for intoxication, or to address effects of other drugs) as their motivation for misuse

of prescription stimulants. About 4% of misusers reported weight loss as their primary motivation for misuse, and this was, perhaps not unexpectedly, more commonly reported by women than by men. By contrast, the performance-enhancing and illicit drug-type motivations were associated with use of or use disorder of other substances. Common correlates among those reporting the two separate types of motivation suggest that purported performance enhancement is consistent with a broad addiction pattern of behavior. Similarly, previous studies have found that college students who report use of stimulants as an academic aid have high rates of other substance use and perform less well than their counterparts who do not use prescription stimulants (34). These findings support restricting the use of stimulants to bona fide clinical indications and caution against their use outside these situations.

We found that the most common source of prescription stimulants for those who misuse them was family or friends, suggesting that diversion from prescriptions is a significant issue. Similar findings that family and friends are the predominant source for misused prescription opioids and benzodiazepines (29, 35) suggest that physicians prescribing any addictive substance need to be alert for population impacts of their medical practices. Clinicians need to be vigilant about their patients sharing their medications with others, or selling them to others (36–39). Prevention interventions are needed for patients with risky patterns of stimulant misuse, and such interventions may need to be considered for the social network of patients and not just for the patient.

TABLE 5. Multinomial Multivariable Logistic Regression Model Showing Associations Between Motivations for Prescription Stimulant Misuse and Sociodemographic Factors, Self-Rated Health, Suicidality, and Specific Substance Use, Misuse, and Use Disorders Among Adults With Past-Year Misuse (N=3,400)^a

Characteristic	Lose Weight Versus Be Alert/Concentrate (N=2,000)		Help Study Versus Be Alert/Concentrate (N=2,700)		Get High/Hooked/Adjust Other Drug Effects/Experiment Versus Be Alert/Concentrate (N=2,500)	
	Adjusted Odds Ratio	95% CI	Adjusted Odds Ratio	95% CI	Adjusted Odds Ratio	95% CI
Age range (years)						
18–29	0.6	0.31–1.00	5.0	2.98–8.54	0.8	0.60–1.15
≥30 (reference)	1.0		1.0		1.0	
Sex						
Male	0.2	0.08–0.37	1.5	1.16–1.92	1.3	1.02–1.75
Female (reference)	1.0		1.0		1.0	
Race/ethnicity						
Non-Hispanic white (reference)	1.0		1.0		1.0	
Non-Hispanic black	2.5	1.03–6.19	1.3	0.75–2.14	1.7	1.03–2.94
Hispanic	2.2	1.09–4.27	1.8	1.23–2.63	1.2	0.76–1.96
Non-Hispanic other	0.9	0.29–2.73	1.6	1.01–2.58	1.7	1.08–2.65
Employment						
Full-time (reference)	1.0		1.0		1.0	
Part-time	0.5	0.23–1.17	1.7	1.28–2.20	0.8	0.57–1.16
Unemployed	1.0	0.34–2.83	1.2	0.63–2.23	1.9	1.17–2.95
Family income						
<\$20,000 (reference)	1.0		1.0		1.0	
\$20,000–\$49,999	0.8	0.33–2.04	1.6	1.18–2.04	1.1	0.76–1.57
\$50,000–\$74,999	0.8	0.35–1.60	0.7	0.50–0.91	1.2	0.82–1.62
≥\$75,000	0.8	0.37–1.72	1.0	0.65–1.44	1.4	0.89–2.06
Health insurance						
Private only (reference)	1.0		1.0		1.0	
Uninsured	2.2	1.07–4.45	0.6	0.37–0.87	1.0	0.67–1.43
Medicaid only	1.6	0.79–3.23	0.6	0.38–0.84	1.0	0.64–1.51
Self-rated health						
Excellent (reference)	1.0		1.0		1.0	
Very good	1.2	0.61–2.24	0.8	0.63–1.09	0.6	0.42–0.86
Good	1.3	0.66–2.72	0.6	0.44–0.91	0.7	0.45–0.96
Fair or poor	1.3	0.40–3.95	0.6	0.34–1.19	0.9	0.52–1.52
Suicidal ideation						
Yes	1.5	0.75–3.80	0.8	0.55–1.09	1.5	1.04–2.07
No (reference)	1.0		1.0		1.0	
Tobacco use or disorder						
Past-month nicotine dependence	0.8	0.33–2.17	0.4	0.23–0.62	0.8	0.44–1.59
Past-year use, but no dependence	0.8	0.35–1.98	1.0	0.63–1.44	1.0	0.54–1.77
Lifetime use, but no past-year use	0.8	0.34–2.11	0.8	0.53–1.29	0.9	0.44–1.68
Never use (reference)	1.0		1.0		1.0	
Alcohol use or disorder						
Past-year alcohol use disorder	0.6	0.21–1.43	2.0	1.01–4.05	1.1	0.56–2.33
Past-year use, but no use disorder	0.6	0.25–1.56	2.2	1.12–4.40	0.9	0.43–1.71
Never use (reference)	1.0		1.0		1.0	
Cannabis use or disorder						
Past-year cannabis use disorder	0.5	0.19–1.36	1.4	0.91–2.04	1.6	1.02–2.55

continued

TABLE 5, *continued*

Characteristic	Lose Weight Versus Be Alert/Concentrate (N=2,000)		Help Study Versus Be Alert/Concentrate (N=2,700)		Get High/Hooked/Adjust Other Drug Effects/Experiment Versus Be Alert/Concentrate (N=2,500)	
	Adjusted Odds Ratio	95% CI	Adjusted Odds Ratio	95% CI	Adjusted Odds Ratio	95% CI
Past-year use, but no use disorder	0.4	0.22–0.84	1.1	0.84–1.50	1.2	0.86–1.78
Never use (reference)	1.0		1.0		1.0	
Cocaine use or disorder						
Past-year use or use disorder	0.5	0.25–1.20	0.9	0.68–1.21	1.8	1.19–2.57
Lifetime use, but no past-year use	0.5	0.25–0.81	0.7	0.52–1.05	1.2	0.81–1.83
Never use (reference)	1.0		1.0		1.0	
Heroin use or use disorder						
Past-year heroin use or use disorder	2.7	0.81–8.63	1.2	0.53–2.81	2.9	1.61–5.27
Lifetime use, but no past-year use	1.9	0.66–5.60	0.5	0.23–1.28	1.4	0.84–2.25
Never use (reference)	1.0		1.0		1.0	
Prescription sedative or tranquilizer misuse or disorder						
Past-year misuse or use disorder	1.4	0.68–3.02	0.9	0.66–1.22	1.0	0.71–1.39
Lifetime, but no past-year misuse	3.0	1.21–7.37	0.8	0.47–1.26	0.8	0.50–1.38
Never misuse (reference)	1.0		1.0		1.0	
Prescription opioid misuse or disorder						
Past-year misuse or use disorder	0.5	0.24–1.11	0.6	0.46–0.84	1.0	0.69–1.35
Lifetime, but no past-year misuse	0.9	0.43–1.82	0.7	0.50–0.99	1.0	0.67–1.55
Never misuse (reference)	1.0		1.0		1.0	

^a The N of 3,400 is the overall unweighted sample size; the Ns in the column headings are the unweighted sample size for those columns. Ns are rounded to the nearest 100, in accordance with the Substance Abuse and Mental Health Services Administration requirements for descriptions of overall sample sizes based on the restricted-use data files, to minimize potential disclosure risk. All results are based on weighted data. This analysis excluded persons who reported other nonspecific motivations for misusing prescription stimulants (N=100). Variables that are presented in Tables 1 and 2 but not here were not significantly associated with the outcomes and were removed from the final multinomial multivariable logistic regression model. Adjusted odds ratios in boldface are significantly different ($p < 0.05$) from the corresponding reference group within the column.

Greater frequency of misusing prescription stimulants and presence of a stimulant use disorder were associated with both drug-related motivations for misuse and greater use of medical sources of medications. Taken together, these findings suggest that subtypes of misusers exist and indicate the importance of assessing misuse and use disorders among patients who are being treated with prescription stimulants.

This study has several limitations. NSDUH did not cover homeless persons not living in shelters, active-duty military personnel, or persons residing in institutions (e.g., incarcerated adults). Our prevalence estimates of prescription stimulant misuse and use disorders may represent a lower bound, because homeless adults not living in shelters and adults in the criminal justice system usually have a higher prevalence of substance use and use disorders compared with the general noninstitutionalized adult civilian population (40).

Furthermore, the 2015 and 2016 NSDUH had lower response rates compared with previous years, which increases the potential for nonresponse bias (21). Further research is needed to examine the validity of self-reported data on prescription stimulants and motivation for misuse. NSDUH data were subject to recall and social-desirability biases.

Among U.S. adults, 16.0 million used prescription stimulants in the past year, 5.0 million misused prescription stimulants, and 0.4 million had prescription stimulant use disorders. Actions should be taken to expand safe, evidence-based treatment for ADHD and to decrease prescribing that may leave unused stimulants available for potential misuse. Clinicians need to screen for and identify adults with an increased risk for prescription stimulant misuse and pay attention to their motivations for misuse. When misuse is identified, prevention interventions may be indicated.

Treatment should be provided for individuals with prescription stimulant use disorders.

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REFERENCES

1. Hughes A, Williams MR, Lipari RN, et al: Prescription Drug Use and Misuse in the United States: Results From the 2015 National Survey on Drug Use and Health (NSDUH Data Review). Sept 2016. <http://www.samhsa.gov/data/sites/default/files/NSDUH-FFR2-2015/NSDUH-FFR2-2015.htm>
2. National Institute on Drug Abuse: How do stimulants affect the brain and body? <https://www.drugabuse.gov/publications/research-reports/prescription-drugs/stimulants/how-do-stimulants-affect-brain-body>
3. Martins SS, Fenton MC, Keyes KM, et al: Mood and anxiety disorders and their association with non-medical prescription opioid use and prescription opioid-use disorder: longitudinal evidence from the National Epidemiologic Study on Alcohol and Related Conditions. *Psychol Med* 2012; 42:1261–1272
4. Wang Y, Cottler LB, Striley CW: Differentiating patterns of prescription stimulant medical and nonmedical use among youth 10–18 years of age. *Drug Alcohol Depend* 2015; 157:83–89
5. Zullig KJ, Divin AL, Weiler RM, et al: Adolescent nonmedical use of prescription pain relievers, stimulants, and depressants, and suicide risk. *Subst Use Misuse* 2015; 50:1678–1689
6. Benson K, Flory K, Humphreys KL, et al: Misuse of stimulant medication among college students: a comprehensive review and meta-analysis. *Clin Child Fam Psychol Rev* 2015; 18:50–76
7. Cruz S, Sumstine S, Mendez J, et al: Health-compromising practices of undergraduate college students: examining racial/ethnic and gender differences in characteristics of prescription stimulant misuse. *Addict Behav* 2017; 68:59–65
8. Vrecko S: Everyday drug diversions: a qualitative study of the illicit exchange and non-medical use of prescription stimulants on a university campus. *Soc Sci Med* 2015; 131:297–304
9. Wong CF, Silva K, Kecojovic A, et al: Coping and emotion regulation profiles as predictors of nonmedical prescription drug and illicit drug use among high-risk young adults. *Drug Alcohol Depend* 2013; 132:165–171
10. LeClair A, Kelly BC, Pawson M, et al: Motivations for prescription drug misuse among young adults: considering social and developmental contexts. *Drugs (Abingdon Engl)* 2015; 22:208–216
11. Kelly BC, Rendina HJ, Vuolo M, et al: Influences of motivational contexts on prescription drug misuse and related drug problems. *J Subst Abuse Treat* 2015; 48:49–55
12. Jones CM: Prescription Trends for Controlled Prescription Drugs. NIDA Webinar, Sept 1, 2015. Based on IMS Health National Prescription Audit. <http://www.drugabuse.gov/news-events/meetings-events/2015/09/latest-prescription-trends-controlled-prescription-drugs>
13. Chen LY, Crum RM, Strain EC, et al: Prescriptions, nonmedical use, and emergency department visits involving prescription stimulants. *J Clin Psychiatry* 2016; 77:e297–e304
14. Burcu M, Zito JM, Metcalfe L, et al: Trends in stimulant medication use in commercially insured youths and adults, 2010–2014. *JAMA Psychiatry* 2016; 73:992–993
15. Oehrlein EM, Burcu M, Safer DJ, et al: National trends in ADHD diagnosis and treatment: comparison of youth and adult office-based visits. *Psychiatr Serv* 2016; 67:964–969
16. Chen LY, Strain EC, Crum RM, et al: Sources of nonmedically used prescription stimulants: differences in onset, recency, and severity of misuse in a population-based study. *Drug Alcohol Depend* 2014; 145:106–112
17. Rigg KK, Ibañez GE: Motivations for non-medical prescription drug use: a mixed methods analysis. *J Subst Abuse Treat* 2010; 39:236–247
18. McCabe SE, Cranford JA: Motivational subtypes of nonmedical use of prescription medications: results from a national study. *J Adolesc Health* 2012; 51:445–452
19. McCabe SE, Boyd CJ, Cranford JA, et al: Motives for nonmedical use of prescription opioids among high school seniors in the United States: self-treatment and beyond. *Arch Pediatr Adolesc Med* 2009; 163:739–744
20. Center for Behavioral Health Statistics and Quality: 2016 National Survey on Drug Use and Health: Detailed Tables. Rockville, Md, Substance Abuse and Mental Health Services Administration, 2017
21. Center for Behavioral Health Statistics and Quality: 2016 National Survey on Drug Use and Health: Methodological Summary and Definitions. Rockville, Md, Substance Abuse and Mental Health Services Administration, 2017
22. American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, 4th ed. Washington, DC, American Psychiatric Association, 1994
23. Shiffman S, Waters A, Hickcox M: The Nicotine Dependence Syndrome Scale: a multidimensional measure of nicotine dependence. *Nicotine Tob Res* 2004; 6:327–348
24. Grucza RA, Abbacchi AM, Przybeck TR, et al: Discrepancies in estimates of prevalence and correlates of substance use and disorders between two national surveys. *Addiction* 2007; 102:623–629
25. Substance Abuse and Mental Health Services Administration: Reliability of Key Measures in the National Survey on Drug Use and Health (Office of Applied Studies, Methodology Series M-8, HHS Publication No SMA 09-4425). Rockville, Md, Substance Abuse and Mental Health Services Administration, 2010
26. Research Triangle Institute: SUDAAN, Release 11.0.1. Research Triangle Park, NC, RTI International, 2015
27. Lu Y, Sjölander A, Cederlöf M, et al: Association between medication use and performance on higher education entrance tests in individuals with attention-deficit/hyperactivity disorder. *JAMA Psychiatry* 2017; 74:815–822
28. Zuvekas SH, Vitiello B: Stimulant medication use in children: a 12-year perspective. *Am J Psychiatry* 2012; 169:160–166
29. Han B, Compton WM, Blanco C, et al: Prescription opioid use, misuse, and use disorders in US adults: 2015 National Survey on Drug Use and Health. *Ann Intern Med* 2017; 167:293–301
30. Krueger RF: The structure of common mental disorders. *Arch Gen Psychiatry* 1999; 56:921–926
31. Blanco C, Wall MM, He JP, et al: The space of common psychiatric disorders in adolescents: comorbidity structure and individual latent liabilities. *J Am Acad Child Adolesc Psychiatry* 2015; 54:45–52
32. Compton WM, Thomas YF, Stinson FS, et al: Prevalence, correlates, disability, and comorbidity of DSM-IV drug abuse and dependence in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry* 2007; 64:566–576
33. Blanco C, Rafful C, Wall MM, et al: The latent structure and predictors of non-medical prescription drug use and prescription drug use disorders: a national study. *Drug Alcohol Depend* 2013; 133:473–479

34. Arria AM, Wilcox HC, Caldeira KM, et al: Dispelling the myth of “smart drugs”: cannabis and alcohol use problems predict nonmedical use of prescription stimulants for studying. *Addict Behav* 2013; 38:1643–1650
35. Blanco C, Han B, Jones CM, et al: Prevalence and correlates of benzodiazepine use, misuse, and use disorders among in the US. *J Clin Psychiatry* (in press)
36. Colaneri N, Keim S, Adelman A: Physician practices to prevent ADHD stimulant diversion and misuse. *J Subst Abuse Treat* 2017; 74:26–34
37. Kaye S, Darke S: The diversion and misuse of pharmaceutical stimulants: what do we know and why should we care? *Addiction* 2012; 107: 467–477
38. Wilens TE, Adler LA, Adams J, et al: Misuse and diversion of stimulants prescribed for ADHD: a systematic review of the literature. *J Am Acad Child Adolesc Psychiatry* 2008; 47: 21–31
39. Weyandt LL, Oster DR, Marraccini ME, et al: Prescription stimulant medication misuse: where are we and where do we go from here? *Exp Clin Psychopharmacol* 2016; 24:400–414
40. Compton WM, Dawson D, Duffy SQ, et al: The effect of inmate populations on estimates of DSM-IV alcohol and drug use disorders in the United States. *Am J Psychiatry* 2010; 167: 473–474