Nonmedical Use and Abuse of Scheduled Medications Prescribed for Pain, Pain-related Symptoms, and Psychiatric Disorders: Patterns, User Characteristics, and Management Options

Meredith Y. Smith, PhD, MPA, and George Woody, MD*

Address
*Purdue Pharma, L.P., One Stamford Forum, Stamford, CT 06901, USA.
E-mail: meredith.smith@pharma.com

Current Psychiatry Reports 2005, **7**:337–343
Current Science Inc. ISSN 1523-3812

The nonmedical use of scheduled medications commonly prescribed for pain, pain-related symptoms, and psychiatric disorders began rising in the mid-1990s. Physicians are confronted with the dilemma of how to minimize the abuse and diversion potential of these products without compromising access for patients with a legitimate medical need. Using data from the National Survey on Drug Use and Health, we describe the scope of nonmedical use of opioids, stimulants, and tranquilizers; characteristics of nonmedical users; and options available to reduce abuse liability. In 2003, lifetime prevalence estimates of nonmedical use were 31.2 million for opioids, 20.7 million for stimulants, and 20.2 million for tranquilizers. Nonmedical users of psychotherapeutics were more likely to be Caucasian; use alcohol, cocaine, or heroin; and to use needles to inject drugs than those who reported using illicit drugs only. Sources of diversion are enumerated, and options for minimizing the abuse liability associated with these medications are described.

Introduction

The nonmedical use and abuse of scheduled medications prescribed for pain, pain-related symptoms, and psychiatric disorders is an established phenomenon in the United States [1–3]. Prominent among these medications are opioids, stimulants, and tranquilizers. Various indicators suggest that nonmedical use and abuse of these drug classes began rising in the mid-1990s, with dramatic increases in nonmedical use of opioids and tranquilizers [2,4••,5]. Certain sectors of the population seem to be especially vulnerable to the nonmedical use of drugs, including adolescents, college students, individuals with known psychiatric disorders, the elderly, and patients with undertreated pain [6–11]. Reasons for use include inadvertent use, self-medication, "experimentation," and abuse or dependence.

Growing concerns about the degree to which the growth in nonmedical prescription drug use is associated with health risks, particularly abuse and dependence, have prompted intensified regulatory scrutiny and calls for effective policies, especially those that may mitigate diversion into illicit drug markets [4••,5,12,13]. In turn, pharmaceutical manufacturers have begun deploying formal risk management programs designed to minimize the risks of abuse and diversion in the postmarketing context [14,15].

An inherent tension at the heart of this issue concerns how best to balance efforts to reduce abuse and diversion without compromising access for patients with legitimate medical need [16,17]. Physicians who prescribe these medications in addition to those who treat abuse and addiction are at the forefront of this dilemma. One particularly difficult challenge is that of treating patients with chronic pain who are at known risk for diversion, abuse, or dependence on a medication that is likely to be useful in treating their medical or psychiatric problems. Drawing on recent national data, this paper presents a brief overview of the problem of nonmedical use of opioids, stimulants, and tranquilizers. Specifically, we address the following questions: 1) what is the prevalence of nonmedical use and abuse of opioids, stimulants, and tranquilizers, and how does it compare to alcohol and some commonly used illicit drugs? 2) What are the key characteristics of nonmedical prescription drug users? 3) How are prescription drugs used nonmedically and where do they come from? 4) What options are available to help manage the risks associated with nonmedical use of prescription drugs?

Methods

Although several national surveys provide information on the nonmedical use of prescription drugs, we chose to focus on the 2002 and 2003 National Survey on Drug Use and Health (NSDUH) because it provides the most comprehensive data. It is an annual, household-based survey of the civilian, noninstitutionalized population aged 12 years and older living in the US, and is designed to collect information on the prevalence, patterns, and consequences of licit and illicit drug and alcohol use. Data obtained includes nonmedical use of prescribed and illicit substances in the respondent's lifetime, past year, and past month in addition to use that represents abuse and dependence as defined in the *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision* (DSM-IV-TR) [18]. In terms of questions about medical use of specific products, the NSDUH survey has questions on 27 opioid analgesics, 21 specific stimulants, and 21 specific tranquilizers [3].

The survey is based on a 50-state design featuring an independent, stratified, multistage-area probability sample drawn from each state and the District of Columbia. Because of a major redesign of the sample and data collection method completed in 2002, estimates for 2002 and later are not comparable with estimates from earlier years [3]; therefore, the most recent data do not provide accurate information on long-term trends. In the NSDUH surveys of 2002 and 2003, data were obtained in segments that were allocated equally into four separate samples (one for each quarter), thereby ensuring that the survey covered the period from January to December. The design over-sampled youths and young adults so that each state included an approximately equal number of respondents among the three main age groups: 12 to 17 years, 18 to 25 years, and 26 years or older [3]. In the 2002 and 2003 survey years, eligible respondents were identified by mailing letters of invitation to selected households followed by a screening visit in which trained research assistants met with participants for interviews that averaged duration of 1 hour.

To increase the probability that respondents would provide truthful answers, questions on nonmedical use of prescription drugs were administered via an audio computer-assisted self-interviewing method. To further facilitate accuracy in recall, respondents were provided with colored pill charts to use in identifying each of the substances included in the questionnaire [2]. Nonmedical use of specific prescription opioids was assessed only in terms of lifetime use. A detailed discussion of survey design and data collection procedures can be found elsewhere [2].

The exact wording used in the 2002 and 2003 survey years to assess lifetime nonmedical use was "Have you ever, even once, used (name of prescription opioid, stimulant, tranquilizer) that was not prescribed for you or that you took only for the experience or feeling it caused?" Similarly, lifetime use of illicit substances was assessed in terms of the following: "Have you ever, even once, used (name of illicit substance) that you took for the experience or feeling it caused?" Questions concerning past year and current (*ie*, past 30 days) nonmedical use also were asked. Questions used to measure abuse and dependence were derived from criteria found in the DSM [18] Heavy drinking was defined as drinking five or more drinks on one occasion on 5 or more days within the past 30 days. Binge drinking was defined as drinking five or more drinks on the same occasion on at least 1 day in the past 30 days.

Our analysis focused on scheduled prescription medications used for pain control, pain-related symptoms, and psychiatric disorders. These include opioid analgesics, stimulants, and tranquilizers. For comparison purposes, we also examined alcohol use in addition to three specific illicit substances: cocaine, heroin, and marijuana and/or hashish.

Analysis

Data analysis was done on the NSDUH public access 2002 and 2003 datasets using the SAMHSA Online Data Analysis System. Frequencies and cross-tabulations were done to describe the analytic sample, and the prevalence of nonmedical use of drugs and drug classes included in the analysis. Results of significance tests of differences in prevalence estimates between consecutive years (2002 and 2003) are reported at a statistical significance level of P less than 0.0.5.

Patterns of Nonmedical Use

Prevalence of nonmedical use

In 2003, the most recent year for which data from the NSDUH were available, an estimated 110.2 million individuals 12 years of age or older reported illicit or nonmedical drug use at least once in their lifetime. As shown in Table 1, almost one-third of these individuals (31.2 million) or 13.1% reported having used one or more prescription opioid analgesics at least once nonmedically, 20.7 million (8.8%) reported using prescription stimulants nonmedically, and 20.2 million (8.5%) reported nonmedical use of tranquilizers [3]. Past-year and current nonmedical use showed a similar ordering, with past-year use ranging from 4.9% (opioid analgesics) to 1.2% (stimulants), and current nonmedical use from 2% (opioid analgesics) to 0.5% (stimulants). With the exception of the latter category, which showed a slight decline between 2002 and 2003, these figures were stable during the 2-year period. Lifetime nonmedical use of opioid analgesics was similar in magnitude to that of cocaine (14.7%), and estimates of lifetime nonmedical use of all three substances was much higher than that reported for heroin (1.6%), although substantially below that reported for alcohol or marijuana.

Opioid analgesics was the class of drugs reported being used most frequently nonmedically. The types of products most frequently used are presented in Table 2 by drug category and type within each category. A significant portion (53.7%) of those reporting past-year nonmedical use of

Table 1. Percent use of alcohol and nonmedical use of selected illicit and prescribed medications in subjects aged 12 years and older [2,3]

	Lifetime		Past year		Current	
Drug	**2002 (*n* = 54,079)**	**2003 (*n* = 55,230)**	**2002 (*n* = 54, 079)**	**2003 (*n* = 55,230)**	**2002 (*n* = 54,079)**	**2003 (*n* = 55,230)**
Alcohol	82.98	83.2	66.03	65.6	50.96	50.4
Marijuana	40.4	40.6	11.03	10.6	6.2	6.2
Cocaine	14.4	14.7	2.51	2.5	0.9	1
Heroin	1.6	1.6	0.2	0.1	0.1	0.1
Opioid analgesics	12.6	13.1	4.7	4.9	1.9	2
Tranquilizers	8.2	8.5	2.1	2.1	0.8	0.8
Stimulants	9	8	1.4*	1.2	0.5	0.5

*Difference between estimate and 2003 is statistically significant at the $P < 0.05$ level

Table 2. Specific opioid analgesics, stimulants, and tranquilizers most frequently reported as having ever been used nonmedically among those reporting past-year use of these substances (*n* = 4287) [2,3]

	Patients reporting use, %
Opioid analgesics (*n* = 1403)	
Darvocet®, Darvon®, or Tylenol® with codeine	61.7
Vicodin®	60
Percodan® or Percocet®	37.8
Codeine	25.9
OxyContin®	15.1
Stimulants (*n* = 1245)	
Methamphetamine, Desoxyn®, or methedrine	56.5
Ritalin®	43
Diet pills (unspecified)	34.8
Dexedrine®	11.7
Dextroamphetamine	4.7
Tranquilizers (*n* = 1639)	
Valium® or diazepam	65.1
Xanax®, alprazolam, or Ativan®	64.1
Klonopin® or clonazepam	24.9
Soma®	24.6
Flexeril®	14.2

stimulants also reported having used opioid analgesics during that period, as did 62.9% of past-year nonmedical users of tranquilizers (data not shown).

Prevalence of Abuse and Dependence

The DSM-IV-TR recognizes two levels of problematic use, abuse, and dependence, with the latter representing a less severe problem. Figure 1 shows the prevalence of current dependence and abuse for those reporting past-year nonmedical use of opioid analgesics, stimulants and tranquilizers. Among those reporting past-year nonmedical use of stimulants, 9% met criteria for substance abuse within the past year, whereas 8.3% and 8.2% of those reporting past-year nonmedical use of tranquilizers and opioid analgesics, respectively, met criteria for abuse. In contrast, the prevalence of substance dependence was approximately triple (stimulants, tranquilizers) or double (opioids) that reported for abuse. The overall percentage reporting any substance dependence ranged from 29% (among those reporting nonmedical stimulant use within the past-year) to 18% (among those reporting past-year nonmedical opioid analgesic use).

Characteristics of Nonmedical Users of Opioid Analgesics, Stimulants, or Tranquilizers

Table 3 presents selected demographic and other characteristics of past-year nonmedical users of opioid analgesics, stimulants, or tranquilizers in comparison with those who reported past-year use of an illicit substance only. A significantly higher percentage of individuals reporting nonmedical use of these medications was Caucasian, had used alcohol heavily within the past 30 days, and used cocaine or heroin within the past year compared with those who used illicit substances only. They also were more likely to have received treatment for alcohol or drug-related problems, and to have used needles to inject drugs. In contrast, nonmedical prescription drug users were less likely than

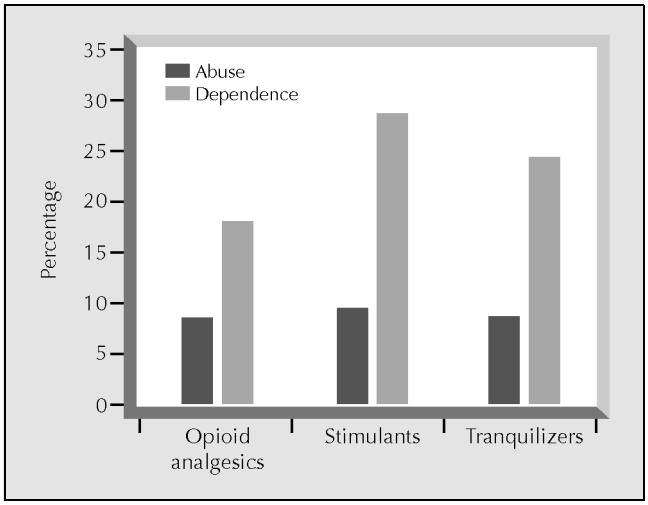

Figure 1. The graph shows the percentage of individuals reporting dependence or abuse of any illicit or prescribed substance among those reporting any past-year use of opioid analgesics, stimulants, or tranquilizers [2,3].

those who used only illicit drugs to be male and to live in a major metropolitan statistical area.

Methods of nonmedical use of prescription medications

Prescription drugs are used nonmedically in various ways that are determined to a large extent by the way they are formulated. In the case of combination opioid analgesic products such as hydrocodone/acetaminophen, oxycodone/acetylsalicylic acid, oxycodone/acetaminophen, and those containing codeine, nonmedical use is predominantly by the oral route, probably because the opioid is combined with acetaminophen or aspirin, which makes it difficult and/or unpleasant to crush and inject or inhale ("snort"). Similarly, there have been reports of injecting propoxyphene but such reports have been rare, probably because many propoxyphene products are now combined with naloxone or acetaminophen [19]. Nonmedical use of extended-release opioids such as oxycodone or fentanyl has involved oral use in addition to injection and inhalation [20,21]. In the case of controlled-release oxycodone, drug-abusing individuals discovered that the extended-release formulation can be overcome by crushing the tablets to form a powder or granules that can be dissolved and injected or inhaled. In the case of extended-release fentanyl, residual amounts of the drug can be extracted from discarded patches and taken orally or injected [20]. The extended-release formulation of morphine has been resistant to the kind or problems that have occurred with controlled-release oxycodone and fentanyl, most likely because of differences in the extended-release matrix, which make it much more difficult to extract the morphine [22].

Nonmedical use of prescription stimulants occurs by the oral route and by crushing and then injecting or inhaling the resulting powder or granules. Alcohol or tranquilizers sometimes are used to reduce the anxiety and hyperactivity ("come down") associated with nonmedical use of stimulants, as often is done with cocaine [18]. Nonmedical use of tranquilizers occurs almost entirely by the oral route, although there have been reports of injection use associated with buprenorphine in the European community [23].

Sources of diversion of prescription medications

To date, there has been little systematic research on sources of diversion of prescription medications. Despite the existence of a closed distribution system as set forth in the Controlled Substances Act, there are at least five main points in the system where opportunities for diversion are present [24]: 1) the manufacturing site; 2) transit between the manufacturing facility and the distributor or final dispenser; 3) the distributor's or dispenser (*eg*, pharmacy, hospital, treatment program, reverse distributor); 4) the point of prescribing (*eg*, diversion by physician or other medical personnel; operation of "prescription mills"); and 5) the consumer (*eg*, selling or forging of prescriptions, selling of medication, doctor-shopping). Increasingly, the Internet has been identified as another avenue for diversion. The degree to which it accounts for nonmedical use and abuse of prescription drugs has not been determined, but is suspected to be significant [25].

The amount of controlled substances that "leak" from the system at any one of these points is unknown. Multiple instances of prescription medication-related crime are chronicled daily on the web site of the National Association of Drug Diversion Investigators (http:/www.naddi.org). In addition, the Drug Enforcement Agency mandates that pharmacies report losses of controlled substances on Drug Enforcement Agency Form 106 (http://www.deadiversion.usdoj.gov/pubs/program/rx_account/index.html); however, the quality of these reports is problematic and it is likely that underreporting is substantial.

Options for Risk Management

The many possible sources of prescription drugs available for nonmedical use indicate that reducing the scope of the problem requires a combination of approaches that may vary according to specific areas, and a collaborative partnership involving the general population, law enforcement, regulators, educators, healthcare practitioners, legislators, patients, community activists, and industry. There are several examples of possible interventions.

Physicians can be educated in how to recognize and manage patients who are seen for treatment of other medical conditions, but who also have substance abuse or dependence problems.

Prescription monitoring programs can be implemented. Prescription monitoring programs collect prescribing and dispensing information from pharmacies within their geographic jurisdiction and distribute summaries of the data to regulatory and law enforcement

Table 3. Selected characteristics of persons aged 12 years or older reporting past-year nonmedical use of opioid analgesics, prescription stimulants, or tranquilizers versus those reporting past-year use of illicit substances only [1–3]

	Past-year nonmedical use of opioid analgesics, stimulants, or tranquilizers (*n* = 5242)	Past-year use of illicit substances only (*n* = 7658)
Age, *y*		
12–17	15.6	16
18–25	31.3	31.9
26+	53.1	52.2
Male	50.6*	61.5
Caucasian	74.9*	68.2
Unemployed (18 years or older)	7.7	7.8
Residence		
MSA > 1 million people	44.8*	48.8
MSA < 1 million people	35.3*	33.2
Segment not an MSA	19.9*	18
Past-year marijuana use	50.1*	89.8
Past-year cocaine use	19.7*	14.9
Past-year heroin use	1.3*	0.7
Heavy alcohol use in the past 30 days	24.2*	21
Binge drinking past in the past 30 days	52*	54.3
Used needles to inject drugs	7.5*	4.3
Received alcohol or drug treatment	17.1*	15.1
Physical, mental, or emotional problems that interfered with job performance	29.6	32.9

*Difference is significant at the $P < 0.05$ level
MSA—metropolitan statistical area

agencies [26••]. These programs also can be designed to alert physicians about patients who are receiving controlled substances from one or more other physicians (so-called "doctor shopping"). More than 15 states have implemented such programs, and data suggest that they can significantly deter doctor shopping (26, http://www.deadiversion.usdoj.gov/pubs/program/rx_monitor/index.html). In addition, the distribution of tamper-resistant prescription pads can help reduce the problem of forged prescriptions.

The development of improved techniques for monitoring and interdicting sales of controlled substances via the Internet is an important intervention, but because many of the Internet sites are based outside the US, international cooperation is needed to reduce this problem effectively.

Increased allocation of regulatory and law enforcement resources to combat the diversion of prescription drugs is critical. Typically, drug enforcement efforts are largely focused on illegal drugs such as heroin and cocaine with comparatively few officers assigned to investigate prescription drug cases in most jurisdictions.

Education of the general public, particularly adolescents, about the dangers associated with nonmedical use of prescription drugs is also vital (*eg*, http://www.drugfree.org). One theme that emerges from contact with individuals who are abusing prescription drugs is the belief that these substances are "safer" to use because they are approved and manufactured under tightly regulated conditions. Knowing that these drugs can have significant adverse effects may help reduce demand.

Improved inventory control in hospitals, nursing homes, physicians' and dentists' offices and other health care facilities is also important. Mandatory reporting of substance diversion cases to state can help identify cases of diversion that may otherwise go undetected. It may also protect institutions and individuals from lawsuits if the suspected individual, after further investigation, was found not to have diverted.

The availability of affordable treatment for substance use disorders should be expanded. Agonist maintenance using buprenorphine or methadone has been found effective for treating opioid dependence, as has residential treatment in a therapeutic community [27]. Similarly, inpatient and outpatient psychosocial treatment has been found effective for stimulant dependence [28•]. Various approaches have been found useful in treating sedative and tranquilizer dependence; all begin with detoxification (inpatient or outpatient) followed by psychosocial treatment [28•].

Discussion

Our results document the widespread prevalence of the nonmedical use of prescription opioids, stimulants, and tranquilizers in the US. Consistent with trends reported for illicit substances, our findings indicate that the nonmedical use of these medications stabilized between 2002 and 2003. Opioid analgesics emerged as the medication most

commonly used nonmedically. However, there was significant overlap in usage across all three drug classes, with more than 50% of nonmedical users of stimulants and 63% of nonmedical users of tranquilizers also reporting nonmedical use of opioid analgesics. Although alcohol and marijuana were by far the most commonly used drugs, nearly as many subjects had used prescription opioids nonmedically as had used cocaine, and more respondents reported using opioid analgesics nonmedically in the past year and past month as reported using cocaine. Past-year and past-month use of tranquilizers and stimulants also were similar to cocaine use over corresponding periods.

Our finding that opioid analgesics, stimulants, and tranquilizers often are taken in combination with marijuana, alcohol, or cocaine is consistent with earlier studies [5,29–31]. A particularly common pattern of multiple drug use among methadone patients is the ingestion of large doses of a rapid-onset benzodiazepine, such as diazepam, immediately before or after the daily methadone dose. Patients have reported that this practice "boosts" the methadone and creates a "high" that does not occur if the methadone is taken alone [32]. Given the substantial rates of polydrug use, it is not surprising that 26% to 38% of nonmedical users of opioid analgesics, stimulants or tranquilizers met criteria for abuse or dependence. Reported rates of abuse and dependence among these nonmedical users are markedly higher than those seen in the population as a whole [4••].

Other interesting findings that emerge from these data are the background and demographic differences seen between the group of nonmedical users of opioid analgesics, stimulants, or tranquilizers versus persons who used only illegal drugs. Those who used prescription drugs nonmedically, as compared with those who used only illicit drugs, were more likely to be Caucasian, male, to have abused alcohol in the past month, used cocaine or heroin within the past year, and to have used needles to inject drugs. Consistent with these findings, nonmedical users of these prescribed drugs also were more likely to have received treatment for alcohol or drug-related problems. These results suggest that these nonmedical users of prescription drugs have a comparatively more serious drug problem than users of illicit substances only.

Notably, the gender distribution of nonmedical users was almost evenly divided, with approximately half being female and half male, a finding different from that in most studies of illegal drug users where two thirds or three quarters of the subjects are male. This gender difference may reflect easier access to prescription drugs by females. Females are more likely than males to receive prescriptions for these medications, and therefore have easier access to these drugs. Other studies have suggested that females have a higher rate of nonmedical use of these types of medications overall [33,34,35•]. However, research focused exclusively on young adults indicates that young males are more likely to use these medications nonmedically and to divert them [11].

In this study, we focused on only one of the national surveys available to evaluate nonmedical use of prescription drugs and illicit substances. Other sources of national data on prescription drug abuse and its health-related consequences include Monitoring the Future, the Drug Abuse Warning Network, the Treatment Episode Dataset, and the Toxic Exposure Surveillance System. However, the NSDUH is the largest nationally representative survey of individuals aged 12 years and older, and is unique in that it provides detailed demographic information and data on overall use, drug classes, specific products, and the relative prevalence of abuse and dependence among major drug classes. Prevalence and incidence estimates derived from NSDUH data are conservative in that they exclude certain populations, such as people who are institutionalized, homeless, or on active military duty, groups known to be at high risk for substance use disorders. In addition, in comparison with surveys that are administered outside the home setting, such as *Monitoring the Future* [36], adolescent participants, who are represented in the NSDUH, are more likely to underreport illicit behaviors [37•].

Conclusions

Any ultimate solution to the twin problems of abuse and diversion of prescribed medications must involve reducing the demand for nonmedical use of these substances. Given the complexity of the behaviors involved, no single intervention is likely to be effective. Rather, to be successful, interventions must be multifaceted and involve collaboration among various parties, including the general public, law enforcement, regulators, legislators, educators, health care professionals, patients, and industry. In addition, the success of any demand reduction strategy also depends on expanding the availability of affordable drug treatment options, a consideration that has been notably absent from policy initiatives over the past decade. Another viable approach is to educate individuals concerning the adverse effects associated with the abuse or nonmedical use of drugs. This tactic, which has been shown to be effective in the context of cigarette smoking, may deter those contemplating drug experimentation in addition to more established users. Increasing the prevalence and quality of demand reduction strategies, while expanding the array of available drug abuse treatment options is a promising strategy for reducing the nonmedical use of prescription medications, and is one worthy of testing and evaluating in future research.

Acknowledgments

Dr. Woody is a paid consultant to Purdue.

References and Recommended Reading

Papers of particular interest, published recently, have been highlighted as:

- • Of importance
- •• Of major importance

1. Goodwin RD, Hasin DS: **Sedative use and misuse in the United States.** *Addiction* 2002, **97:**555–562.
2. Substance Abuse and Mental Health Services Administration. *Overview of Findings from the 2002 National Survey on Drug Use and Health (Office of Applied Studies, NHSDA Series H-21, DHHS Publication No. SMA 03-3774).* Rockville, MD, 2003.
3. Substance Abuse and Mental Health Services Administration. *Results from the 2003 National Survey on Drug Use and Health: National Findings (Office of Applied Studies, NSDUH Series H-25, DHHS Publication No. SMA 04-3964).* Rockville, MD, 2004.
4. •• Zacny J, Bigelow G, Compton P, *et al.*: **College on problems of drug dependence task force on prescription opioid nonmedical us and abuse: position statement.** *Drug Alcohol Depend* 2003, **69:**215–232.

The authors urge balance between risk management strategies and appropriate access to pharmacotherapy for the treatment of pain.

5. National Institute on Drug Abuse. **NIDA and partners announce national initiative on prescription drug misuse.** *NIDA, National Institutes of Health, U.S. Department of Health and Human Services;* **Bethesda, MD.** News release issued April 10, 2001. Available at www.drugabuse.gov/MedAdv/01/NR4-10.html.
6. Manchikanti L, Fellows B, Damron KS, *et al.*: **Prevalence of illicit drug use among individuals with chronic pain in the Commonwealth of Kentucky: an evaluation of patterns and trends.** *Journal of the Kentucky Medical Association* 2005, **103:**55–62.
7. Williams RJ, Goodale LA, Shay-Fiddler MA, *et al.*: **Methylphenidate and dextroamphetamine abuse in substance-abusing adolescents.** *Am J Addict* 2004, **13:**381–89.
8. Zarba A, Storr CL, Wagner FA: **Carrying habits into old age: prescription drug use without medical advice by older American adults.** *J Am Geriatr Soc* 2005, **53:**170–171.
9. Hall KM, Irwin MM, Bowman KA, *et al.*: **Illicit use of prescribed stimulant medication among college students.** *J Am Coll Health* 2005, **53:**167–174.
10. Clark RE, Xie H, Brunette MF: **Benzodiazepine prescription practices and substance abuse in persons with severe mental illness.** *J Clin Psychiatry* 2004, **65:**151–152.
11. McCabe SE, Teter CJ, Boyd CJ, *et al.*: **Nonmedical use of prescription opioids among U.S. college students: Prevalence and correlates from a national survey.** *Addict Behav* 2005, **30:**789–805.
12. Young D: **Federal reports say oxycodone abuse is on the rise.** *Am J Health Syst Pharm* 2001, **58:**1175,1178–1179.
13. **Office of National Drug Control Policy** 2005. http://www.whitehousedrugpolicy.gov/publications/policy/ndcs05/ndcs.pdf.
14. Cicero TJ, Adams EH, Geller A, *et al.*: **A post-marketing surveillance program to monitor Ultram (tramadol hydrochloride) abuse in the United States.** *Drug Alcohol Abuse* 1999, **57:**7–22.
15. Arfken CL, Schuster CR, Johanson CE: **Postmarketing surveillance of abuse liability of Sibutramine.** *Drug Alcohol Depend* 2003, **69:**169–173.
16. World Health Organization: *Cancer Pain Relief, Second Edition with a Guide to Opioid Availability, Cancer Pain Relief and Palliative Care: Report of the WHO Expert Committee (WHO Technical Report Series, No. 804).* Geneva: WHO; 1996.
17. Gilson AM, Ryan KM, Joranson DE, *et al.*: **A reassessment of trends in the medical use and abuse of opioid analgesics and implications for diversion control: 1997-2002.** *J Pain Symptom Manage* 2004, **28:**176–188.
18. American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders,* 4th Edition, Text Revision. Washington, DC: American Psychiatric Association; 2000:247.
19. **Physicians' Desk Reference,** 2005.
20. DiSio JM, Bacon DR, Peer G, *et al.*: **Intravenous abuse of transdermal fentanyl therapy in a chronic pain patient.** *Anesthesiology* 1993, **79:**1139–1141.
21. Meier B: *Painkiller: A "wonder" Drug's Trail of Addiction and Death.* New York: Rodale Press; 2003.
22. Brookoff D: **Abuse potential of various opioid medications.** *J Gen Intern Med* 1993, **8:**688–690.
23. Auriacombe M, Franques P, Tignol J: **Deaths attributable to methadone vs. buprenorphine in France.** *JAMA* 2001, **285:**35.
24. Graham A, Smith MY, Haddox JD, *et al.*: **Reducing the potential for diversion of prescription opioids: Tested interventions.** *Poster presented at College on Problems of Drug Dependence,* Orlando, Florida, June 2005.
25. Forman R, Woody G, McLellan T: **Availability of websites offering to sell opioid-containing medications without a prescription.** *Am J Psychiatry* In press, 2005.
26. •• Joranson DE, Carrow GM, Ryan KM, *et al.*: **Pain management and prescription monitoring.** *J Pain Symptom Manage* 2002, **23:**231–238.

The authors report on prescription monitoring programs as a strategy agains diversion of prescription drugs.

27. Fudala P, Woody GE: **Current and experimental therapeutics for opioid addiction.** In *Neuropsychopharmacology: The Fifth Generation of Progress.* Edited by Davis KL, Charney D, Coyle JT. Philadelphia: Lippincott, Williams & Wilkins; 2002:1507–1518.
28. • Woody GE: **Psychosocial and pharmacologic treatment of substance abuse disorders.** In *The Science, Treatment and Prevention of Antisocial Behaviors.* Edited by Fishbein DH. Kingston, NJ: Civic Research Institute; 2000.

This is an important work dealing with two components of treatment in substance abuse disorders.

29. Cone EJ, Fant RV, Rohay JM, *et al.*: **Oxycodone involvement in drug abuse deaths. II. Evidence for toxic multiple drug-drug interactions.** *J Anal Toxicol* 2004, **28:**616–624.
30. Miller S, Greenfeld A: **Patient characteristics and risks factors for development of dependence on hydrocodone and oxycodone.** *Am J Ther* 2004, **11:**26–32.
31. Woody G, O'Brien CP, Greenstein RA: **Misuse and abuse of diazepam: an increasingly common medical problem.** *Int J Addict* 1975, **10:**843–848.
32. Potter JS, Hennessy G, Borrow JA, *et al.*: **Substance use histories in patients seeking treatment for controlled-release oxycodone dependence.** *Drug Alcohol Depend* 2004, **76:**213–215.
33. Simoni-Wastila L, Ritter G, Strickler G: **Gender and other factors associated with the nonmedical use of abusable prescription drugs.** *Substance Use Misuse* 2004, **39:**1–23.
34. Simoni-Wastila L: **The use of abusable prescription drugs: The role of gender.** *J Womens Health Gender Based Med* 2000, **9:**289–297.
35. • Simoni-Wastila L, Strickler G: **Risk factors associated with problem use of prescription drugs.** *Am J Pub Health* 2004, **94:**266–268.

This paper found the greatest risk in older adults, females, those in poor/fair health, and people who consume alcohol on a daily basis.

36. Johnston LD, O'Malley PM, Bachman JG, *et al.*: *Monitoring the Future national results on adolescent drug use: Overview of Key Findings, 2004. (NIH:Publication No. 04-5506).* Bethesda, MD: National Institute on Drug Abuse, 2005.
37. • Gfroerer J, Wright D, Kopstein A: **Prevalence of youth substance use: the impact of methodological differences between two national surveys.** *Drug Alcohol Depend* 1997, **47:**19–30.

Using two major, federally funded surveys, the authors concluded that methodologic differences in survey design can have a significant impact on prevalence estimates.