

# New The DAWN Report

Issue 29, 2006

DRUG ABUSE WARNING NETWORK

## Emergency Department Visits Involving ADHD Stimulant Medications

### In Brief

According to the Drug Abuse Warning Network (DAWN) for 2004:

- An estimated 7,873 drug-related emergency department (ED) visits involved methylphenidate or amphetamine-dextroamphetamine, two medications used to treat attention-deficit/hyperactivity disorder (ADHD).
- The most frequent reason for these visits was nonmedical use (48%), followed by adverse reactions associated with medical use (34%), accidental ingestion (10%), and suicide attempts (8%).
- The rates of ED visits involving methylphenidate or amphetamine-dextroamphetamine for patients aged 12 to 17 were higher than the rates for patients aged 18 or older.
- Over two thirds (68%) of the visits involving nonmedical use of these two drugs also involved another substance, such as alcohol, an illicit drug, or pharmaceutical.

Recent studies have indicated that as many as 7 percent of children and 4 percent of adults now meet the criteria for a diagnosis of attention-deficit/hyperactivity disorder (ADHD).<sup>1,2,3</sup> As a result, more prescriptions are being written for the stimulants used to treat ADHD. More prescriptions will likely lead to increases in medical side effects associated with the use of these medications and, potentially, greater use of these drugs for nonmedical purposes as well.<sup>4</sup> A recent Food and Drug Administration (FDA) advisory panel recognized the danger of side effects for ADHD stimulants and recommended that they carry a warning of an increased potential for cardiac problems, such as hypertension, cardiac arrests, and stroke.<sup>5</sup> The possibility of medical problems may be exacerbated by using ADHD stimulant medications improperly or in combination with other drugs.

The potential for greater access of these medications to persons without a prescription is supported by research, which has shown that peers are a common source of ADHD medications.<sup>6</sup> Although the potential for diversion has increased, estimates from the 2003 National Survey on Drug Abuse and Health (NSDUH) indicate that nonmedical use of ADHD stimulant medications is still relatively low: 0.3 percent of the population aged 12 or older reported using such stimulants nonmedically during the past year. However, those aged 18 to

25 had a higher rate of nonmedical use than those who were younger or older.<sup>7</sup> College students, who may use these drugs as study aids because of their stimulant properties, fall primarily in this 18-to-25 age group.

The Drug Abuse Warning Network (DAWN), which collects data from a national sample of short-term, general, non-Federal hospitals,<sup>8</sup> provides estimates of drug-related emergency department (ED) visits. The findings presented in this issue of *The DAWN Report* are based on ED visits related to two of the pharmaceuticals commonly used to treat ADHD—methylphenidate and amphetamine-dextroamphetamine. DAWN includes both generic and branded drugs, including methylphenidate marketed as *Ritalin*<sup>®</sup> and *Concerta*<sup>®</sup> and amphetamine-dextroamphetamine marketed as *Adderal*<sup>®</sup>. Based on DAWN data, this report examines the reasons for the ED visits and the relative frequency of these ED visits for different age groups. Finally, for the ED visits involving nonmedical use, DAWN provides the ability to examine the drugs used along with the ADHD drugs. DAWN, which observes drug-related morbidity in ED visits, offers a different view of drug use than the NSDUH, which measures prevalence of nonmedical use in the population at large.

## Overview

In 2004, about 106 million ED visits occurred in short-term, general, non-Federal hospitals in the United States.<sup>9</sup> DAWN estimates that about 2 million ED visits in 2004 were drug related, and the ADHD drugs examined in this report were implicated in under 1 percent of those drug-related visits. Methylphenidate was involved in an estimated 3,601 ED visits, and amphetamine-dextroamphetamine was involved in an estimated 4,272 ED visits.

## Reasons for ED visits

Among the 7,873 ED visits involving one of the ADHD medications, nonmedical use accounted for 48 percent of the visits and medical use (i.e., adverse reaction) accounted for 34 percent (Table 1). Nonmedical use includes cases when a higher than prescribed dose was used, a drug prescribed for another person was used, or there was other evidence in the medical record of drug misuse or abuse. Considerably fewer of the ED visits were associated with accidental ingestion (10%) or suicide attempt (8%).<sup>10</sup>

## Patient age

As mentioned above, findings from the NSDUH suggest that nonmedical use of ADHD drugs is more frequent among those aged 18 to 25 than among younger (e.g., 12 to 17) or older (26 or older) age groups. DAWN estimates show that the rate of ED visits involving ADHD stimulants is highest among patients aged 12 to 17 (Figure 1). This pattern is found for both medical and nonmedical use of these stimulants. These findings suggest that younger persons (aged 12 to 17) are at greater risk for adverse health effects, despite being less likely than those aged 18 to 25 to use ADHD drugs nonmedically.

## Drug combinations

ED visits involving adverse reactions associated with medical use usually involve only a single drug. For methylphenidate or amphetamine-dextroamphetamine, about three quarters (77%) of adverse-reaction visits involved only the single drug.

**Table 1. Estimated ED visits, by reason for ED visit and drug**

Reason for visit	Methylphenidate		Amphetamine-dextroamphetamine		Total	
	ED visits	% of visits	ED visits	% of visits	ED visits	% of visits
Total <sup>a</sup>	3,601	100%	4,272	100%	7,873	100%
Nonmedical use	1,541	43%	2,228	52%	3,769	48%
Adverse reaction (medical use)	1,322	37%	1,320	31%	2,642	34%
Accidental ingestion	390	11%	435	10%	825	10%
Suicide attempt	348	10%	289	7%	637	8%

<sup>a</sup> The total includes only the four types of ED visits shown. This excludes patients who presented to the ED specifically to seek admission to the hospital's detoxification or substance abuse treatment unit.

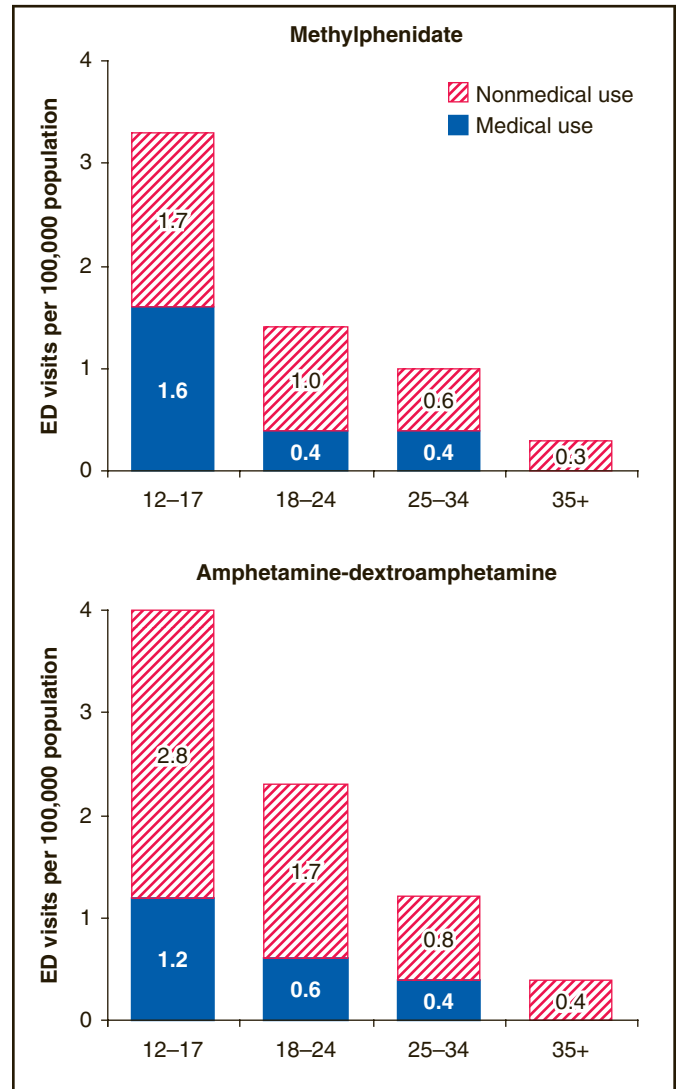
For ED visits associated with nonmedical use, polydrug use is typical. This is important because the combination of ADHD medications with alcohol, illicit drugs, and other pharmaceuticals may amplify the health risks.

Multiple drugs were present in about two thirds (68%) of the nonmedical-use visits involving methylphenidate or amphetamine-dextroamphetamine (Table 2). Alcohol was present in 20 percent of visits, illicit drugs in 26 percent, and other pharmaceuticals in 57 percent.

**Notes**

1. Robison, L.M., Sclar, D.A., Skaer, T.L., & Galin, R.S. (1999). National trends in the prevalence of attention-deficit/hyperactivity disorder and the prescribing of methylphenidate among school-age children: 1990–1995. *Clinical Pediatrics*, 38(4), 209–218.
2. Wender, P.H. (1998). Pharmacotherapy of attention-deficit/hyperactivity disorder in adults. *Journal of Clinical Psychiatry*, 59 (supp. 7), 76–79.
3. Kessler, R.C., Adler, L., Barkley, R., Biederman, J., Conners, C.K., Demler, O., Faraone, S.V., Greenhill, L.L., Howes, M.J., Secnik, K., Spencer, T., Ustun, T.B., Walters, E.E., & Zaslavsky, A.M. (2006). The prevalence and correlates of adult ADHD in the United States: Results from the National Comorbidity Survey Replication. *American Journal of Psychiatry*, 163, 716–723.
4. Cohen, A. L., Jhung, M.A., & Budnitz, D.S. (2006, May 25). Stimulant medications and attention deficit-hyperactivity disorder. *New England Journal of Medicine*, 354(21), 2294–2295.
5. U.S. Department of Health and Human Services, Food and Drug Administration. (2006, January 6). Drug Safety and Risk Management Advisory Committee; Notice of Meeting. Washington, DC: *Federal Register*, 71(4), 942.
6. McCabe, S.E., & Boyd, C.J. (2005). Sources of prescription drugs for illicit use. *Addictive Behaviors*, 30(7), 1342–1350.
7. Kroutil, L.A., Van Brunt, D.L., Stahl, M.H., Heller, D.C., Bray, R. M., & Penne, M. A. (in press). *Nonmedical use of prescription stimulants in the United States*. Research Triangle Park, NC: RTI International.
8. Specialty hospitals, including children’s hospitals, are excluded from the DAWN sample.
9. AHA Annual Survey Database, Fiscal Year 2003. Health Forum LLC, Copyright 2004, One North Franklin Street, Chicago, IL 60606.
10. DAWN does not collect data on preexisting conditions, so it is not possible to know whether a specific drug or a preexisting condition, such as depression, contributed to the suicide attempt.

**Figure 1. Rates of ED visits, by drug, type of use, and age**



Source: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2004 (09/2005 update).

**Table 2. Nonmedical use of ADHD medications in combination with other substances**

	Methylphenidate	Amphetamine-dextroamphetamine	Total	%
Total	1,541	2,227	3,768	100%
Single drug	597	607	1,191	32%
Multiple drugs <sup>a</sup>	944	1,620	2,564	68%
with alcohol	341	413	754	20%
with any illicit drug	331	662	993	26%
with other pharmaceutical	810	1,329	2,139	57%

<sup>a</sup> Components do not sum to total because categories are not mutually exclusive. For example, one multiple-drug visit may include alcohol and another pharmaceutical. Source: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2004 (09/2005 update).

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The **Drug Abuse Warning Network (DAWN)** is a public health surveillance system that monitors drug-related morbidity and mortality. DAWN uses a probability sample of hospitals to produce estimates of drug-related emergency department (ED) visits for the United States and selected metropolitan areas annually. DAWN also produces annual profiles of drug-related deaths reviewed by medical examiners or coroners in selected metropolitan areas and States.

Any ED visit or death related to recent drug use is included in DAWN. All types of drugs—licit and illicit—are covered. Alcohol is included for adults when it occurs with another drug. Alcohol is always included for minors. DAWN's method of classifying drugs was derived from the Multum Lexicon, Copyright © 2005, Multum Information Services, Inc. The Multum Licensing Agreement can be found in DAWN annual publications and at <http://www.multum.com/license.htm>.

DAWN is one of three major surveys conducted by the Substance Abuse and Mental Health Services Administration's Office of Applied Studies (SAMHSA/OAS). For information on other OAS surveys, go to <http://www.oas.samhsa.gov>. SAMHSA has contracts with Westat (Rockville, MD) and RTI International (Research Triangle Park, NC) to operate the DAWN system and produce publications.

For publications and additional information about DAWN, go to <http://DAWNinfo.samhsa.gov>.