

# The DAWN Report

July 2, 2012

## Highlights of the 2010 Drug Abuse Warning Network (DAWN) Findings on Drug-Related Emergency Department Visits

### In Brief

- In 2010, there were 4.9 million drug-related emergency department (ED) visits; about one half (46.8 percent, or 2.3 million visits) were attributed to drug misuse or abuse with a nearly equal percentage (47.4 percent) attributed to adverse drug reactions
- In 2010, ED visits resulting from the misuse or abuse of pharmaceuticals occurred at a rate of 434.9 visits per 100,000 population compared with a rate of 378.5 visits per 100,000 population for illicit drugs
- ED visits involving misuse or abuse of pharmaceuticals increased 115 percent between 2004 and 2010, from 626,472 visits in 2004 to 1,345,645 visits in 2010
- ED visits involving adverse reactions to pharmaceuticals taken as prescribed increased 86 percent between 2005 and 2010, from 1,250,377 visits in 2005 to 2,329,221 visits in 2010

The Drug Abuse Warning Network (DAWN) provides demographic and visit-level information on emergency department (ED) visits resulting from substance misuse or abuse, adverse reactions to drugs taken as prescribed, accidental ingestion of drugs, drug-related suicide attempts, and other drug-related medical emergencies.<sup>1,2</sup> DAWN data provide important information on the types of drugs involved and the characteristics of individuals suffering the negative consequences of drug use. The DAWN data reflect the commitment of the Substance Abuse and Mental Health Services Administration (SAMHSA) to provide the public health community with recent and historical information on the use, misuse, and abuse of alcohol, illicit drugs, and pharmaceuticals in the Nation. In support of SAMHSA's mission, such data help guide the development and evaluation of national as well as community-level policy

and programmatic efforts targeted at the prevention, intervention, and treatment of substance abuse. DAWN data also provide a window on drug-related medical emergencies associated with medical use of prescription medications, pharmaceuticals, and over-the-counter drugs. Public agencies such as the U.S. Food and Drug Administration, the pharmaceutical industry, and public health researchers track DAWN data to monitor life-threatening effects of medications. Such information is used to inform drug scheduling, drug labeling, and other public health policy and program decision making.

## Overview

In 2010, there were 4.9 million drug-related ED visits (Table 1). About one half (46.8 percent, or 2.3 million visits) were attributed to drug misuse or abuse with a nearly equal percentage (47.4 percent) attributed to adverse drug reactions.<sup>3,4</sup> Of the 2.3 million ED visits involving drug misuse or abuse, 1.3 million visits involved pharmaceuticals, 1.2 million involved illicit drugs, 0.6 million involved alcohol in combination with drugs, and 0.2 million involved underage drinking.<sup>5,6,7</sup>

Patients aged 20 or younger accounted for 18.8 percent (922,953 visits) of all drug-related ED visits in

2010 (data not shown). About one half (45.3 percent, or 417,856 visits) of these visits involved drug misuse or abuse, representing a rate of 476.1 ED visits per 100,000 population aged 20 or younger. The majority of drug-related ED visits were made by patients aged 21 or older (81.2 percent, or 3,992,113 visits). Of these, about one half (47.2 percent, or 1,882,539 visits) involved drug misuse or abuse, reflecting a rate of 849.4 visits per 100,000 population aged 21 or older.

## ED Visits Involving Drug Misuse or Abuse

In 2010, ED visits resulting from the misuse or abuse of pharmaceuticals occurred at a rate of 434.9 visits per 100,000 population (Table 2). About half of ED visits for misuse or abuse of pharmaceuticals involved pain relievers (213.3 visits per 100,000 population). With 137.4 visits per 100,000 population, narcotic pain relievers (e.g., oxycodone and hydrocodone products)

**Table 1. Drug-Related Emergency Department (ED) Visits, by Type of Visit: 2010**

Type of Visit	Number of ED Visits*	Percent*
Total Drug-Related ED Visits	4,916,328	100.0
Drug Misuse or Abuse	2,301,050	46.8
Pharmaceuticals	1,345,645	27.4
Illicit Drugs	1,171,024	23.8
Alcohol**	687,574	14.0
In Combination with Other Drugs	564,796	11.5
Underage Drinking***	189,060	3.8
Adverse Reactions	2,329,221	47.4

\* Because a visit may involve multiple drugs, the sum of visits by drug will be greater than the total, and the sum of percentages will be greater than 100.

\*\* Alcohol in combination with other drugs for patients of all ages and alcohol only for patients aged 20 or younger are recorded by DAWN.

\*\*\*Underage drinking includes both use of alcohol in combination with other drugs and use of alcohol only for patients aged 20 or younger.

Source: 2010 SAMHSA Drug Abuse Warning Network (DAWN).

**Table 2. Misused or Abused Drugs Most Commonly Involved in Emergency Department (ED) Visits: 2010**

Drug	Number of ED Visits*	ED Visits per 100,000 Population
Alcohol—In Combination with Other Drugs	564,796	182.5
Alcohol—Underage Drinking**	189,060	215.4
Illicit Drugs	1,171,024	378.5
Cocaine	488,101	157.8
Heroin	224,706	72.6
Marijuana	461,028	149.0
Pharmaceuticals	1,345,645	434.9
Anti-anxiety and Insomnia Drugs	472,769	152.8
Benzodiazepines	408,021	131.9
Antidepressants	105,229	34.0
Pain Relievers	659,969	213.3
Narcotic Pain Relievers	425,247	137.4
Hydrocodone Products	115,739	37.4
Oxycodone Products	182,748	59.1

\* Because a visit may involve multiple drugs, the sum of visits by drug will be greater than the total.

\*\*Underage drinking includes both use of alcohol in combination with other drugs and use of alcohol only for patients aged 20 or younger.

Source: 2010 SAMHSA Drug Abuse Warning Network (DAWN).

were the type of pain reliever most commonly involved. About one third of ED visits for misuse or abuse of pharmaceuticals involved anti-anxiety and insomnia drugs (152.8 visits per 100,000 population).

ED visits resulting from use of illicit drugs occurred at a rate of 378.5 visits per 100,000 in 2010 (Table 2). Cocaine and marijuana had the highest rates of involvement at 157.8 and 149.0 visits per 100,000 population, respectively. ED visits involving alcohol in combination with other drugs occurred at a rate of 182.5 visits per 100,000 population, whereas ED visits resulting from underage drinking occurred at a rate of 215.4 visits per 100,000 population aged 20 or younger.

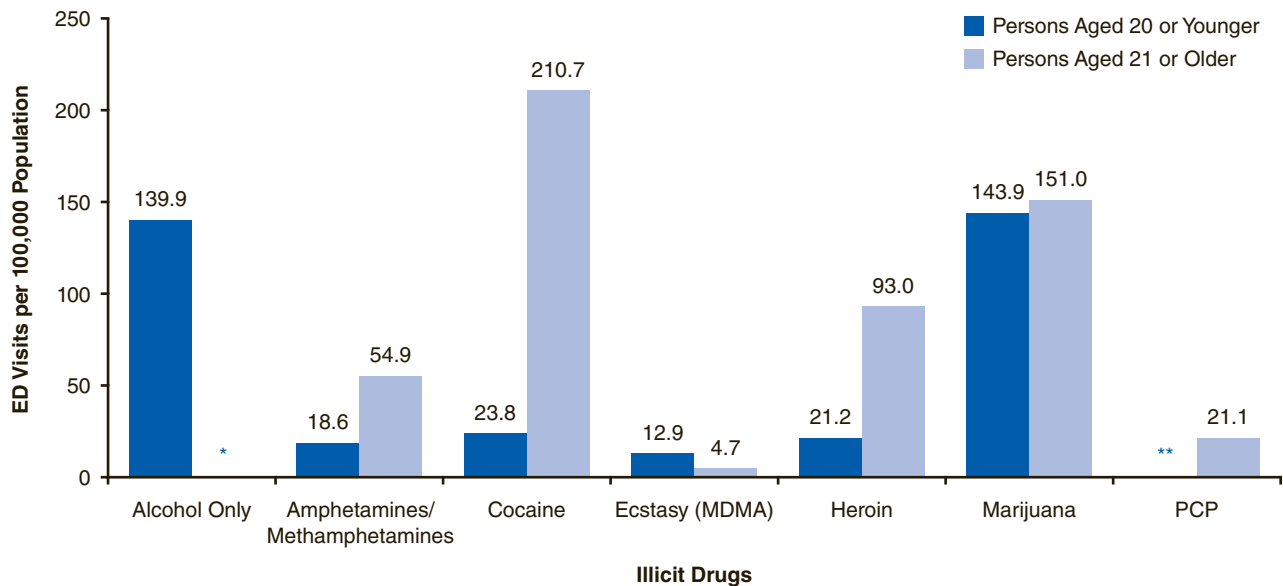
### ED Visits Involving Drug Misuse or Abuse, by Age

Out of the 4.0 million drug-related ED visits made by patients aged 21 or older, 1.9 million (47.2 percent or 849.4 visits per 100,000 population aged 21 or older) involved drug misuse or abuse. Cocaine was the most commonly involved illicit drug (210.7 visits per 100,000 population aged 21 or older), followed by marijuana (151.0 visits), heroin (93.0 visits), and amphetamines/methamphetamines (54.9 visits) (Figure 1). Among

pharmaceuticals, benzodiazepines were involved in 168.8 visits per 100,000 population aged 21 or older (Figure 2). Narcotic pain relievers were involved in 177.4 visits with oxycodone and hydrocodone appearing in 74.5 and 48.5 visits per 100,000 population aged 21 or older, respectively. Antidepressants appeared in 41.8 visits per 100,000 population aged 21 or older and antipsychotics in 27.1 visits.

Out of the 922,953 visits made by patients aged 20 or younger, 417,856 (45.3 percent) involved drug misuse or abuse. This is the equivalent of 476.1 visits per 100,000 population aged 20 or younger. Slightly less than one third of these visits, or 139.9 visits per 100,000 population aged 20 or younger, involved just alcohol (Figure 1). Marijuana was also involved in about a third of visits, or 143.9 visits per 100,000 population aged 20 or younger. Rates for other illicit drugs did not exceed 25 visits per 100,000 population for this age group. Considered collectively, benzodiazepines and narcotic pain relievers occurred at rates of 38.6 and 36.3 visits per 100,000 population aged 20 or younger, respectively (Figure 2). Rates for specific benzodiazepines or narcotic pain relievers did not exceed 20 visits per 100,000 population aged 20 or younger.

**Figure 1. Rates of Emergency Department (ED) Visits Involving Illicit Drugs per 100,000 Population, by Age and Drug: 2010**

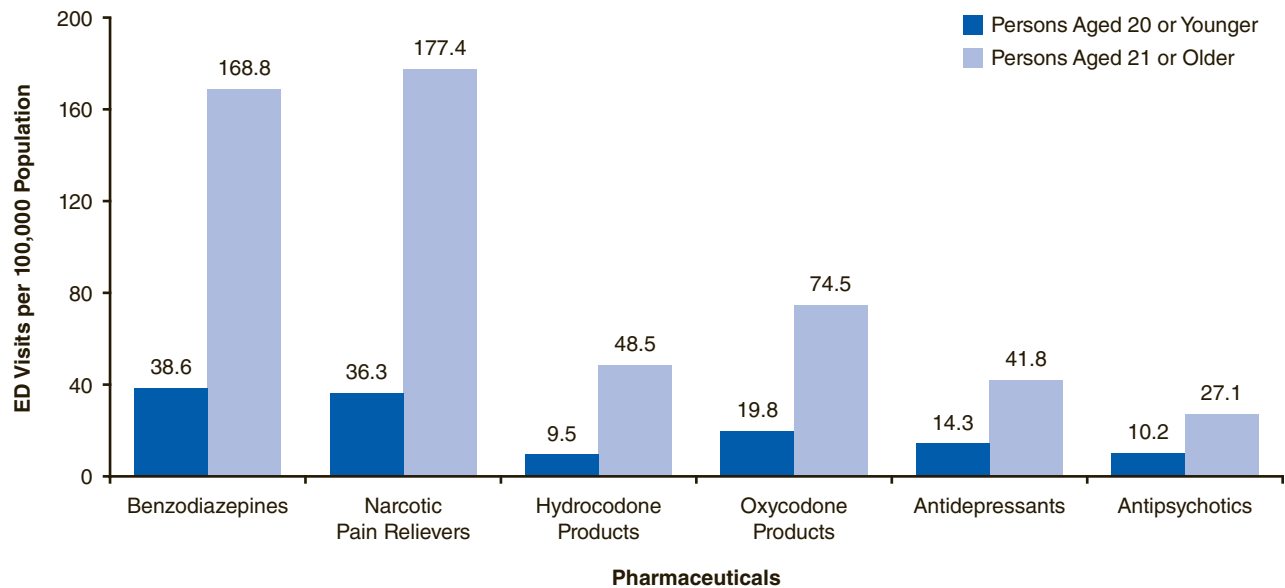


\*Alcohol-only visits are not captured by DAWN for patients aged 21 or older.

\*\*Estimate suppressed due to low statistical precision.

Source: 2010 SAMHSA Drug Abuse Warning Network (DAWN).

**Figure 2. Rates of Emergency Department (ED) Visits Involving Misuse or Abuse of Select Pharmaceuticals per 100,000 Population, by Age and Drug: 2010**



Source: 2010 SAMHSA Drug Abuse Warning Network (DAWN).

## Trends in ED Visits Involving Drug Misuse or Abuse

The total number of drug-related ED visits increased 94 percent from 2004 (2.5 million visits) to 2010 (4.9 million visits). ED visits involving misuse or abuse of pharmaceuticals increased 115 percent between 2004 and 2010, going from 626,472 visits in 2004 to 1,345,645 visits in 2010 (Figure 3); the corresponding rates were 213.9 visits per 100,000 population in 2004 and 434.9 visits in 2010 (Table 3). Ranging from 0.9 to 1.2 million visits, the overall level of ED visits involving illicit drug use did not change significantly across the time period (Figure 3). ED visits resulting from alcohol involvement with drug use and underage drinking also did not change significantly (Table 3).

Visits involving two illicit drugs and several types of pharmaceuticals showed significant increases over this 7-year period (Table 4). Oxycodone products had the largest increase in terms of the absolute number of visits; there were 131,330 more visits in 2010 than in 2004. The second largest increase was for visits involving hydrocodone products, for which there were 69,203 more visits 2010 than 2004.

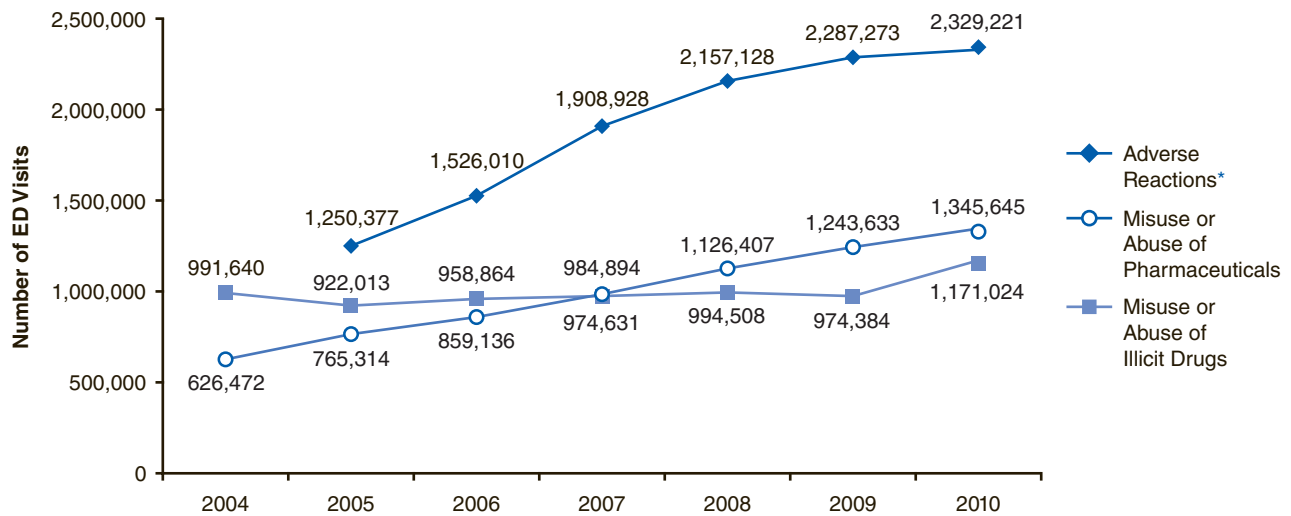
Among anti-anxiety and insomnia drugs, involvement of benzodiazepines increased 139 percent, with 237,550 more visits in 2010 than in 2004. Among other types of drugs, ED visits involving muscle relaxants increased by 103 percent, with about 30,000 more visits; visits involving central nervous system stimulants (e.g., ADHD drugs) increased 196 percent, with about 20,000 more visits. Visits related to antipsychotics increased 65 percent, with 27,219 more visits in 2010.

Although there was no significant change between 2004 and 2010 in the number of visits involving illicit drugs as a whole, visits involving marijuana increased 64 percent, reflecting 179,409 more visits, and visits related to MDMA (Ecstasy) increased 114 percent, with 11,609 more visits.

For patients aged 20 or younger, ED visits resulting from misuse or abuse of pharmaceuticals increased 45 percent between 2004 and 2010 (116,176 to 168,409 visits, respectively); among patients aged 21 or older, there was an increase of 131 percent (509,067 to 1,176,842 visits, respectively) (data not shown). There were no significant changes overall in ED visits involving illicit drugs for either age group or for ED visits involving underage drinking by those aged 20

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**Figure 3. Number of Drug-Related Emergency Department (ED) Visits, by Type of Visit: 2004 to 2010**



\* Estimate for 2004 suppressed due to low statistical precision.

Note: Estimates may be slightly different from those reported in previous years due to updating of DAWN's drug categorization system and resultant reassignment of drugs to drug codes. Rates may change due to changes in intercensal population estimates. For further information on the DAWN drug lexicon and updating process, see <http://www.samhsa.gov/data/DAWN.aspx>.

Source: 2010 SAMHSA Drug Abuse Warning Network (DAWN).

**Table 3. Rates of Drug-Related Emergency Department (ED) Visits per 100,000 Population, by Type of Visit: 2004 to 2010**

Type of Visit	2004	2005	2006	2007	2008	2009	2010	Percent Change, 2004 to 2010*
Total Drug-Related ED Visits	866.7	1,018.2	1,153.6	1,326.8	1,441.2	1,497.9	1,589.0	94
Accidental Ingestion (Aged 5 or Younger)	220.8	192.7	244.7	275.8	288.3	259.4	300.2	NC
Adverse Reactions	**	423.1	511.5	633.5	709.2	745.6	752.8	86
Drug Misuse or Abuse	552.9	547.0	584.2	624.9	657.5	674.9	743.7	NC
Illicit Drugs	338.7	312.0	321.4	323.4	327.0	317.6	378.5	NC
Alcohol***	230.5	178.4	193.6	210.6	216.0	214.6	222.2	NC
In Combination with Other Drugs	178.9	141.0	151.1	165.0	172.3	169.4	182.5	NC
Underage Drinking <sup>+</sup>	238.8	183.9	212.0	225.8	217.8	227.9	215.4	NC
Pharmaceuticals	213.9	259.0	287.9	326.8	370.4	405.4	434.9	115

\* Percent change is measured as difference in the estimated number of visits (not rates) between 2004 and 2010 except for Adverse Reactions where change is measured from 2005 to 2010. Reported changes are significant at the .05 level; "NC" signifies no significant change.

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\*\*\*Alcohol in combination with other drugs for patients of all ages and alcohol only for patients aged 20 or younger are recorded by DAWN.

<sup>+</sup> Underage drinking includes both use of alcohol in combination with other drugs and use of alcohol alone for patients aged 20 or younger.

Note: Estimates may be slightly different from those reported in previous years due to updating of DAWN's drug categorization system and resultant reassignment of drugs to drug codes. Rates may change due to changes in intercensal population estimates. For further information on the DAWN drug lexicon and updating process, see <http://www.samhsa.gov/data/DAWN.aspx>.

Source: 2010 SAMHSA Drug Abuse Warning Network (DAWN).

**Table 4. Drugs with Increasing Involvement in Emergency Department (ED) Visits for Drug Misuse or Abuse: 2004 to 2010**

Drug	ED Visits, 2004	ED Visits, 2010	Percent Change, 2004 to 2010*
Illicit Drugs	991,640	1,171,024	NC
Marijuana	281,619	461,028	64
MDMA (Ecstasy)	10,227	21,836	114
Pharmaceuticals	626,472	1,345,645	115
Anti-anxiety and Insomnia Drugs	210,711	472,769	124
Benzodiazepines	170,471	408,021	139
Antipsychotics	41,930	69,149	65
CNS Stimulants (e.g., ADHD Drugs)	10,656	31,507	196
Muscle Relaxants	29,014	58,783	103
Pain Relievers	282,275	659,969	134
Narcotic Pain Relievers	166,338	425,247	156
Hydrocodone Products	46,536	115,739	149
Oxycodone Products	51,418	182,748	255

\* Percent change is measured as difference in the estimated number of visits between 2004 and 2010. Reported changes are significant at the .05 level; "NC" signifies no significant change.

Source: 2010 SAMHSA Drug Abuse Warning Network (DAWN).

or younger. Visits involving marijuana increased for both age groups. Visits by patients aged 20 or younger also saw a 189 percent increase in Ecstasy involvement between 2004 and 2010.

### Trends in ED Visits Involving Adverse Reactions to Drugs

ED visits involving adverse reactions to pharmaceuticals taken as prescribed or indicated increased 86 percent between 2005 and 2010, from 1,250,377 visits in 2005 to 2,329,221 visits in 2010 (Figure 3).<sup>8</sup> The rate for adverse reactions ranged from 423.1 visits per 100,000 population in 2005 to 752.8 visits in 2010 (Table 3).

In 2010, the highest rates of drug-related adverse reactions was found among patients aged 65 or older with 1,678.9 visits per 100,000 population (data not shown). Drugs to treat cardiovascular conditions are often involved in adverse reactions for patients aged 65 or older (300.3 visits per 100,000 population aged 65 or older). Other drugs found at higher levels for older adults were anticoagulants (270.6 visits per 100,000 population aged 65 or older), pain relievers

(263.7 visits), drugs to treat infections (215.7 visits), drugs to treat diabetes (167.4 visits), and cancer drugs (116.6 visits).

### Discussion

DAWN data demonstrate the increasing involvement of pharmaceuticals in ED visits related to both drug misuse or abuse and adverse reactions. When used either as directed or recreationally, pharmaceuticals can sometimes produce life-threatening health conditions. It falls to the public health community to raise awareness of possible serious consequences of prescription as well as over-the-counter drugs. This objective is especially challenging because pharmaceuticals are perceived as being safe because they are legally manufactured and dispensed. Effective educational efforts will emphasize the difference between appropriate therapeutic use and drug misuse or abuse. Clear communication of possible interactions with other drugs and alcohol is critical. Drug packaging and labeling can be designed so that possible side effects are obvious even to those with low literacy levels. Raising awareness among first

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responders, such as emergency medical technicians and emergency department staff, about the possible effects of pharmaceuticals and appropriate treatments can also help reduce the negative effects of these drugs on patients' health and well-being.

Pharmacists have been using technology—such as software that allows them to record a patient's medications and potential interactions or contraindications—as another avenue toward increased drug safety. Patients also can reduce the potential for adverse effects by showing an updated list of all their drugs and supplements to doctors and pharmacists when they are prescribed a new medication.

Additional suggestions for methods to increase public awareness, reduce nonmedical use, and control access to pharmaceuticals are provided in the Centers for Disease Control and Prevention's 2011 publication *Policy Impact: Prescription Painkiller Overdoses*.<sup>9</sup>

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#### End Notes

- <sup>1</sup> All types of drugs—illegal drugs, prescription and over-the-counter pharmaceuticals (e.g., dietary supplements, cough medicine), and substances inhaled for their psychoactive effects—are included.
- <sup>2</sup> Alcohol is considered a reportable drug when consumed by patients aged 20 or younger. For patients aged 21 or older, alcohol is reported only when it is used in conjunction with other drugs.

- <sup>3</sup> Adverse reaction visits include adverse drug reactions, side effects, drug-drug interactions, and drug-alcohol interactions experienced when drugs are taken for therapeutic purpose as prescribed or directed. Visits attributed to drug misuse or abuse include use of illicit drugs, alcohol abuse by minors, and misuse or abuse of pharmaceuticals in a manner other than prescribed or directed.
- <sup>4</sup> DAWN also collects information on emergency department visits due to accidental ingestion (0.1 million), visits to obtain detoxification or treatment services (0.2 million), and drug-related suicide attempts (0.2 million).
- <sup>5</sup> ED visits often involve multiple drugs. The sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.
- <sup>6</sup> Alcohol involvement includes use of alcohol in combination with other drugs for patients of all ages and use of alcohol only for persons aged 20 or younger.
- <sup>7</sup> Underage drinking includes both use of alcohol in combination with other drugs and use of alcohol only for persons aged 20 or younger.
- <sup>8</sup> DAWN data for ED visits involving adverse reactions in 2004 are not analyzed or reported because of low statistical precision.
- <sup>9</sup> Centers for Disease Control and Prevention. (2011). *Policy impact: Prescription painkiller overdoses*. Atlanta, GA. Retrieved from <http://www.cdc.gov/homeandrecreationalsafety/rxbrief/>

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Findings from SAMHSA's 2010 Drug Abuse Warning Network (DAWN)

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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 related to recent drug use is included in DAWN. All types of drugs—licit and illicit—are covered. Alcohol involvement is documented for patients of all ages if it occurs with another drug. Alcohol is considered an illicit drug for minors and is documented even if no other drug is involved. The classification of drugs used in DAWN is derived from the Multum *Lexicon*, copyright 2010 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The Multum Licensing Agreement governing use of the *Lexicon* can be found at <http://www.samhsa.gov/data/DAWN.aspx>.

DAWN is one of three major surveys conducted by the Substance Abuse and Mental Health Services Administration's Center for Behavioral Health Statistics and Quality (SAMHSA/CBHSQ). For more information on other CBHSQ surveys, go to <http://www.samhsa.gov/data/>. 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://www.samhsa.gov/data/DAWN.aspx>.



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