

The DAWN Report

February 22, 2013

Highlights of the 2011 Drug Abuse Warning Network (DAWN) Findings on Drug-Related Emergency Department Visits

The Drug Abuse Warning Network (DAWN) provides nationally representative patient demographic and visit-level information on emergency department (ED) visits resulting from substance misuse or abuse, adverse reactions to drugs taken as prescribed or directed, accidental ingestion of drugs, drug-related suicide attempts, and ED admissions for substance abuse treatment. The year 2011 marks the eighth year that the Substance Abuse and Mental Health Services Administration (SAMHSA) has collected data on drug-related ED visits in the Nation using the new sampling and study design introduced in 2004. This report highlights 2011 findings from DAWN with comparisons to 2004 and 2009 for visits involving illicit drug use, misuse or abuse of pharmaceuticals, alcohol use, adverse reactions to drugs, and accidental ingestions. Multiyear data collection affords the opportunity to track the level of drug involvement in medical emergencies in the Nation and alert the public health community to changing patterns of drug use and misuse. Analyses by patient age and type of drug yield further insight into critical age-specific characteristics associated with drug use and misuse behaviors. Such information is critical to anticipating changes in drug use behaviors and developing programmatic responses in a timely fashion, particularly for vulnerable populations such as adolescents and young adults. A more thorough analysis of 2011 and previous data will be available at the SAMHSA website (<http://www.samhsa.gov/data/>), including a comprehensive set of detailed tables that display drug-specific ED visit counts by various patient demographics and visit characteristics for the Nation and select metropolitan areas.

DAWN analyses and tables are used by the Federal, State, and local public health communities to guide the development of substance abuse intervention policy and evaluate programmatic efforts targeted at the prevention, intervention, and treatment of drug use and abuse. In addition, public health agencies such as the Centers for Disease Control and Prevention and the Food and Drug Administration,



IN BRIEF

In 2011, there were 5.1 million drug-related emergency department (ED) visits; about one half (49 percent) were attributed to drug misuse or abuse with a nearly equal percentage (45 percent) attributed to adverse drug reactions

ED visits involving use of illicit drugs were relatively stable from 2004 (991,640 visits) to 2009 (974,392 visits) but increased from 2009 to 2011 (1,252,500 visits); between 2009 and 2011, the rate of visits involving illicit stimulants increased 68 percent, and the rate of visits involving marijuana rose 19 percent

ED visits involving misuse or abuse of pharmaceuticals increased from 2004 (626,470 visits) through 2011 (1,428,145 visits); the most commonly involved drugs were anti-anxiety and insomnia medications and narcotic pain relievers (160.9 and 134.8 visits per 100,000 population, respectively)

ED visits involving adverse reactions to drugs increased from 1,250,377 visits in 2005 to 2,287,271 visits in 2009; however, no increase occurred between 2009 and 2011 (2,301,059 visits)

pharmaceutical companies, and 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.

For this report, all changes over time and between age groups are measured by comparing the rate of ED visits per 100,000 population, not point estimates. All reported differences in rates are significant at the .05 level.

Overview

In 2011, there were 5.1 million drug-related ED visits (Table 1).¹ About one half (49 percent, or 2.5 million

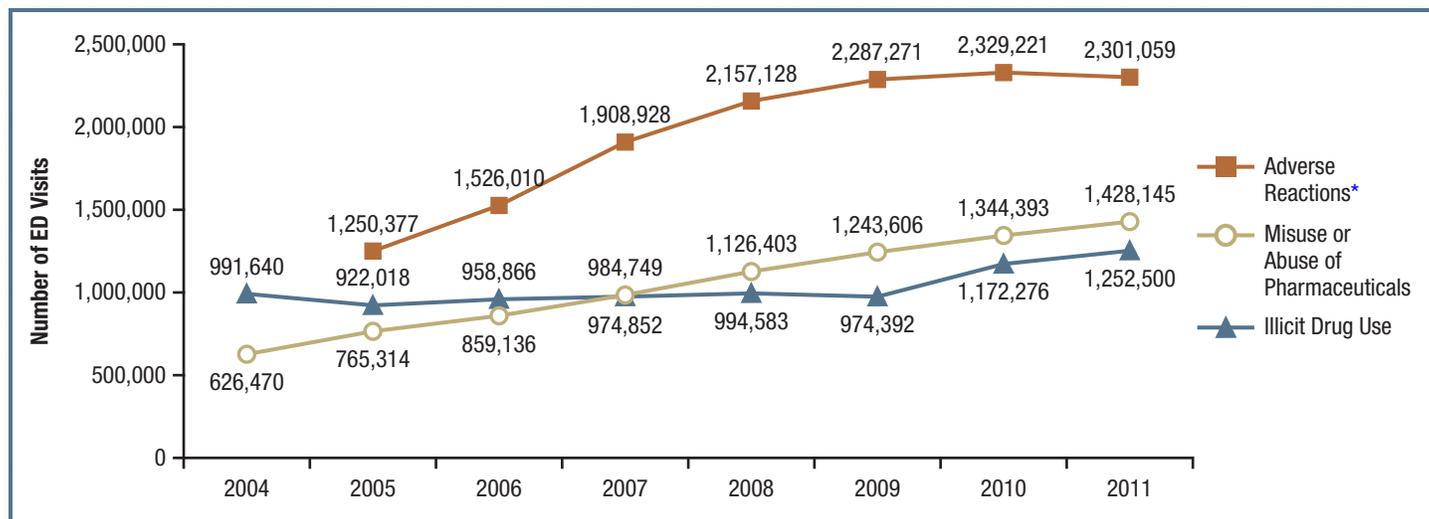
visits) were attributed to drug misuse or abuse with a nearly equal number (45 percent, or 2.3 million visits) attributed to adverse drug reactions.^{2,3} Among visits involving drug misuse or abuse, 1.4 million visits involved pharmaceuticals, and 1.3 million involved illicit drugs.⁴ Visits involving use of illicit drugs were relatively stable from 2004 (991,640 visits) to 2009 (974,392 visits) but increased from 2009 to 2011 (1,252,500 visits) (Figure 1). The trend in visits involving misuse or abuse of pharmaceuticals displayed a steady upward climb from 2004 (626,470 visits) through 2011 (1,428,145 visits). Visits involving adverse reactions to drugs increased from 1,250,377 visits in 2005 to

Table 1. Reasons for Drug-Related Emergency Department (ED) Visits, by Patient Demographic and Visit Characteristics: 2011

Reason for Visit	Number of ED Visits	Percent of ED Visits	Percent of ED Visits Involving a Patient Aged 21 or Older	Percent of ED Visits Involving a Male Patient	Percent of ED Visits Resulting in Admission to the Hospital	Percent of ED Visits Involving a Single Drug
Total ED Visits	5,067,374	100	81	48	24	66
Drug Misuse or Abuse*	2,462,948	49	82	56	25	51
Pharmaceuticals	1,428,145	28	87	50	27	41
Illicit Drugs	1,252,500	25	85	65	24	44
Adverse Reaction	2,301,059	45	82	39	21	82
Accidental Ingestion	113,624	2	26	50	10	86

* Because multiple drugs may be involved in each visit, estimates of visits by drug may add to more than the total, and percentages may add to more than 100 percent. Source: 2011 SAMHSA Drug Abuse Warning Network (DAWN).

Figure 1. Reasons for Drug-Related Emergency Department (ED) Visits, by Year: 2004 to 2011



* The estimate for ED visits involving adverse reactions in 2004 was suppressed due to low statistical precision. Source: 2011 SAMHSA Drug Abuse Warning Network (DAWN).

2,287,271 visits in 2009; however, no increases occurred between 2009 and 2011 (2,301,059 visits).⁵

Patient Demographics and Visit Characteristics

Slightly more than 80 percent of drug-related ED visits were made by adults aged 21 or older, 48 percent were male, 24 percent resulted in the patient being admitted to the hospital, and 66 percent involved a single drug (Table 1). Among visits involving misuse or abuse of drugs, 82 percent were made by adults aged 21 or older, 56 percent were made by males, 25 percent resulted in the patient being admitted to the hospital, and

51 percent involved a single drug. Visits for adverse reactions typically involved a single drug (82 percent), and one fifth of patients were admitted to the hospital (21 percent). Visits for accidental ingestions typically involved patients aged 20 or younger, the majority (86 percent) involved a single drug, and a small portion (10 percent) were admitted to the hospital.

Visits Involving Illicit Drugs

In 2011, there were 402.0 ED visits per 100,000 population involving illicit drugs (Table 2). The most commonly involved drug was cocaine, with

Table 2. Selected Substances Involved in Drug-Related Emergency Department (ED) Visits for Misuse or Abuse of Drugs: 2004, 2009, and 2011

Drug	Number of ED Visits in 2011*	Rate of ED Visits per 100,000 Population in 2011	Percent Change, 2004 to 2011**	Percent Change, 2009 to 2011**
Total ED Visits	2,462,948	790.4	52	19
Illicit Drugs	1,252,500	402.0	NC	27
Cocaine	505,224	162.1	NC	NC
Marijuana	455,668	146.2	52	19
Heroin	258,482	83.0	NC	NC
Illicit Stimulants	159,840	51.3	NC	68
Other Illicit Drugs	131,178	42.1	86	60
Pharmaceuticals	1,428,145	458.3	114	13
Anti-anxiety and Insomnia Medications	501,207	160.9	124	14
Alprazolam	154,016	49.4	155	NC
Clonazepam	76,557	24.6	122	NC
Lorazepam	50,399	16.2	127	NC
Zolpidem	37,225	11.9	152	NC
Narcotic Pain Relievers	420,040	134.8	153	NC
Oxycodone Products	175,229	56.2	220	NC
Hydrocodone Products	97,183	31.2	96	NC
Methadone	75,693	24.3	74	NC
Morphine Products	38,416	12.3	144	NC
Antidepressants	108,388	34.8	NC	NC
Antipsychotics	76,197	24.5	71	NC
Cardiovascular Medications	55,543	17.8	63	NC
Anticonvulsants	53,142	17.1	51	NC
Muscle Relaxants	52,830	17.0	71	NC
Respiratory Medications	46,819	15.0	76	NC
Central Nervous System Stimulants	45,158	14.5	292	78

NC = no significant change.

* Because multiple drugs may be involved in each visit, estimates of visits by drug may add to more than the total.

** Percent change is measured as the difference in the rates of visits per 100,000 population between years. Reported changes are significant at the .05 level.

Source: 2011 SAMHSA Drug Abuse Warning Network (DAWN).

162.1 visits per 100,000 population. This was closely followed by marijuana, which was involved in 146.2 visits per 100,000 population. Other drugs had lower rates: heroin (83.0 visits per 100,000 population), illicit stimulants (predominately amphetamines and methamphetamine; 51.3 visits per 100,000 population), and other illicit drugs (predominately PCP and various hallucinogens; 42.1 visits per 100,000 population).

Trends

ED visits involving use of illicit drugs were relatively stable from 2004 (991,640 visits) to 2009 (974,392 visits) but increased from 2009 to 2011 (1,252,500 visits). Between 2009 and 2011, the rate of visits involving illicit stimulants increased 68 percent, the rate of visits involving other illicit drugs (e.g., PCP, hallucinogens) rose 60 percent, and the rate of visits involving marijuana rose 19 percent (Table 2). Cocaine and heroin involvement changed in neither the long term from 2004 to 2011 nor the short term from 2009 to 2011.

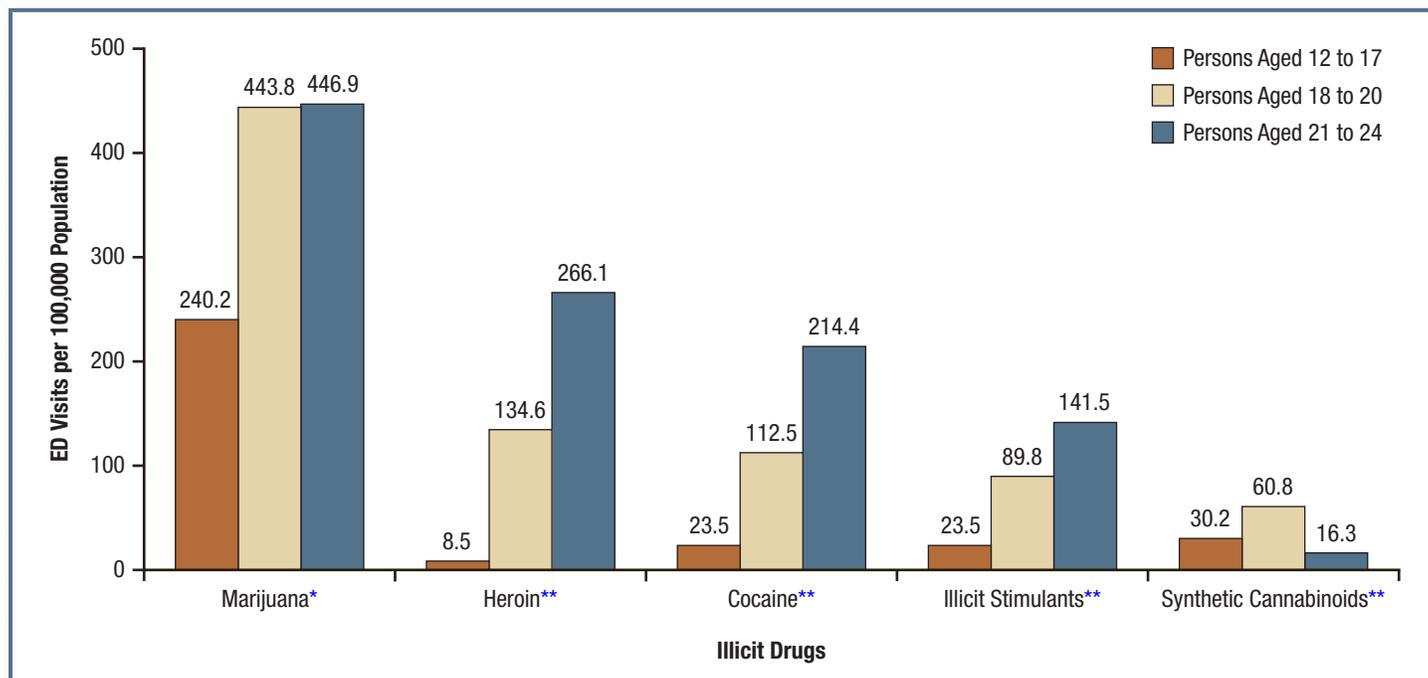
Age

Figure 2 depicts the rates of ED visits per 100,000 population for the major illicit drug categories among patients aged 12 to 17, aged 18 to 20, and aged 21 to 24. Rates of visits for heroin, cocaine, and illicit stimulants rose for each successively older age group. Visits involving marijuana were less common among patients aged 12 to 17 (240.2 visits per 100,000 population) compared with the older age groups, but there was no difference between those aged 18 to 20 (443.8 visits per 100,000 population) and those aged 21 to 24 (446.9 visits per 100,000 population).

Visits Involving Synthetic Cannabinoids

Synthetic cannabinoids first appeared in DAWN records in 2009, but there were too few visits to be reported. By 2010, ED visits involving synthetic cannabinoids rose to a reportable level for the Nation (3.7 visits per 100,000 population).⁶ By 2011, there were 9.2 visits per 100,000 population involving synthetic cannabinoids across all age groups—about

Figure 2. Rates of Emergency Department (ED) Visits Involving Illicit Drugs among Patients Aged 12 to 24 per 100,000 Population, by Age Group: 2011



* The differences between those aged 12 to 17 and the two older age groups were statistically significant at the .05 level.

**All differences between age groups were statistically significant at the .05 level.

Source: 2011 SAMHSA Drug Abuse Warning Network (DAWN).

a 150 percent increase (data not shown). The rate of visits involving synthetic cannabinoids was highest among patients aged 18 to 20 (60.8 visits per 100,000 population), followed by patients aged 12 to 17 (30.2 visits per 100,000 population) (Figure 2).

Visits Involving Misuse or Abuse of Pharmaceuticals

In 2011, there were 458.3 ED visits per 100,000 population involving misuse or abuse of pharmaceuticals (Table 2). The most commonly involved drugs were anti-anxiety and insomnia medications (160.9 visits per 100,000 population) and narcotic pain relievers (134.8 visits per 100,000 population).

Among visits involving anti-anxiety and insomnia medications, alprazolam (e.g., Xanax®) was the most common at 49.4 visits per 100,000 population, followed by clonazepam (e.g., Klonopin®) at 24.6 visits, lorazepam (e.g., Ativan®) at 16.2 visits, and zolpidem (e.g., Ambien®) at 11.9 visits. Oxycodone products were the narcotic pain relievers most commonly involved in ED visits (175,229 visits, or 56.2 visits per 100,000 population). Involvement of hydrocodone, methadone, and morphine products followed oxycodone with 31.2, 24.3, and 12.3 visits per 100,000 population, respectively. Narcotic pain relievers and anti-anxiety and insomnia medications are often not specifically identified by drug or brand name in the ED records, so the actual involvement of specific drugs is likely higher than reported here.

Other types of drugs with measurable involvement included antidepressants (34.8 visits per 100,000 population) and antipsychotics (24.5 visits per 100,000 population). Drug classes with fewer than 20 visits per 100,000 population included cardiovascular medications (17.8 visits), muscle relaxants (17.0 visits), respiratory medications (15.0 visits), and central nervous system (CNS) stimulants (e.g., Adderall®, Ritalin®; 14.5 visits).

Trends

The rate of ED visits involving misuse or abuse of pharmaceuticals increased 114 percent from 214.0 visits per 100,000 population in 2004 to 458.3 visits

per 100,000 population in 2011. CNS stimulants experienced the largest change in involvement with a 292 percent increase. The rate of visits involving anti-anxiety and insomnia medications increased 124 percent. Other drug groups experiencing lower increases included respiratory medications (76 percent), antipsychotics (71 percent), muscle relaxants (71 percent), cardiovascular medications (63 percent), and anticonvulsants (51 percent). An exception to the general upward trend occurred for visits involving antidepressants, where involvement remained stable from 2004 to 2011.

In respect to shorter term trends between 2009 and 2011, overall involvement of pharmaceuticals increased by about 13 percent. Only two drug groups showed significant increases from 2009 to 2011: visits involving anti-anxiety and insomnia medications increased 14 percent overall (although no single drug had a significant increase), and visits involving CNS stimulants increased 78 percent.

Age

Figure 3 depicts the rates of ED visits per 100,000 population for the major pharmaceutical drugs among patients aged 12 to 17, aged 18 to 20, and aged 21 to 24 in 2011. Rates of visits for narcotic pain relievers and anti-anxiety and insomnia medications rose for each successively older age group. The rate of visits involving CNS stimulants for those aged 12 to 17 was similar to that for those aged 18 to 20 but lower than the rate for those aged 21 to 24. Visits involving antipsychotics were less common among patients aged 12 to 17 than among patients in older age groups, but there was no difference between the two older age groups.

Visits Involving Alcohol

Involvement of alcohol is documented for all ED visits that also involve pharmaceuticals or illicit drugs. Also, because alcohol is considered an illicit drug for minors, visits involving “alcohol only” are included in DAWN for those aged 20 or younger. For the population aged 20 or younger, the rate of ED visits involving alcohol (with or without other drugs) is 215.8 visits

per 100,000 population. The majority of those visits involved alcohol only (134.6 visits per 100,000 population). The rate of visits involving alcohol and other drugs was 238.9 visits per 100,000 population for patients aged 21 or older and 81.3 visits per 100,000 population for patients younger than 21. There have been no long- or short-term changes in the rate of visits involving drugs in combination with alcohol, or in visits for alcohol only (for those aged 20 or younger).

Visits Involving Accidental Ingestion of Drugs

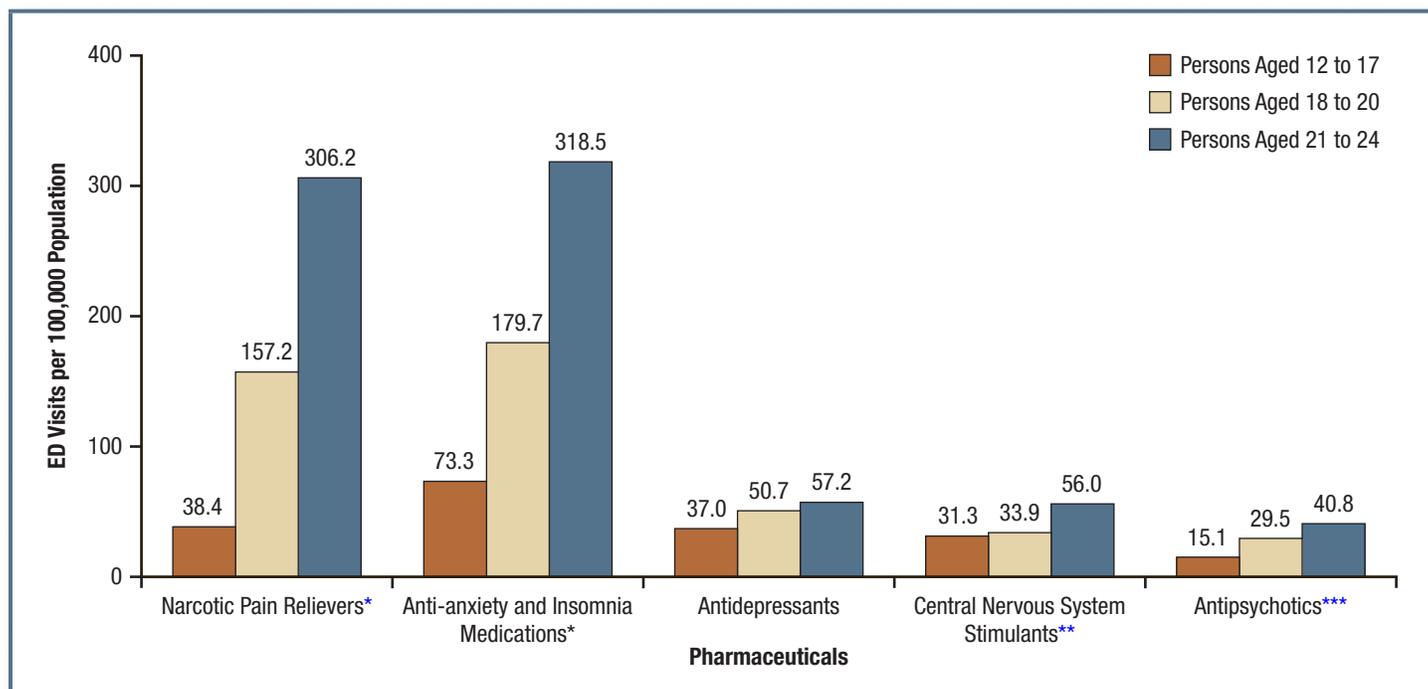
ED visits involving accidental ingestion of drugs are most common among children aged 5 or younger, for whom the rate was 317.8 visits per 100,000 population in 2011. In the long term, this represents a 49 percent increase over visits occurring in 2004 (213.9 ED visits per 100,000 population). Involvement of narcotic pain relievers and anti-anxiety and insomnia medications increased from 2004 to 2011 (data not shown). No significant increases occurred from 2009 to 2011.

Visits Involving Adverse Reactions to Drugs

ED visits involving adverse reactions to pharmaceuticals taken as prescribed or indicated increased 84 percent between 2005 and 2011, from 1,250,377 visits in 2005 to 2,301,059 visits in 2011 (Figure 1).⁵ The rate for adverse reactions ranged from 423.1 visits per 100,000 population in 2005 to 738.5 visits in 2011—a 75 percent increase. There have been no short-term increases in the rate, however, since 2009.

In 2011, the highest rates of drug-related adverse reactions were found among patients aged 65 or older, with 1,525.8 visits per 100,000 population (data not shown). Cardiovascular medications are often involved in adverse reactions for patients aged 65 or older (273.1 visits per 100,000 population). Other common drugs for older adults were anticoagulants (215.9 visits per 100,000 population aged 65 or older), drugs to treat infections (225.5 visits), narcotic pain relievers (135.8 visits), drugs to treat diabetes (128.9 visits), and cancer

Figure 3. Rates of Emergency Department (ED) Visits Involving Misuse or Abuse of Pharmaceuticals among Patients Aged 12 to 24 per 100,000 Population, by Age Group: 2011



* All differences between age groups were statistically significant at the .05 level.

** The difference between patients aged 12 to 17 and those aged 21 to 24 was statistically significant at the .05 level.

*** The differences between patients age 12 to 17 and the two older age groups were statistically significant at the .05 level.

Source: 2011 SAMHSA Drug Abuse Warning Network (DAWN).

drugs (128.8 visits). Visits involving anticoagulants, narcotic pain relievers, and diabetes drugs decreased (ranging from 19 to 38 percent decreases) from 2009 to 2011.

Discussion

A central finding of the 2011 DAWN is that the involvement of certain commonly abused pharmaceuticals in ED visits associated with drug misuse or abuse did not change from 2009 to 2011. There were no significant increases in the rates of visits involving narcotic pain relievers from 2009 to 2011. Visits involving anti-anxiety or insomnia medications increased a small amount in general, but no specific drugs in this category showed increases. Additionally, no increases occurred from 2009 to 2011 for ED visits involving adverse reactions to pharmaceuticals overall. Pharmaceuticals continue to be involved at a higher rate than illicit drugs, and further efforts to educate the public and medical communities are still needed to emphasize the difference between appropriate therapeutic use and drug misuse or abuse. 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*.⁷

A second critical finding of DAWN 2011 is that there may be an increase in the involvement of illicit drugs. After 5 years of relative stability, an upward trend was observed between 2009 and 2011. Visits involving marijuana, illicit stimulants, and synthetic cannabinoids increased between 2009 and 2011. Involvement of legal stimulants (e.g., CNS stimulants used to treat attention deficit/hyperactivity disorder) also rose over this period. These findings suggest the need to renew public health messaging and deterrent activities targeted at illicit drugs generally and illicit stimulants specifically.

The DAWN finding about drug involvement by age serves primarily to remind the public health community of the critical juncture in drug taking behaviors that occurs during the adolescent and young

adult years. Although involvement of all illicit drugs rose between the 12 to 17 and 18 to 20 age groups, interventions focused on marijuana and other illicit drugs (e.g., synthetic cannabinoids) are particularly important for these age groups. Interventions for 18 to 20 and 21 to 24 age groups should focus on heroin, cocaine, and illicit stimulants because the involvement of these drugs in ED visits increased with increasing age. Alcohol in combination with drugs persists as a serious concern for all three age groups. It may be beneficial to address misuse or abuse of anti-anxiety and insomnia medications, narcotic pain relievers, and antipsychotics as part of substance abuse prevention efforts targeted at adolescents. The delayed increase in involvement of CNS stimulants suggests that messaging targeted to the older group of 21 to 24 year olds may be needed.

End Notes

1. 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.
2. 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.
3. DAWN also collects information on ED visits to obtain detoxification or treatment services (0.25 million visits) and drug-related suicide attempts (0.23 million visits).
4. 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.
5. DAWN data for ED visits involving adverse reactions in 2004 are not analyzed or reported because of low statistical precision.
6. Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality. (December 4, 2012). *The DAWN Report: Drug-related emergency department visits involving synthetic cannabinoids*. Rockville, MD.
7. Centers for Disease Control and Prevention. (2011). *Policy impact: Prescription painkiller overdoses*. Retrieved from <http://www.cdc.gov/homeandrecreationalafety/rxbrief/>

Suggested Citation

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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 2012 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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