Drug Abuse Warning Network, 2009: National Estimates of Drug-Related Emergency Department Visits

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Substance Abuse and Mental Health Services Administration
Center for Behavioral Health Statistics and Quality

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ORIGINATING OFFICE

Center for Behavioral Health Statistics and Quality
Substance Abuse and Mental Health Services Administration
1 Choke Cherry Road, Rockville, MD 20857

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HIGHLIGHTS

This publication presents national estimates of drug-related visits to hospital emergency departments (EDs) for the calendar year 2009, based on data from the Drug Abuse Warning Network (DAWN). Also presented are comparisons of 2009 estimates with those for 2004, 2007, and 2008. DAWN is a public health surveillance system that monitors drug-related ED visits for the Nation and for selected metropolitan areas. The Substance Abuse and Mental Health Services Administration (SAMHSA), U.S. Department of Health and Human Services (HHS), is the agency responsible for DAWN. SAMHSA is required to collect data on drug-related ED visits under section 505 of the Public Health Service Act.

DAWN relies on a nationally representative sample of general, non-Federal hospitals operating 24-hour EDs, with oversampling of hospitals in selected metropolitan areas. In each participating hospital, ED medical records are reviewed retrospectively to find the ED visits that involved recent drug use. All types of drugs—illegal drugs, prescription drugs, over-the-counter pharmaceuticals (e.g., dietary supplements, cough medicine), and substances inhaled for their psychoactive effects—are included. Alcohol is considered an illicit drug when consumed by patients aged 20 or younger. For patients aged 21 or older, though, alcohol is reported only when it is used in conjunction with other drugs.

Between 2004 and 2009, large increases in the involvement of non-illicit drugs (prescription drugs, over-the-counter medications, and supplements [e.g., herbal remedies]) have been observed in all types of drug-related ED visits (misuse/abuse, suicide attempts, adverse reactions, and accidental ingestions). It is likely that there multiple causes contributing to these increases. In respect to adverse reactions, some portion may be associated with the greater number of prescriptions being written and more people taking prescription drugs as part of their medical care. People of all ages are increasingly being prescribed multiple drugs simultaneously, which, in turn, has increased the possibility of unintended interactions. Polypharmacy is particularly common among older populations who are placed on long-term medication for chronic conditions, and the number of older persons in the nation is growing. In respect to misuse and abuse, these same trends have led to prescription drugs being more accessible and more easily able to be diverted. It is beyond the scope of this report to explore the causes behind the growing numbers of ED visits involving pharmaceuticals, and further analysis is needed.

All Drug-Related ED Visits

In 2009, slightly over 120 million visits were made to EDs in general-purpose hospitals in the United States, and DAWN estimates that at least 4.5 million of these visits were drug related. Drug-related ED visits have increased by over 80 percent since 2004. This increase primarily reflects greater numbers of medical emergencies associated with adverse reactions, accidental drug ingestions, and misuse or abuse of prescription drugs and over-the-counter medications.

Overall Drug Misuse or Abuse

In 2009, DAWN estimates that about 2.1 million ED visits resulted from medical emergencies involving drug misuse or abuse, the equivalent of 674.4 ED visits per year per 100,000 population. For those aged 20 or younger, the rate is 473.3 visits; for those aged 21 or older, the rate is 754.8 visits.

Of the 2.1 million visits associated with drug misuse or abuse in 2009,

- 35.3 percent involved pharmaceuticals alone,
- 23.0 percent involved illicit drugs alone,
- 10.2 percent involved illicit drugs plus alcohol,
- 11.0 percent involved pharmaceuticals plus alcohol,
- 10.0 percent involved pharmaceuticals plus illicit drugs,
- 6.7 percent involved alcohol alone in patients aged 20 or younger, and
- 3.9 percent involved pharmaceuticals and illicit drugs plus alcohol.

Understanding that a visit may appear in more than one group, DAWN found that out of all drug misuse or abuse ED visits:

- 1,079,683 ED visits, or 52.1 percent, involved pharmaceuticals;
- 973,591 ED visits, or 47.0 percent, involved illicit drugs; and
- 658,263 ED visits, or 31.8 percent, involved alcohol.

Although the overall number of ED visits attributable to drug misuse or abuse was stable from 2004 to 2009, increases were seen in ED visits involving nonmedical use of pharmaceuticals with no other drug involvement (117% increase), pharmaceuticals with illicit drugs (97%), pharmaceuticals with alcohol (63%), and pharmaceuticals combined with both illicit drugs and alcohol (76%).

Illicit Drugs

For 2009, DAWN estimates that 973,591 ED visits involved an illicit drug. That is, 47.0 percent of all the drug misuse or abuse ED visits during the year involved one or more illicit drugs taken alone or in combination with pharmaceuticals, alcohol, or both; specifically:

- cocaine was involved in 422,896 visits, or 43.4 percent;
- marijuana was involved in 376,467 visits, or 38.7 percent;
- alcohol was involved in 291,553 visits, or 29.9 percent;
- heroin was involved in 213,118 visits, or 21.9 percent;
- stimulants, including amphetamines and methamphetamine, were involved in 93,562 visits, or 9.6 percent; and
- other illicit drugs—such as PCP, MDMA (Ecstasy), and hallucinogens—were each involved in less than 4 percent.

For each 100,000 persons in the U.S. population, over the course of 2009 there were over 300 ED visits involving illicit drugs. Just under 140 ED visits per 100,000 population resulted from medical emergencies involving cocaine. This was followed by marijuana (122.6 ED visits per 100,000 population), heroin (69.4), stimulants (30.5), amphetamines (12.2), and PCP (12.0). Lower-incidence drugs had rates below eight visits per 100,000 population. The rates for visits involving cocaine, heroin, marijuana, and stimulants were consistently higher for males than for females. Looking across age categories, the rate of cocaine involvement was highest for patients aged 35 to 44 (278.8 visits per 100,000 population), stimulants were highest for those aged 25 to 29 (83.3), heroin was highest for those aged 21 to 24 (203.2), and marijuana was highest for those aged 18 to 20 (484.8). A little over 40 percent of the patients had some type of follow-up care (i.e., referral to detoxification services, admission to the hospital, or transfer to another facility); most other patients were treated and released to home.

The level of ED visits involving illicit drugs from 2004 through 2009 was stable. However, some changes were evident at the drug level. There was a 123 percent increase in the number of visits involving MDMA and a 109 percent increase in the use of miscellaneous hallucinogens.

Drugs and Alcohol Taken Together

In 2009, over half a million ED visits, or 25.1 percent of all drug misuse/abuse ED visits, involved drugs combined with alcohol. The rate of alcohol-related ED visits per 100,000 population for males (211.1) was higher than that for females (128.4). The highest level was seen for patients aged 25 to 29 (314.4). Almost half (48.0%) of patients received some sort of follow-up care: 28.7 percent were admitted to the hospital, 12.6 percent were transferred to another facility, and 6.7 percent were referred to detox. The remaining patients were treated and released to home (44.1%) or had other outcomes (7.9%).

Illicit drugs were involved in over half (56.1%) of ED visits involving alcohol and other drugs, with cocaine or marijuana representing the greatest proportion of such visits (29.4% and 24.1%, respectively). One or more pharmaceuticals were also involved in over half (59.3%) of these visits. Pain relievers were observed in 23.8 percent of visits, with narcotic pain relievers accounting for over half of that (14.5%). Drugs for insomnia and anxiety were involved in 24.7 percent of visits, with the largest part of that being benzodiazepines (anti-anxiety drugs; 21.0%). Psychotherapeutic agents (antidepressants and antipsychotics) were involved in less than 9 percent of such visits.

Between 2004 and 2009, involvement of alcohol in drug-related medical emergencies remained stable.

Underage Drinking

In 2009, there were over 199,429 medical emergencies involving alcohol for patients aged 20 or younger. That represents almost half (48.0%) of all drug abuse/misuse ED visits made by patients aged 20 or younger. The rate of medical emergencies involving the abuse of alcohol by youths was

310.8 visits per 100,000 population aged 12 to 17 and 914.7 visits per 100,000 population aged 18 to 20, almost a threefold difference. The pattern is similar when looking at ED visits for either alcohol alone or alcohol used in combination with other drugs. Between 2004 and 2009, levels of ED visits involving underage drinking remained constant for both 12- to 17-year-olds and 18- to 20-year-olds.

Nonmedical Use of Pharmaceuticals

Representing about a quarter of all drug-related ED visits and over half of ED visits for drug abuse or misuse, an estimated 1,079,683 ED visits in 2009 involved the nonmedical use of prescription drugs, over-the-counter medicines, or other types of pharmaceuticals. Over half (53.6%) of ED visits resulting from nonmedical use of pharmaceuticals involved multiple drugs, and 17.8 percent involved alcohol.

Visits for nonmedical use of pharmaceuticals did not differ between males and females (349.2 and 354.0 visits per 100,000 population, respectively). On the other hand, notable differences were seen between age categories: rates for patients aged 18 to 34 were over 500 visits per 100,000 population, with lower levels observed for younger and older patients.

Almost 40 percent (38.7%) of patients misusing or abusing pharmaceuticals received some form of follow-up care, including referral to detox/treatment (2.6%), admission to the hospital (26.5%), or transfer to another facility (9.7%). Of the remaining patients, most were treated and released to home (54.2%) or had other outcomes. This distribution of visit dispositions is similar to that found for ED visits involving illicit drugs.

Pain relievers were the most common type of drugs reported in the nonmedical use category of ED visits (47.8%). Among specific types of pain relievers, higher levels were seen for the narcotic pain relievers oxycodone, hydrocodone, and methadone (13.7%, 8.0%, and 5.8%, respectively). Drugs used to treat anxiety and insomnia were also seen frequently (33.6%) in visits related to nonmedical use of pharmaceuticals. Benzodiazepines were involved in 29.0 percent of such ED visits, with alprazolam (e.g., Xanax®), indicated in 10.4 percent of such visits.

Medical emergencies related to the nonmedical use of pharmaceuticals increased 101 percent from 2004 to 2009, rising from about half a million visits to over one million visits. Contributing to this rise are significant long-term increases in the number of visits involving narcotic pain relievers that increased 137 percent over the 2004 level of 144,644 visits. Specific narcotic drugs that more than doubled their involvement in ED visits between 2004 and 2009 were fentanyl, hydrocodone, hydromorphone, morphine, and oxycodone. Drugs for anxiety and insomnia also saw large increases (105%). As noted earlier, there are a number of factors that may be contributing to these increases.

Drug-Related Suicide Attempts

DAWN estimates that there were almost 200,000 medical emergencies resulting in ED visits for drug-related suicide attempts in 2009. Almost all (94.2%) of these ED visits involved a prescription drug or over-the-counter medication; two thirds (65.1%) involved multiple drugs; about a third (31.2%) involved alcohol; and about a fifth (17.9%) involved illicit drugs.

The rate of drug-related suicide attempt visits for females (77.4 visits per 100,000 population) was higher than that for males (51.5 per 100,000). With regard to age, rates peaked at 132.1 visits per 100,000 population for those aged 18 to 20.

Following the ED visit, 72.7 percent of patients who attempted suicide received some form of follow-up care. Almost half (47.0%) were admitted for inpatient hospital care. A fifth (19.1%) were admitted to intensive or critical care units (ICU), and about half that number were admitted to psychiatric units. A quarter (25.4%) of patients were transferred to another health care facility, and 2.8 percent were discharged with a referral to detox or substance abuse treatment services. The remaining patients (17.5%) were treated and released to home or had other dispositions.

At 38.1 percent, pain relievers were the most commonly involved type of drug in drug-related suicide attempts. Benzodiazepines followed pain relievers at 28.7 percent, with alprazolam and clonazepam (e.g., Klonopin®) accounting for 11.7 percent and 8.1 percent of these visits, respectively. At 26.4 percent, psychotherapeutic drugs occurred at a level similar to benzodiazepines. Illicit drugs were involved in 17.9 percent of visits.

The number of drug-related suicide attempts has remained stable from 2004 to 2009. However, a significant rise was observed in the involvement of two pain relievers—hydrocodone and oxycodone—and three anti-anxiety drugs—alprazolam, clonazepam, and zolpidem (e.g., Ambien®).

Seeking Detox Services

The category of visits referred to as “seeking detox” includes nonemergency requests for admission for detoxification and visits to obtain medical clearance before entry to a detox program as well as acute emergencies in which an individual who is experiencing withdrawal symptoms is seeking detox. DAWN estimates that there were 205,407 drug-related ED visits for patients seeking detox or substance abuse treatment services during 2009. Visits for almost three quarters (69.2%) of patients seeking detox involved multiple drugs, and 34.8 percent involved alcohol. Males were more likely than females to seek detox services (62.9 and 37.1 visits per 100,000 population, respectively). Rates of visits for patients seeking detox peaked at 188.8 visits per 100,000 population for those aged 21 to 24. Over 60 percent (64.6%) of ED patients seeking detox obtained some form of follow-up: 36.6 percent were admitted to the hospital, 20.9 percent were referred to detox or treatment services, and 7.1 percent were transferred to another facility. The remaining patients were treated and released to home (29.3%) or had other outcomes.

As to the types of drugs involved, cocaine was observed in 29.2 percent of visits, heroin in 28.4 percent, marijuana in 18.3 percent, and stimulants in 5.4 percent. Among pharmaceuticals, narcotic pain relievers were observed in 38.2 percent of visits, including oxycodone at 22.2 percent. Benzodiazepines were observed in 23.7 percent of visits, with alprazolam at 13.5 percent.

The number of patients seeking detox services through the ED was relatively stable from 2004 through 2008. With one noteworthy exception, the specific types of drugs involved in seeking detox have also remained stable. The exception is the anti-anxiety drug clonazepam (e.g., Klonopin) which has seen a 461 percent increase in involvement since 2004, peaking at over 8,000 visits in 2009.

Adverse Reactions to Pharmaceuticals

Adverse reactions among ambulatory populations are a growing public health concern in the United States as people are being prescribed more drugs and the number of older persons who typically take more medications has increased. In 2009, DAWN estimates that 2,287,273 ED visits involved adverse reactions to prescription medicines, over-the-counter drugs, or other therapeutic substances used as prescribed or indicated. This represents about half of all drug-related ED visits.

When population size and sampling error are taken into account, women had notably more visits than men (895.6 and 589.9 visits per 100,000 population, respectively). The rate of ED visits for adverse reactions peaked for patients aged 65 and older at 1,856.8 visits per 100,000 population. Over three quarters of patients were treated and released to home. About a fifth of patients were admitted to the hospital, and the remainder had other outcomes.

The drugs most commonly involved in adverse reactions were anti-infectives (e.g., penicillins) at 20.9 percent of visits. As a general category, pain relievers were involved in 16.9 percent of visits, with narcotic pain relievers accounting for 9.5 percent. Cardiovascular agents appeared in 10.8 percent of visits. Coagulation modifiers were involved in 9.5 percent, with coumarins accounting for 8.2 percent. Metabolic agents, such as insulin and lipid-lowering drugs, were found in 7.6 percent of visits.

ED visits resulting from adverse reactions to pharmaceuticals increased 83 percent in the period from 2005 to 2009, rising from about 1.3 million visits to over 2.3 million visits. Contributing heavily to the increase were anti-infectives (170,725 more visits in 2009 than in 2005), pain relievers (163,894 more), and cardiovascular agents (131,737 more).

Accidental Ingestion of Drugs

DAWN chose to focus in this report on the types of drugs most commonly involved in ED visits for accidental ingestions by children aged 5 and under. Accidental ingestion of drugs by children is a preventable health risk. Nonetheless, poison control centers find that over half of human exposure calls involve children aged 5 and under, and the majority of substances involved in pediatric

exposures are drugs. The danger of accidental ingestion of drugs by children is even more apparent in the 2009 DAWN findings, where two thirds (65.9%) of the 95,098 accidental ingestion ED visits involved children aged 5 and under. DAWN found the rate of ED visits for accidental ingestion by children aged 5 and under to be 20 times higher than for adults: 246.0 ED visits per 100,000 children aged 0 to 5 compared with 12.1 for adults aged 21 and older.

Drugs recognized as being particularly dangerous when accidentally ingested by children include calcium channel blockers ("heart pills"), camphor-containing salves, narcotic pain medications, salicylates (e.g., aspirin), antidepressants, antidiabetic medications, blood pressure medicines (e.g., clonidine), eye drops, and nasal sprays. This is consistent with DAWN findings, wherein cardiovascular agents were one of the more commonly involved drugs in 14.5 percent of visits. Of these, beta blockers, calcium channel blocking agents, and angiotensin-converting enzyme (ACE) inhibitors accounted for 3.8, 2.6, and 2.6 percent of visits, respectively. Among pain relievers, acetaminophen products were involved in 13.3 percent of accidental ingestion visits, narcotic pain relievers in 7.6 percent, nonsteroidal anti-inflammatory agents (e.g., ibuprofen and naproxen products) in 6.2 percent, and aspirin products in 1.0 percent. Anxiolytics, sedatives, and hypnotics (drugs to treat insomnia and anxiety) were found in 11.3 percent of visits, with just over half of those being some type of benzodiazepine (5.9%). Clustered with each having about 8 to 9 percent of visits were topical agents (8.9%); drugs to treat respiratory conditions (8.5%); and psychotherapeutic agents (8.3%), including antidepressants (5.8%).

Medical emergencies related to accidental ingestions by patients aged 5 and under were stable from 2004 to 2009, though increases were observed for particular drug groups. Specifically, involvement of narcotic pain relievers increased 198 percent since 2004, with a 77 percent increase between 2008 and 2009, leading to just under 5,000 visits in 2009. Drugs to treat insomnia and anxiety increased 83 percent in the period from 2004 to 2009, rising to just over 7,000 visits in 2009. DAWN's findings echo reports by the American Association of Poison Control Centers (AAPCC) concerning the rise in involvement of pain relievers and sedatives. AAPCC 2009 data found that "all analgesic exposures including opioids and sedatives are increasing year after year." Similar trends were found by the Centers for Disease Control and Prevention (CDC) when tracking opiate-related poisoning deaths.

1. INTRODUCTION

This publication presents estimates of drug-related emergency department (ED) visits from the Drug Abuse Warning Network (DAWN) for 2009, with comparison of estimates for 2004, 2007, and 2008. DAWN is a public health surveillance system that monitors patients' medical records of ED visits for the Nation to identify those visits that are related to drug use, abuse, and misuse. The Center for Behavioral Health Statistics and Quality (CBHSQ) of the Substance Abuse and Mental Health Services Administration (SAMHSA), U.S. Department of Health and Human Services (HHS), has been responsible for DAWN operations since 1992.

This introduction provides a brief description of the major features of DAWN and the statistics presented in this report. Findings are organized in eight sections, with each section focusing on a specific type of ED visit. Appendix B: Glossary of DAWN Terms, 2009 Update and Appendix C: DAWN Methodology, 2009 provide additional detail on the 2009 DAWN.

1.1 Major Features of DAWN

1.1.1 What Is a DAWN Case?

A DAWN case is any ED visit involving recent drug use that is implicated in the ED visit. The reason a patient used a drug is not part of the criteria for considering a visit to be drug related. Therefore, DAWN includes ED visits resulting from accidental ingestions and adverse reactions as well as explicit drug abuse.

1.1.2 What Drugs Are Included in DAWN?

DAWN captures drugs that are explicitly named in the medical record as being involved as a reason for the ED visit. The relationship between the ED visit and the drug use need not be causal. That is, an implicated drug may or may not have directly caused the condition generating the ED visit; the ER staff simply named it as being involved. Conversely, DAWN does not report medications or pharmaceuticals mentioned in the ED medical records as having been taken by the patient but that are unrelated to the ED visit.

Within those guidelines, DAWN collects data on all types of drugs, including

- illegal drugs, e.g., heroin, cocaine, marijuana, MDMA (Ecstasy);
- substances that have psychoactive effects when inhaled;
- narcotic pain relievers, e.g., OxyContin®, Vicodin®;
- prescription drugs for anxiety, depression, sleeplessness, and other behavior disorders, e.g., Xanax, Ritalin®, Prozac®;
- prescription drugs used in the treatment of other medical conditions, e.g., antibiotics, anti-coagulants, insulin, and chemotherapy drugs;
- anesthetic gases;

- over-the-counter medications, e.g., acetaminophen, ibuprofen, and multi-ingredient cough and cold remedies;
- dietary supplements, e.g., vitamins, herbal remedies, and nutritional products;
- alcohol when used in combination with other drugs; and
- alcohol alone, in patients aged 20 or younger.

1.1.3 What Is Covered in This Publication?

This report provides detailed information on ED visits involving drug use, misuse, or abuse for the years 2004 through 2009. The types of ED visits (referred to as *analytic groups*) highlighted in this publication are listed in Table 1. Because a visit may involve multiple drugs, a single visit may appear in multiple analytic groups.

1.2 Hospital Participation in 2009

DAWN relies on a nationally representative sample of hospitals with oversampling of hospitals in selected metropolitan areas. The universe of hospitals eligible for DAWN includes non-Federal, short-stay, general medical and surgical facilities in the United States that operate 24-hour EDs. DAWN excludes specialty hospitals (e.g., pediatric hospitals), long-term care facilities, and Federal facilities (e.g., Veterans Health Administration hospitals). The American Hospital Association Annual Survey Database (ASDB) was used to identify the original frame members. Subsequent ASDB surveys are used annually to identify "births" of new hospitals that open and "deaths" of hospitals that close or merge with other hospitals.

For 2009, data submitted from 242 hospitals were used for estimation. The overall weighted response rate was 31.8 percent. Among these participating hospitals, about 9.5 million charts out of a universe of 12.0 million eligible charts were reviewed, and 380,125 drug-related ED visits were identified.[1] With about 80 percent of charts reviewed, the average number of drug-related cases per hospital was 1,570 visits, with a median of 1,178 visits and a range of 20 to 6,636 visits. Twelve metropolitan areas had sufficient participation to support separate estimates.[2] The metropolitan area response rates ranged from 28.5 percent in the Houston Metropolitan Statistical Area (MSA) to 92.1 percent in the Seattle MSA.

1.3 Estimates of ED Visits

This publication reports nationally representative estimates of drug-related ED visits for the United States. Estimates are calculated by applying weights and adjustments to the data provided by the sampled hospitals participating in DAWN. The primary sampling weights reflect the probability of hospital selection, and separate adjustment factors are included to account for sampling of ED

[1] In larger hospitals, DAWN draws a systematic sample of charts to review.
[2] This report does not include estimates made for metropolitan areas. Detailed tables with estimates for metropolitan areas are available on the DAWN Web site (http://dawninfo.samhsa.gov).

Table 1. DAWN analytic groups

Analytic group	Description
Drug misuse or abuse	—
Overall drug misuse or abuse	This analytic category includes visits that involve all forms of drug abuse or misuse, as defined by DAWN. This category is the combination of visits from the following four analytic groups: illicit drug visits, nonmedical use of pharmaceuticals, alcohol-related visits, and underage drinking. A visit may appear in more than one of the subgroups listed below, but it will appear only once in this overall group. Suicide attempts and seeking detox visits will be included in this category if illicit drugs were involved.
Illicit drugs	This analytic category includes visits that involve the use of drugs that have limited or no therapeutic value and are generally illegal if taken without a prescription. These substances include cocaine, heroin, marijuana, methamphetamines, MDMA (Ecstasy), GHB (4-hydroxybutanoic acid), flunitrazepam (Rohypnol), ketamine, LSD, PCP, and hallucinogens. Visits involving the inhalation of substances for their psychoactive properties (e.g., sniffing model airplane glue) are included.
Drugs and alcohol taken together	This analytic category includes visits involving alcohol used in combination with other drugs. These visits are analyzed as a group to better understand the interactive effects of alcohol and drugs on morbidity.
Underage drinking	This analytic category includes ED visits that involve alcohol use (alone or with other drugs) for patients under the age of 21. Underage drinking is an important barometer of adolescent drinking patterns and a predictor of more serious substance abuse problems in young adults.
Nonmedical use of pharmaceuticals	This analytic category includes visits that involve nonmedical use of pharmaceuticals: patients who took a higher than prescribed or recommended dose of their own medication, patients who took a pharmaceutical prescribed for another person, malicious poisoning of the patient by another individual, and documented substance abuse involving pharmaceuticals.
Drug-related suicide attempts	This analytic category includes ED visits that involve drug-related suicide attempts. It includes visits for drug overdoses and for suicide attempts by other means (e.g., using a firearm) if drugs were involved or related to the suicide attempt. Inclusion in this analytic category has no restrictions on the type of drug used.
Seeking detox services	This analytic category includes nonemergency requests for admission for detoxification services and visits to obtain medical clearance before entry into a detox program as well as acute emergencies where an individual is experiencing withdrawal symptoms and is seeking detox. These estimates do not include patients who seek or enter the hospital's detox unit through other avenues.

Table 1. DAWN analytic groups (continued)

Analytic group	Description
Other	—
Adverse reactions to pharmaceuticals	This analytic category includes ED visits in which an adverse health consequence (e.g., side effects or an allergic reaction) resulted when taking prescription drugs, over-the-counter medications, or dietary supplements as prescribed or recommended.
Accidental ingestion of drugs	This analytic category includes ED visits in which an individual accidentally or unknowingly used a prescription drug, over-the-counter medication, or dietary supplement. Drug-related accidental ingestions typically involve patients under the age of 6.

visits, nonresponse, data quality, and the known total of ED visits delivered by the universe of eligible hospitals, as reported by the most current ASDB survey.

Many of the tables in this report provide estimates of visits, by drug. DAWN is able to identify more than 3,300 individual drugs (which map to more than 19,000 individual brands and street names).[3] The more commonly involved drugs and drug categories were selected for inclusion in the drug detail tables appearing in this report. Because (a) a single ED visit may involve multiple drugs, or (b) the same drug may be reported both under its specific drug name and under its drug category, the sum of ED visits from different rows in the drug detail tables will be greater than the total number of visits. For the same reason, percentages will add to more than 100.

1.4 Rates of ED Visits per 100,000 Population

Standardized measures are helpful when comparing levels of drug-related ED visits for different age and gender groups. This publication reports rates of ED visits per 100,000 population by age and gender based on population data obtained from the U.S. Census Bureau. Tables in this publication do not include population-based rates for race/ethnicity categories because race/ethnicity information is often missing from ED records; a dash (—) is displayed instead.

1.5 Sampling Error

Because DAWN relies on a sample of hospitals, each estimate produced from the DAWN ED data is subject to *sampling variability,* the variation in estimates that would be observed naturally if different samples were drawn from the same population using the same procedures. One measure

[3] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2010 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

of sampling variability of an estimate used in this publication is the *relative standard error* (RSE). The precision of an estimate is inversely related to its RSE. That is, the greater the RSE, the lower the precision. A second measure of sampling error used in this publication is the *95 percent confidence interval* (CI). A 95 percent CI means that if repeated samples were drawn from the same population of hospitals using the same sampling and data collection procedures, the true population value would fall within the CI 95 percent of the time. A CI, which is expressed as a range of values, is useful because the interval reflects both the estimate and its particular margin of error. For example, in 2009, there were 2,070,439 ED visits associated with drug misuse or abuse with a CI of 1,779,183 to 2,361,695. The CI indicates with a high degree of confidence that the actual number was within this range.

1.6 Suppression

DAWN uses a set of criteria to determine whether estimates can be released to the public. Data may be suppressed to protect patient confidentiality or to ensure that published findings meet statistical standards of reliability for survey results. In all published materials, estimates are suppressed according to the following rules:

- *The RSE of the estimate is greater than 50 percent*. The RSE is a measure of the relative precision and is calculated by dividing the estimate's standard error by the estimate itself. When the RSE is greater than 50 percent, the lower bound of the 95 percent CI approaches or includes the value zero. A CI that includes zero means that the estimate is not statistically different from zero at this precision level.
- *The estimate is based on fewer than 30 ED visits.* Estimates based on a small number of cases are typically suppressed because the RSE is greater than 50 percent. Estimates that do meet RSE criteria for publication but are based on fewer than 30 ED visits (weighted or unweighted) are deemed too unreliable for publication. Such estimates are also suppressed to protect patient privacy.

Ratios (percentages or rates per 100,000 population) based on suppressed estimates are likewise suppressed. An asterisk (*) is displayed in the place of suppressed estimates and rates.

1.7 Comparisons Across Years

In this publication, between-year changes are assessed by comparing estimates for 2009 with those for 2004, 2007, and 2008.[4] This publication reports only those between-year changes that are statistically significant at the $p < 0.05$ level. The *p*-value is a measure of the probability (*p*) that the difference between two estimates could have occurred by chance, if the estimates being compared were really the same. The larger the *p*-value, the more likely the difference could have occurred by chance. For example, if the difference between two DAWN estimates has a *p*-value of

[4] Due to data limitations in 2004, long-term comparisons for ED visits resulting from adverse reactions are made between 2005 and the current year.

0.01, it means that there is a 1 percent probability that the difference observed could be due to chance alone.

The redesign of DAWN in 2003 altered most of DAWN's core features. Changes were made to the design of the hospital sample, the protocol for selecting charts to review, the eligibility criteria for being a DAWN case, and the data items submitted on these cases. These changes created a permanent disruption in trends. As a result, comparisons cannot be made between old DAWN (2003 and prior years) and the redesigned DAWN (2004 and forward).

1.8 Limitations of the Data

Readers are advised to consider the following limitations to the DAWN data when interpreting results:

- DAWN data collectors attempt to identify with a high degree of specificity the exact drugs involved in an ED visit, but extant medical records vary in specificity and detail. If extant medical records include only a general description of a drug (e.g., "benzodiazepines"), the drug is grouped in a general category (e.g., "benzodiazepines not otherwise specified").
- Many drug-related ED visits involve multiple drugs. In these instances, it may be difficult or impossible to determine whether a single drug is responsible for the visit or if the visit was the result of the interaction between the drugs.
- When multiple drugs are involved, it should not be assumed that they are all taken for the same reason; a patient may misuse one type of prescription medication while taking another medication as prescribed.
- While DAWN seeks to report only the drugs that are related to the ED visit, some unrelated drugs may be included if ED records fail to indicate that they were obtained through a legitimate prescription, were taken as prescribed or indicated, and were unrelated to the ED visit. For example, anecdotal evidence suggests that ED records may mention methadone but fail to indicate that the patient was enrolled in a methadone treatment program and that the methadone was unrelated to the medical emergency leading to the ED visit.
- DAWN does not produce rates (visits per 100,000 population) for race/ethnicity groups. Information on race and ethnicity is often poorly documented in extant ED records. In addition, some hospitals consider race/ethnicity to be private information and will not make it available to DAWN Reporters. About 15 percent of visits each year do not contain race/ethnicity information. These missing data result in the systematic understatement of visits by race/ethnicity category.
- Although DAWN documents whether a drug was positively confirmed by toxicology testing, DAWN does not require that drugs reported for the ED visit be confirmed by laboratory testing. Toxicology tests are not used consistently across EDs, and some toxicology tests are not specific enough to identify particular drugs. Furthermore, a positive toxicology test is not necessarily evidence of recent drug involvement in an ED visit if it is a current medication or a drug that persists in the system long after it was used. For this reason,

DAWN requires that the involvement of drugs be mentioned in the ED record, not just in the toxicology testing results, for the visit to be considered a DAWN case.

- Information on drug-related visits is based on a sample and is therefore subject to sampling variability. Standard error measurements are provided in many tables to reflect the sampling variability that occurs (a) by chance because only a sample rather than the entire universe is surveyed, and (b) due to nonresponse.
- As in any survey, a low response rate is of concern because it creates larger-than-expected sampling errors plus the opportunity for unpredictable biases. DAWN addresses these issues for the short term by always reporting standard errors based on the actual sample of respondents and for the long term by continuing its efforts to raise the hospital participation rate.

2. OVERALL DRUG MISUSE OR ABUSE

2.1 ED Visits Involving Overall Drug Misuse or Abuse, 2009

For 2009, DAWN estimates that there were over 4.5 million drug-related ED visits. Of these, over 2.1 million ED visits were associated with drug misuse or abuse (Table 2). That is the equivalent of 674.4 ED visits for each 100,000 persons in the Nation; for those aged 20 or younger, the rate is 473.3 visits; for those aged 21 or older, the rate is 754.8 visits.

Of the ED visits in 2009 that involved drug misuse or abuse, about two thirds (64.9%) were associated with a single drug type (illicit drugs, alcohol, or pharmaceuticals). Illicit drugs alone were involved in 23.0 percent of drug misuse or abuse visits, pharmaceuticals alone were involved in 35.3 percent, and alcohol with no other drug (minors only) was involved in 6.7 percent. The remaining visits (35.1%) involved some combination of illicit drugs, alcohol, and pharmaceuticals.

Table 2. ED visits involving drug misuse or abuse, by drug combinations, 2009

Drug combinations (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Total ED visits, drug misuse or abuse (2)	**2,070,439**	**100.0**	**7.2**	**1,779,183**	**2,361,695**
Illicit drugs only	475,605	23.0	12.1	362,370	588,839
Alcohol only (age < 21) (3)	138,614	6.7	14.6	98,936	178,291
Pharmaceuticals only	730,138	35.3	8.1	614,781	845,494
Combinations	—	—	—	—	—
Illicit drugs with alcohol (4)	211,542	10.2	9.7	171,127	251,956
Illicit drugs with pharmaceutical(s)	206,433	10.0	21.0	121,360	291,507
Alcohol with pharmaceutical(s)	228,096	11.0	7.8	193,238	262,955
Illicit drugs with alcohol and pharmaceuticals	80,011	3.9	12.6	60,250	99,772

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(3) ED patients aged 21 or older for whom alcohol was the only drug associated with their ED visits are not considered DAWN cases.

(4) When present with other drugs, alcohol is reportable for patients of all ages.

NOTE: CI = confidence interval. RSE = relative standard error. A dash (—) indicates a blank cell.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Understanding that visits may involve multiple drugs, DAWN found that:

- 1,079,683 ED visits, or 52.1 percent of drug misuse or abuse ED visits, involved pharmaceuticals;
- 973,591 ED visits, or 47.0 percent, involved illicit drugs; and
- 658,263 ED visits, or 31.8 percent, involved alcohol.

2.2 Trends in ED Visits Involving Drug Misuse or Abuse, 2004–2009

This section presents the trends in the estimates of ED visits involving drug misuse or abuse for the period 2004 through 2009 (Table 3). Differences between years are presented in terms of the percentage increase or decrease in visits in 2009 compared with the estimates for 2004 (long-term trends) and for 2007 and 2008 (short-term trends). Only statistically significant changes are discussed and displayed in the table.

Overall, the number of ED visits attributable to drug misuse or abuse was stable from 2004 to 2009. The small changes seen in the estimates each year are within the boundaries of expected sample variation. This stability is noteworthy in light of the 4.8 percent increase in the U.S. population and the 10.9 percent increase in ED visits over that period.

While the number of visits has been stable, the types of drugs involved have changed. Significant increases were seen in the number of visits involving pharmaceuticals. ED visits related to the use of pharmaceuticals with no other drug involvement rose substantially (117%), as did the use of pharmaceuticals with illicit drugs (97%), pharmaceuticals with alcohol (63%), and pharmaceuticals combined with both illicit drugs and alcohol (76%). The increases reflect over 390,000 more ED visits related to pharmaceuticals alone in 2009 compared with 2004, over 100,000 more ED visits related to pharmaceuticals and illicit drugs, and almost 90,000 more ED visits related to pharmaceuticals and alcohol. As noted earlier, there are a number of factors that may be contributing to these increases.

Table 3. Trends in ED visits involving drug misuse or abuse, by drug combinations, 2004–2009

Drug combinations (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Total ED visits, overall drug misuse or abuse (3)	**1,619,054**	**1,616,311**	**1,742,887**	**1,883,272**	**1,999,861**	**2,070,439**	—	—	—
Illicit drug(s) only	502,136	517,558	536,554	522,650	509,773	475,605	—	—	—
Alcohol only (age < 21) (4)	150,988	110,599	126,704	137,369	132,842	138,614	—	—	—
Pharmaceutical(s) only	336,987	444,309	486,276	582,187	664,654	730,138	117	25	10
Combinations	—	—	—	—	—	—	—	—	—
Illicit drug(s) with alcohol (5)	338,638	221,823	219,521	237,936	229,564	211,542	—	—	—
Illicit drug(s) with pharmaceutical(s)	105,017	127,245	142,535	143,783	168,541	206,433	97	—	—
Alcohol with pharmaceutical(s) (5)	139,716	140,275	171,743	189,444	208,985	228,096	63	—	—
Illicit drug(s) with alcohol and pharmaceutical(s) (5)	45,571	54,500	59,553	69,903	85,501	80,011	76	—	—

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) This column denotes statistically significant ($p < 0.05$) increases or decreases between estimates for the periods shown.

(3) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(4) ED patients aged 21 or older for whom alcohol was the only drug associated with their ED visits are not considered DAWN cases.

(5) When present with other drugs, alcohol is reportable for patients of all ages.

NOTE: A dash (—) indicates a blank cell.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

3. ILLICIT DRUGS

3.1 ED Visits Involving Illicit Drugs, 2009

This analytic category includes visits that involve the use of drugs that have limited or no therapeutic value and are generally illegal if taken without a prescription. These substances include cocaine, heroin, marijuana, methamphetamines, MDMA (Ecstasy), GHB (4 hydroxybutanoic acid), flunitrazepam (Rohypnol), ketamine, LSD, PCP, and hallucinogens. Visits involving the inhalation of substances for their psychoactive properties (e.g., sniffing model airplane glue) are also included.[5]

Of the approximately 2.1 million drug misuse or abuse ED visits that occurred during 2009, a total of 973,591, or just under half, involved illicit drugs. A majority (59.2%) of illicit drug ED visits involved multiple drugs (Table 4). Cocaine and marijuana were the most commonly involved drugs, with 422,896 ED visits (43.4%) and 376,467 ED visits (38.7%), respectively. Cocaine and marijuana were followed by heroin at 213,118 ED visits, or 21.9 percent, and then by stimulants at 93,562 visits, or 9.6 percent.[6]

Other illicit drugs involved in ED visits occurred at levels under 4 percent and included the following:

- PCP in 36,719 visits;
- MDMA (Ecstasy) in 22,816 visits;
- miscellaneous hallucinogens in 6,579 visits;
- inhalants in 6,137 visits;
- LSD in 4,028 visits;
- GHB in 1,758 visits; and
- ketamine in 529 visits.

On average, 29.9 percent of visits involving illicit drugs also involved alcohol.

For each 100,000 persons in the U.S. population, there were 317.1 ED visits in 2009 that involved illicit drugs (Table 5). The highest rates were found for cocaine involvement (137.7 ED visits per 100,000 population) and marijuana (122.6). These were followed by heroin (69.4) and stimulants (30.5) (Figure 1). Lower-incidence drugs had rates below eight visits per 100,000 population.

[5] Among illicit drugs for which there are legitimate medicinal uses (e.g., cocaine, anesthetic gases), DAWN Reporters are careful to distinguish abuse from adverse reactions.

[6] Heroin-related ED visits may be underestimated. When drugs related to an ED visit are determined through toxicology tests, heroin may be categorized as an "unspecified opiate" and not as heroin specifically. The number of drug misuse or abuse ED visits involving unspecified opiates is estimated at 91,740 visits, and over half of these (58,980 visits) were determined through toxicology testing. What portion of these toxicology results is attributable to heroin is unknown.

Table 4. ED visits involving illicit drugs, 2009

Drugs (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Total ED visits, illicit drugs (2,3)	**973,591**	**100.0**	**10.5**	**773,405**	**1,173,778**
Single drug	396,839	40.8	12.2	302,233	491,445
Multiple drugs	576,752	59.2	11.4	447,840	705,665
Alcohol (all ages)	291,553	29.9	9.3	238,468	344,639
Aged 20 or younger	40,471	4.2	11.2	31,578	49,364
Cocaine	422,896	43.4	14.6	301,836	543,956
Heroin	213,118	21.9	12.5	161,054	265,182
Marijuana	376,467	38.7	12.6	283,741	469,192
Stimulants	93,562	9.6	19.8	57,260	129,865
Amphetamines	37,430	3.8	20.9	22,088	52,771
Methamphetamine	64,117	6.6	24.5	33,349	94,885
MDMA (Ecstasy)	22,816	2.3	19.5	14,082	31,551
GHB	1,758	0.2	23.8	937	2,578
Flunitrazepam (Rohypnol)	800	0.1	34.2	264	1,337
Ketamine	529	0.1	40.3	112	947
LSD	4,028	0.4	20.9	2,375	5,681
PCP	36,719	3.8	35.6	11,124	62,314
Misc. hallucinogens	6,579	0.7	14.7	4,685	8,473
Inhalants	6,137	0.6	22.5	3,428	8,846
Combinations NTA	3,557	0.4	24.8	1,831	5,283

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(3) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both cocaine and marijuana will appear twice in this table). The sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.

NOTE: CI = confidence interval. NTA = not tabulated above. RSE = relative standard error. An asterisk (*) indicates that an estimate with an RSE greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Table 5. Rates of ED visits per 100,000 population involving illicit drugs, 2009

Drugs (1)	Rate of ED visits per 100,000 population (2)	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Total ED visits, illicit drugs (3)	**317.1**	**10.5**	**251.9**	**327.6**
Cocaine	137.7	14.6	98.3	152.4
Heroin	69.4	12.5	52.5	81.9
Marijuana	122.6	12.6	92.4	135.2
Stimulants	30.5	19.8	18.7	50.3
Amphetamines	12.2	20.9	7.2	33.1
Methamphetamine	20.9	24.5	10.9	45.4
MDMA (Ecstasy)	7.4	19.5	4.6	27.0
GHB	0.6	23.8	0.3	24.4
Flunitrazepam (Rohypnol)	0.3	34.2	0.1	34.4
Ketamine	0.2	40.3	0.0	40.4
LSD	1.3	20.9	0.8	22.3
PCP	12.0	35.6	3.6	47.5
Misc. hallucinogens	2.1	14.7	1.5	16.8
Inhalants	2.0	22.5	1.1	24.5
Combinations NTA	1.2	24.8	0.6	25.9

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

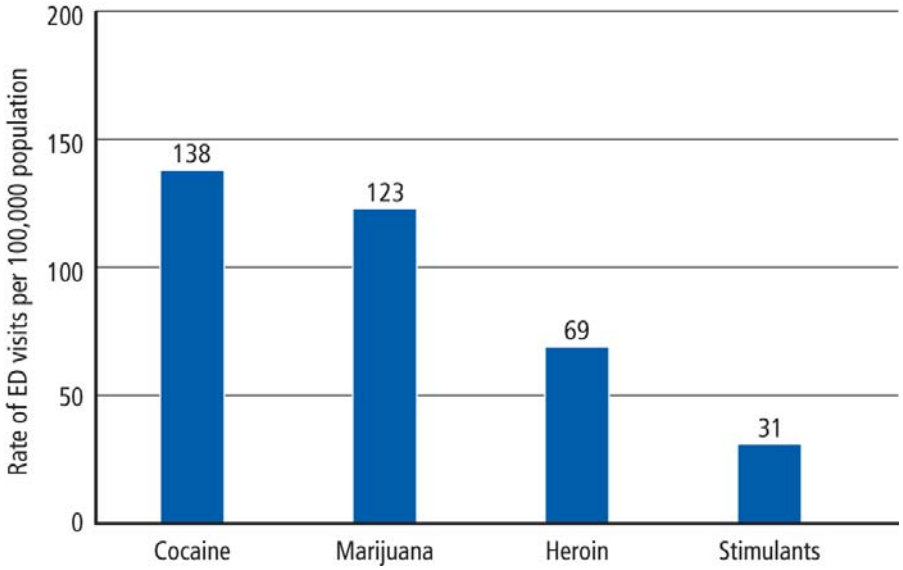
(2) All rates are ED visits per 100,000 population. Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(3) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both cocaine and marijuana will appear twice in this table). The sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.

NOTE: CI = confidence interval. NTA = not tabulated above. RSE = relative standard error. An asterisk (*) indicates that an estimate with an RSE greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Figure 1. Rates of ED visits per 100,000 population involving illicit drugs, 2009



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Table 6 presents estimates of the number of ED visits in 2009 involving illicit drugs, by sex, age, and race/ethnicity categories. To facilitate comparisons between demographic groups (e.g., compare males to females), Table 7 and Figure 2 present the rates of ED visits per 100,000 population. The rates for visits involving cocaine, heroin, marijuana, and stimulants were consistently higher for males than for females. The types of drugs most commonly observed varied notably by age: 18- to 20-year-olds had the highest rate of medical emergencies involving marijuana (484.8 per 100,000 population), 21- to 24-year-olds had the highest rates for heroin (203.2), 25- to 29-year-olds had the highest rates for stimulants (83.3), and 35- to 44-year-olds had the highest rates for cocaine (278.8).

Considering race/ethnicity, 50.1 percent of patients were White, 26.9 percent were Black, 13.1 percent were Hispanic, 1.2 percent were of other or multiple race/ethnic groups, and 8.6 percent were of unknown race/ethnicity. DAWN does not produce population-based rates for race/ethnicity categories because race/ethnicity information is often missing from ED records.

Overall, 42.3 percent of visits involving illicit drugs resulted in some form of follow-up, including admission to the hospital (24.8%), transfer to another health care facility (10.3%), or referral to a drug detox/dependency program (7.3%) (Table 8). Most other patients (47.8%) were treated and released to home.

Table 6. ED visits involving illicit drugs, by patient demographics, 2009

Patient demographics	All illicits	Cocaine	Heroin	Marijuana	Stimulants	MDMA (Ecstasy)	GHB	LSD	PCP
Total ED visits, illicit drugs (1,2,3)	**973,591**	**422,896**	**213,118**	**376,467**	**93,562**	**22,816**	**1,758**	**4,028**	**36,719**
Gender	—	—	—	—	—	—	—	—	—
Male	629,593	266,461	145,891	245,505	55,776	13,945	1,015	2,734	26,686
Female	343,580	156,357	67,179	130,672	37,782	8,871	740	1,294	10,032
Unknown	*	*	*	*	*	*	*	*	*
Age	—	—	—	—	—	—	—	—	—
0–5 years	1,433	*	*	526	*	*	*	*	*
6–11 years	1,533	*	*	*	*	*	*	*	*
12–17 years	55,306	5,294	1,749	45,088	3,708	4,336	*	812	671
18–20 years	97,582	18,722	15,225	64,050	6,999	6,697	*	1,429	*
21–24 years	126,666	34,293	34,955	61,961	13,075	5,274	428	540	6,458
25–29 years	136,331	50,323	31,449	59,516	18,048	3,134	451	*	5,919
30–34 years	111,394	49,734	26,832	36,862	13,901	1,775	437	*	7,378
35–44 years	206,724	115,805	48,166	57,266	21,987	1,055	269	429	6,218
45–54 years	181,326	115,310	40,267	38,466	11,635	523	76	*	3,753
55–64 years	49,183	29,510	13,337	10,647	2,816	*	*	*	683
65 years and older	5,908	3,255	1,022	1,757	199	*	*	*	*
Unknown	207	110	*	*	*	*	*	*	*
Race/ethnicity	—	—	—	—	—	—	—	—	—
White	489,308	166,825	119,138	220,586	56,139	9,293	1,461	3,272	11,725
Black	261,981	166,359	35,671	85,651	5,073	4,785	*	*	19,987
Hispanic	127,231	54,173	33,200	38,632	15,584	*	*	*	2,904
Other or two or more race/ ethnicities	11,830	3,414	2,025	4,707	3,251	393	*	*	*
Unknown	83,242	32,125	23,084	26,890	*	1,612	177	181	1,844

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(3) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both cocaine and marijuana will appear twice in this table). The sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.

NOTE: An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed. A dash (—) indicates a blank cell.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Table 7. Rates of ED visits per 100,000 population involving illicit drugs, by patient demographics, 2009

Patient demographics	All illicits	Cocaine	Heroin	Marijuana	Stimulants	MDMA (Ecstasy)	GHB	LSD	PCP
Rates of ED visits, illicit drugs (1,2,3)	**317.1**	**137.7**	**69.4**	**122.6**	**30.5**	**7.4**	**0.6**	**1.3**	**12.0**
Gender	—	—	—	—	—	—	—	—	—
Male	415.7	175.9	96.3	162.1	36.8	9.2	0.7	1.8	17.6
Female	220.9	100.5	43.2	84.0	24.3	5.7	0.5	0.8	6.4
Age	—	—	—	—	—	—	—	—	—
0–5 years	5.6	*	*	2.1	*	*	*	*	*
6–11 years	6.3	*	*	*	*	*	*	*	*
12–17 years	223.4	21.4	7.1	182.2	15.0	17.5	*	3.3	2.7
18–20 years	738.6	141.7	115.2	484.8	53.0	50.7	*	10.8	*
21–24 years	736.4	199.4	203.2	360.2	76.0	30.7	2.5	3.1	37.5
25–29 years	628.9	232.1	145.1	274.5	83.3	14.5	2.1	*	27.3
30–34 years	560.1	250.1	134.9	185.3	69.9	8.9	2.2	*	37.1
35–44 years	497.8	278.8	116.0	137.9	52.9	2.5	0.6	1.0	15.0
45–54 years	406.6	258.6	90.3	86.3	26.1	1.2	0.2	*	8.4
55–64 years	141.4	84.8	38.3	30.6	8.1	*	*	*	2.0
65 years and older	14.9	8.2	2.6	4.4	0.5	*	*	*	*

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

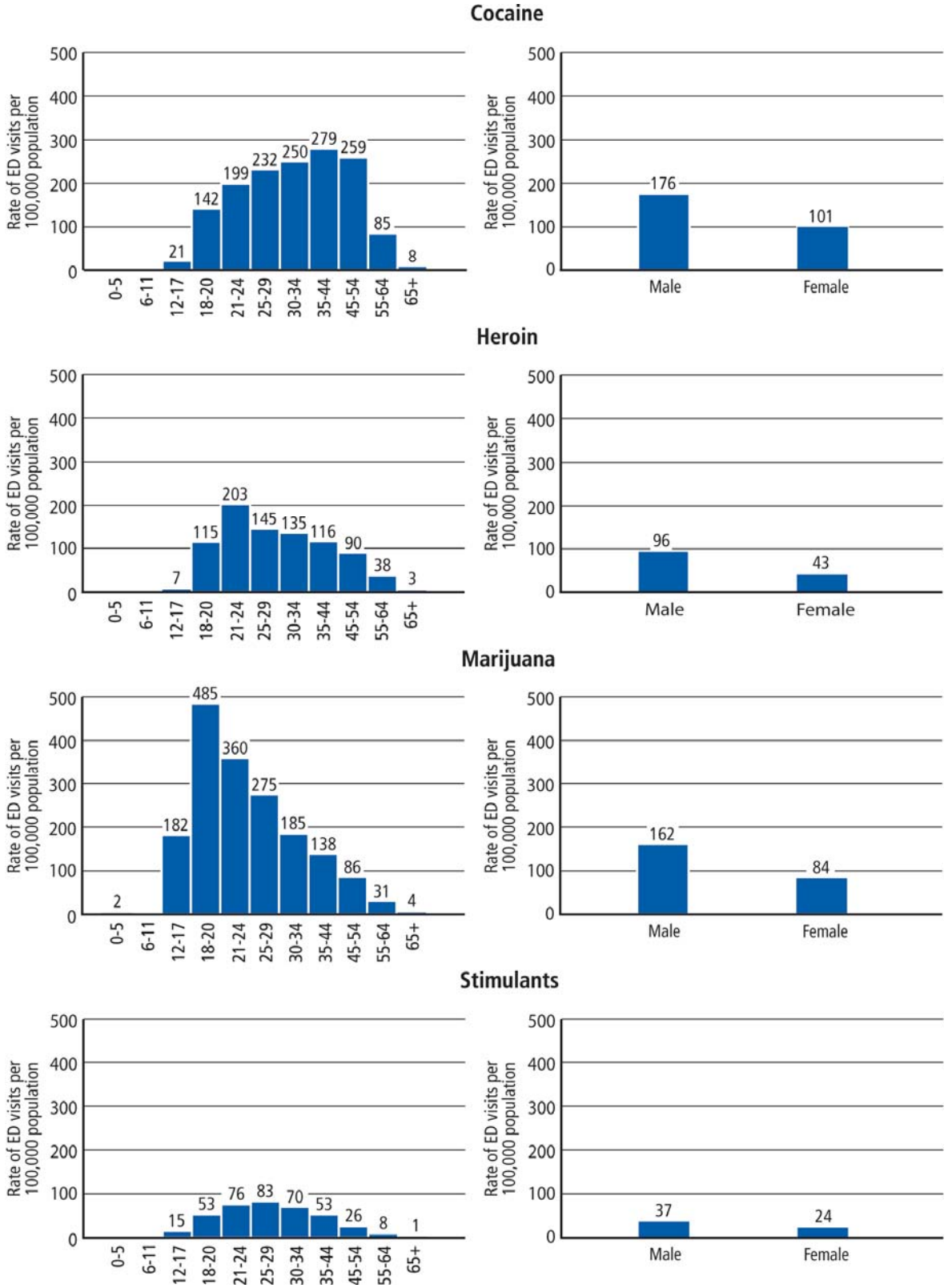
(2) All rates are ED visits per 100,000 population. Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(3) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both cocaine and marijuana will appear twice in this table). The sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.

NOTE: An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed. A dash (—) indicates a blank cell. Rates are not provided for race and ethnicity subgroups because of data limitations.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Figure 2. Rates of ED visits per 100,000 population involving illicit drugs, by selected drugs, age, and gender, 2009



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Table 8. ED visits and rates involving illicit drugs, by patient disposition, 2009

Patient disposition	ED visits	Percent of ED visits	Rate of ED visits per 100,000 population (1)
Total ED visits, illicit drugs (2)	**973,591**	**100.0**	**317.1**
Treated and released	**578,369**	**59.4**	**188.4**
Discharged home	465,320	47.8	151.6
Released to police/jail	43,054	4.4	14.0
Referred to detox/treatment	69,995	7.2	22.8
Admitted to this hospital	**241,366**	**24.8**	**78.6**
ICU/critical care	32,294	3.3	10.5
Surgery	2,906	0.3	0.9
Chemical dependency/detox	28,356	2.9	9.2
Psychiatric unit	51,276	5.3	16.7
Other inpatient unit	126,533	13.0	41.2
Other disposition	**153,857**	**15.8**	**50.1**
Transferred	100,890	10.4	32.9
Left against medical advice	20,495	2.1	6.7
Died	1,105	0.1	0.4
Other	26,237	2.7	8.5
Not documented	5,129	0.5	1.7

(1) All rates are ED visits per 100,000 population. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

3.2 Trends in ED Visits Involving Illicit Drugs, 2004–2009

This section presents the trends in the estimates of ED visits involving illicit drugs for the period 2004 through 2009 (Table 9). Differences between years are presented in terms of the percentage increase or decrease in visits in 2009 compared with the estimates for 2004 (long-term trends) and for 2007 and 2008 (short-term trends). Only statistically significant changes are discussed and displayed in the table.

Table 9. Trends in ED visits involving illicit drugs, by selected drugs, 2004–2009

Drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Total ED visits, illicit drugs (3,4)	**991,363**	**921,127**	**958,164**	**974,272**	**993,379**	**973,591**	**—**	**—**	**—**
Cocaine	475,425	483,865	548,608	553,530	482,188	422,896	—	-24	-12
Heroin	214,432	187,493	189,780	188,162	200,666	213,118	—	—	—
Marijuana	281,619	279,664	290,563	308,547	374,435	376,467	—	—	—
Stimulants	162,435	137,650	107,575	85,043	91,939	93,562	—	—	—
Amphetamines	34,085	34,928	32,240	21,545	31,534	37,430	—	74	—
Methamphetamine	132,576	109,655	79,924	67,954	66,308	64,117	—	—	—
MDMA (Ecstasy)	10,220	11,287	16,749	12,748	17,865	22,816	123	79	—
GHB	1,789	1,036	1,084	2,207	1,441	1,758	—	—	—
Flunitrazepam (Rohypnol)	*	*	*	*	*	800	—	—	—
Ketamine	*	303	270	291	344	529	—	—	—
LSD	2,146	2,001	4,002	3,561	3,287	4,028	—	—	—
PCP	31,342	14,825	21,960	28,035	37,266	36,719	—	—	—
Misc. hallucinogens	3,150	3,194	3,898	4,839	6,028	6,579	109	—	—
Inhalants	9,523	5,156	5,643	7,920	7,115	6,137	—	—	—
Combinations NTA	*	3,201	2,055	3,989	3,512	3,557	—	—	—

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) This column denotes statistically significant ($p < 0.05$) increases or decreases between estimates for the periods shown.

(3) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(4) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both cocaine and marijuana will appear twice in this table). Thus, the sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.

NOTE: NTA = not tabulated above. An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed. A dash (—) indicates a blank cell.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

The overall level of ED visits involving illicit drugs saw no significant increases between 2004 and 2009. There were some noteworthy changes at the drug level, though. There was a 123 percent increase in the involvement of MDMA overall between 2004 and 2009. While the level of involvement was relatively small (22,816 visits in 2009), the number of visits has increased steadily since 2004. Likewise, there was a 109 percent increase in the use of miscellaneous hallucinogens between 2004 and 2009. The level of visits is small (6,579 in 2009), but the rise has been steady. Trends for two drugs followed a U-shaped curve. Declines in visits involving amphetamines between 2004 and 2007 were offset by increases between 2007 and 2009, bringing 2009 visits back up to their 2004 levels. In a similar but opposite fashion, cocaine involvement rose between 2004 and 2007 and then declined between 2007 and 2009, resulting in 2009 levels that were similar to 2004 levels.

4. ALCOHOL

4.1 ED Visits Involving Drugs and Alcohol Taken Together, 2009

According to the National Institute on Alcohol Abuse and Alcoholism (NIAAA), more than 150 medications have harmful additive or interactive effects when combined with alcohol. The harmful effects of combining drugs with alcohol are heightened by drugs that depress the central nervous system, such as heroin, opiate pain relievers, benzodiazepines (anti-anxiety drugs), antihistamines, and antidepressants. These drug-alcohol interactions may result in increased risk of illness, injury, and even death. Medications for certain disorders—including diabetes, high blood pressure, and heart disease—also can have harmful interactions with alcohol.[7]

In 2009, over half a million ED visits involved drugs combined with alcohol (Table 10). On average, a quarter (25.1%) of the ED visits associated with drug misuse or abuse also involved alcohol.

Table 10. ED visits involving alcohol, 2009

Alcohol use category (1)	ED visits (2)	Percent of drug misuse/ abuse visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Alcohol with drugs (3)	519,650	25.1 of patients all ages	7.8	440,696	598,604
Underage drinking (4)	199,429	48.0 of patients < 21	11.9	152,968	245,890

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(3) For patients of all ages, DAWN always records whether alcohol is involved in a drug-related visit. ED visits involving alcohol and no other drug are reportable to DAWN only if the patient is aged 20 or younger. DAWN estimates do not represent visits involving just alcohol for adults aged 21 or older.

(4) Underage drinking includes ED visits for patients aged 20 or younger that involve alcohol with or without concurrent use of other drugs.

NOTE: CI = confidence interval. RSE = relative standard error.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

[7] National Institute on Alcohol Abuse and Alcoholism (NIAAA). (2007, February). *Frequently asked questions for the general public*. Retrieved June 5, 2011, from http://www.niaaa.nih.gov/FAQs/General-English/default.htm#taking_medications.

The types of drugs that accompany alcohol use are displayed in Table 11. Illicit drugs were involved in over half (56.1%) of ED visits involving alcohol-drug combinations, with cocaine and marijuana representing the greater proportions of such visits (29.4% and 24.1%, respectively). One or more pharmaceuticals were also involved in over half (59.3%) of such visits. Pain relievers were involved in 23.8 percent of visits, with narcotic pain relievers accounting for over half of that number (14.5%). Anxiolytics, sedatives, and hypnotics (drugs to treat insomnia and anxiety) were involved in 24.7 percent of visits, with the largest part of that being benzodiazepines (21.0%). Psychotherapeutic agents (antidepressants and antipsychotics) were involved in less than 9 percent of such visits.

The rate of ED visits per 100,000 population for males (211.1) was higher than that for females (128.4) (Table 12 and Figure 3). Overall, rates by age group showed a general pattern of being higher for those aged 18 to 54. The highest level was found for patients aged 25 to 29 (314.4).

Table 11. ED visits involving drugs and alcohol taken together: Most frequent combinations, 2009

Drugs reported with alcohol (1)	ED visits	Percent of ED visits	Rate of ED visits per 100,000 population (2)
Total ED visits, drugs with alcohol (3,4)	**519,650**	**100.0**	**169.3**
Illicit drugs	**291,553**	**56.1**	**95.0**
Cocaine	152,631	29.4	49.7
Heroin	43,110	8.3	14.0
Marijuana	125,438	24.1	40.9
Stimulants	17,511	3.4	5.7
Methamphetamine	12,106	2.3	3.9
Pharmaceuticals	**308,108**	**59.3**	**100.4**
Psychotherapeutic agents	44,217	8.5	14.4
Antidepressants	31,443	6.1	10.2
SSRI antidepressants	15,207	2.9	5.0
Antipsychotics	16,767	3.2	5.5
Atypical antipsychotics	14,961	2.9	4.9
Central nervous system agents	229,230	44.1	74.7
Pain relievers	123,731	23.8	40.3
Opiates/opioids	91,690	17.6	29.9
Opiates/opioids, unspecified	18,230	3.5	5.9
Narcotic pain relievers	75,521	14.5	24.6
Hydrocodone products	27,993	5.4	9.1
Oxycodone products	30,968	6.0	10.1
Misc. pain reliever products (5)	20,725	4.0	6.8
Acetaminophen products	14,619	2.8	4.8
Anticonvulsants	10,458	2.0	3.4
Anxiolytics, sedatives, and hypnotics	128,366	24.7	41.8
Benzodiazepines	109,192	21.0	35.6
Alprazolam	43,941	8.5	14.3
Clonazepam	20,251	3.9	6.6
Benzodiazepines not otherwise specified	23,547	4.5	7.7
Misc. anxiolytics, sedatives, and hypnotics	25,195	4.8	8.2
Drug unknown	47,110	9.1	15.3

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) All rates are ED visits per 100,000 population. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(3) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(4) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both cocaine and marijuana will appear twice in this table). 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) This category includes acetaminophen and tramadol but excludes nonsteroidal anti-inflammatory drugs and salicylates.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Table 12. ED visits involving drugs and alcohol taken together, by patient demographics, 2009

Patient demographics	ED visits	Percent of ED visits	Rate of ED visits per 100,000 population (1)
Total ED visits, drugs and alcohol (2)	**519,650**	**100.0**	**169.3**
Gender	—	—	—
Male	319,764	61.5	211.1
Female	199,786	38.4	128.4
Unknown	*	*	—
Age	—	—	—
0–5 years	*	*	*
6–11 years	*	*	*
12–17 years	22,192	4.3	89.7
18–20 years	38,067	7.3	288.1
21–24 years	52,944	10.2	307.8
25–29 years	68,157	13.1	314.4
30–34 years	61,866	11.9	311.1
35–44 years	119,351	23.0	287.4
45–54 years	115,988	22.3	260.1
55–64 years	33,255	6.4	95.6
65 years and older	7,184	1.4	18.2
Unknown	87	<0.1	—
Race/ethnicity	—	—	—
White	309,478	59.6	—
Black	99,707	19.2	—
Hispanic	64,214	12.4	—
Other or two or more race/ethnicities	6,638	1.3	—
Unknown	39,614	7.6	—

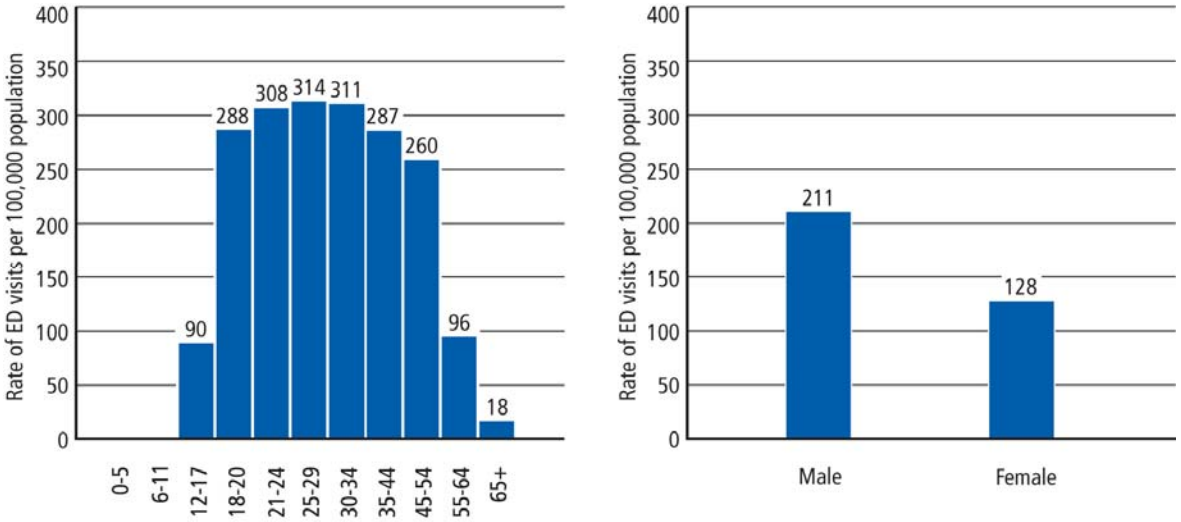
(1) All rates are ED visits per 100,000 population. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

NOTE: An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed. A dash (—) indicates a blank cell. Rates are not provided for race and ethnicity subgroups because of data limitations.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Figure 3. Rates of ED visits per 100,000 population involving alcohol, by age and gender, 2009



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Considering race/ethnicity, 59.6 percent of patients were White, 19.2 percent were Black, 12.4 percent were Hispanic, 1.3 percent were of other or multiple race/ethnic groups, and 7.6 percent were of unknown race/ethnicity. DAWN does not produce population-based rates for race/ethnicity categories because race/ethnicity information is often missing from ED records.

About half (48.0%) of patients received some sort of follow-up care: 28.7 percent were admitted to the hospital, 12.6 percent were transferred to another facility, and 6.7 percent were referred to detox (Table 13). The remaining patients were treated and released to home (44.1%) or had other outcomes. On average, ED visits involving alcohol were more likely to receive follow-up care than visits involving either illicit drugs or nonmedical use of pharmaceuticals.

Table 13. ED visits involving drugs and alcohol taken together, by patient disposition, 2009

Patient disposition	ED visits	Percent of ED visits	Rate of ED visits per 100,000 population (1)
Total ED visits, drugs with alcohol (2)	**519,650**	**100.0**	**169.3**
Treated and released	**279,627**	**53.8**	**91.1**
Discharged home	229,246	44.1	74.7
Released to police/jail	15,807	3.0	5.1
Referred to detox/treatment	34,574	6.7	11.3
Admitted to this hospital	**149,180**	**28.7**	**48.6**
ICU/critical care	31,365	6.0	10.2
Surgery	1,292	0.2	0.4
Chemical dependency/detox	17,922	3.4	5.8
Psychiatric unit	31,525	6.1	10.3
Other inpatient unit	67,077	12.9	21.8
Other disposition	**90,842**	**17.5**	**29.6**
Transferred	65,546	12.6	21.3
Left against medical advice	8,939	1.7	2.9
Died	*	*	*
Other	12,886	2.5	4.2
Not documented	2,933	0.6	1.0

(1) All rates are ED visits per 100,000 population. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

NOTE: An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

4.2 Underage Drinking

The use of alcohol by those under the age of 21 is of substantial concern to health care and substance abuse professionals and public health officials. Alcohol abuse has many immediate adverse consequences for youth and also can lead to higher levels and dangerous patterns of drinking in later years. Intervention at an early age is critical to preventing these patterns from developing. Intervention during an ED visit may be an efficient way to identify those youth at higher risk.

In 2009, of the nearly 400,000 drug abuse–related ED visits made by patients aged 20 or younger, almost half (199,429, or 48.0%) involved alcohol (Table 10). Of these ED visits involving underage drinking, just over 75,000 visits (76,918) were made by patients aged 12 to 17, and 120,853 were made by patients aged 18 to 20 (Table 14). For both age groups, about two thirds of these visits involved just alcohol, with the remainder involving alcohol taken with other drugs.

The rate of medical emergencies involving use of alcohol was 310.8 visits per 100,000 youth for patients aged 12 to 17 and 914.7 visits for patients aged 18 to 20, almost a threefold difference. The pattern is similar when looking at ED visits for either alcohol alone or alcohol used in combination with other drugs (Figure 4).

Table 14. ED visits involving alcohol, by patients aged 12 to 17 and 18 to 20, 2009

Alcohol use category (1)	ED visits (2)	Rate of ED visits per 100,000 population (3)	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Alcohol abuse, patients aged 12 to 17	**76,918**	**310.8**	**14.6**	**54,871**	**98,965**
Alcohol with drugs	22,192	89.7	13.9	16,146	28,239
Alcohol alone	54,726	221.1	16.9	36,549	72,903
Alcohol abuse, patients aged 18 to 20	**120,853**	**914.7**	**11.5**	**93,588**	**148,119**
Alcohol with drugs	38,067	288.1	8.9	31,429	44,705
Alcohol alone	82,786	626.6	14.9	58,579	106,993

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

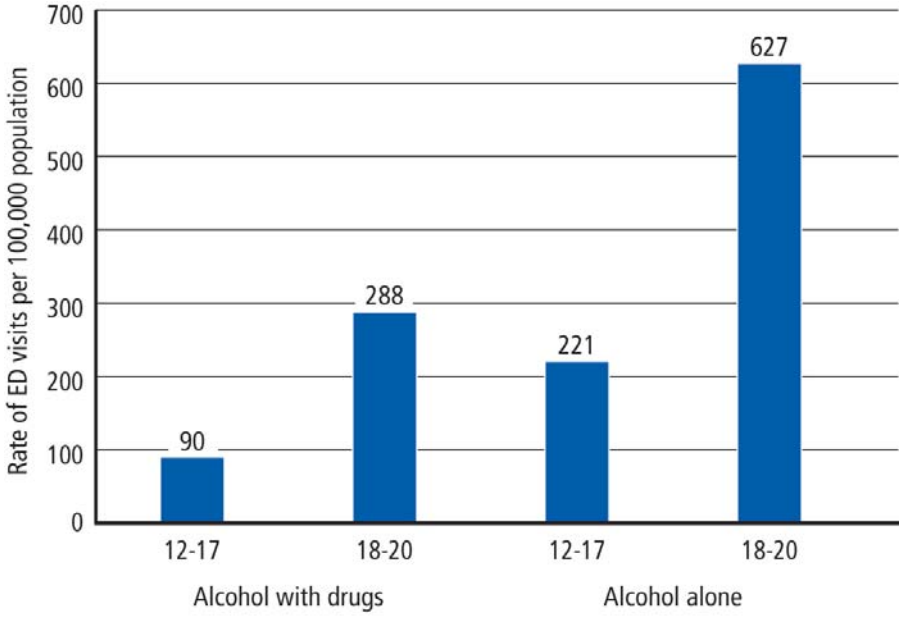
(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(3) All rates are ED visits per 100,000 population. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

NOTE: CI = confidence interval. RSE = relative standard error.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Figure 4. Rates of ED visits per 100,000 population involving alcohol, by patients aged 12 to 17 and 18 to 20, 2009



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

4.3 Trends in ED Visits Involving Alcohol, 2004–2009

This section presents the trends in the estimates of ED visits involving alcohol for the period 2004 through 2009 (Table 15). Differences between years are presented in terms of the percentage increase or decrease in visits in 2009 compared with the estimates for 2004 (long-term trends) and for 2007 and 2008 (short-term trends). Only statistically significant changes are discussed and displayed in the table.

Involvement of alcohol in drug-related medical emergencies has remained stable over the period 2004 through 2008. Underage drinking has, likewise, remained constant for youth (patients aged 12 to 17) and young adults (patients aged 18 to 20).

Table 15. Trends in ED visits involving alcohol, 2004–2009

Alcohol use category (1,2)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (3)	Percent change, 2007, 2009 (3)	Percent change, 2008, 2009 (3)
Alcohol with drugs (all ages) (4)	523,926	416,599	450,817	497,283	524,050	519,650	—	—	—
Underage drinking (5)	204,910	158,393	183,257	196,204	189,998	199,429	—	—	—
Patients aged 12 to 17	67,589	62,459	76,760	82,364	74,988	76,918	—	—	—
Patients aged 18 to 20	135,313	95,166	105,675	112,563	113,993	120,853	—	—	—

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(3) This column denotes statistically significant ($p < 0.05$) increases or decreases between estimates for the periods shown.

(4) For patients of all ages, DAWN always records whether alcohol is involved in a drug-related visit. ED visits involving alcohol and no other drug are reportable to DAWN only if the patient is aged 20 or younger. DAWN estimates do not represent visits involving just alcohol for adults aged 21 or older.

(5) Underage drinking includes ED visits for patients aged 20 or younger that involve alcohol with or without concurrent use of other drugs.

NOTE: A dash (—) indicates a blank cell.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

5. NONMEDICAL USE OF PHARMACEUTICALS

5.1 ED Visits Involving Nonmedical Use of Pharmaceuticals, 2009

When taken as directed for legitimate medical purposes, prescription drugs are safe and effective. However, they are just as dangerous and deadly as illegal drugs when used for nonmedical reasons.[8] In 2009, prescription drugs were the second-most abused category of drugs in the United States, following marijuana.[9] While about 16.7 million persons aged 12 or older used marijuana, 7.0 million persons reported using psychotherapeutic drugs nonmedically (5.3 million reported using pain relievers, 2.0 million tranquilizers, 1.3 million stimulants, and 370,000 sedatives). Over 2.5 million persons used psychotherapeutics nonmedically for the first time within the past year, an average of around 7,000 new initiates per day. The number of patients in treatment for abuse of pain relievers has risen from 360,000 in 2002 to 739,000 in 2009.

As used by DAWN, nonmedical use of pharmaceuticals includes

- taking more than the prescribed dose of a prescription pharmaceutical or more than the recommended dose of an over-the-counter pharmaceutical or supplement;
- taking a pharmaceutical prescribed for another individual;
- deliberate poisoning with a pharmaceutical by another person; and
- documented misuse or abuse of a prescription drug, an over-the-counter pharmaceutical, or a dietary supplement.

Nonmedical use of pharmaceuticals may involve pharmaceuticals alone or pharmaceuticals in combination with illicit drugs or alcohol. DAWN focuses on ED visits related to recent drug use and excludes medications taken on a regular basis that are not related to the ED visit.[10]

For 2009, DAWN estimates that 1,079,683 ED visits involved nonmedical use of prescription medicines, over-the-counter drugs, or other types of pharmaceuticals (Table 16). This represents about a quarter (24.6%) of all drug-related ED visits and over half (52.1%) of ED visits for drug abuse or misuse. Over half (53.6%) of medical emergencies seen in the ED resulting from nonmedical use of pharmaceuticals involved multiple drugs. However, when multiple drugs are

[8] Office of National Drug Control Policy (ONDCP). (2011, April). *A response to the epidemic of prescription drug abuse.* Retrieved June 6, 2011, from http://www.whitehousedrugpolicy.gov/publications/html/rx_epidemic.html.

[9] Substance Abuse and Mental Health Services Administration (SAMHSA). (2010). *Results from the 2009 National Survey on Drug Use and Health: Volume I. Summary of National Findings* (Office of Applied Studies, NSDUH Series H-38A, HHS Publication No. SMA 10-4856Findings). Rockville, MD. Retrieved June 6, 2011, from http://www.oas.samhsa.gov/NSDUH/2k9NSDUH/2k9Results.htm.

[10] DAWN tries to capture only pharmaceuticals that are related to the ED visit and actively discourages reporting of current medications that are unrelated to the visit. Given the limitations of medical record documentation, though, it is not always possible to distinguish and exclude current medications that are unrelated to the visit. This limitation may have the effect of overstating the variety of pharmaceuticals involved in ED visits.

involved, it should not be assumed that they are all taken for the same reason; a patient may misuse one type of prescription medication while taking another medication as prescribed. On average, 17.8 percent of ED visits involving nonmedical use of pharmaceuticals also involved alcohol.

At 47.8 percent, pain relievers were the most common type of drugs involved in medical emergencies associated with nonmedical use of pharmaceuticals. Narcotic pain relievers seen more commonly were oxycodone, hydrocodone, and methadone at 13.7, 8.0, and 5.8 percent, respectively.[11] Non-narcotic pain relievers, such as acetaminophen and nonsteroidal anti-inflammatory agents (e.g., ibuprofen, naproxen), were seen at lower levels of between 3 and 5 percent.

[11] ED records frequently do not distinguish methadone used properly for the treatment of opiate addiction (and not specifically related to the ED visit) from nonmedical methadone use (related to the ED visit). This could result in overreporting the estimated number of ED visits related to methadone, but the extent of the overreporting is unknown.

Table 16. ED visits involving nonmedical use of pharmaceuticals, by selected drugs, 2009

Drug category and selected drugs (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Total ED visits, nonmedical use (2,3)	**1,079,683**	**100.0**	**9.2**	**883,953**	**1,275,413**
Single drug	500,542	46.4	8.1	420,821	580,262
Multiple drugs	579,141	53.6	11.6	447,097	711,185
Alcohol (all ages)	191,924	17.8	9.1	157,530	226,319
Aged 20 or younger	23,419	2.2	11.5	18,122	28,716
Pharmaceuticals	**1,079,683**	**100.0**	**9.2**	**883,953**	**1,275,413**
Psychotherapeutic agents	132,482	12.3	7.1	114,051	150,913
Antidepressants	89,070	8.2	7.7	75,575	102,566
MAO inhibitors	*	*	*	*	*
SSRI antidepressants	39,814	3.7	9.9	32,100	47,528
Tricyclic antidepressants	18,303	1.7	24.3	9,575	27,030
Misc. antidepressants	8,563	0.8	18.6	5,437	11,689
Antipsychotics	58,018	5.4	8.3	48,550	67,487
Central nervous system agents	791,385	73.3	10.7	625,375	957,396
Pain relievers	516,045	47.8	11.3	401,970	630,120
Antimigraine agents	1,175	0.1	26.3	570	1,781
Cox-2 inhibitors	1,034	0.1	29.2	443	1,626
Opiates/opioids	416,458	38.6	13.2	308,762	524,154
Opiates/opioids, unspecified	84,144	7.8	19.6	51,739	116,549
Narcotic pain relievers	342,628	31.7	13.4	252,719	432,536
Buprenorphine products	14,266	1.3	22.4	8,001	20,531
Codeine products	7,958	0.7	15.4	5,556	10,359
Fentanyl	20,945	1.9	17.9	13,588	28,302
Hydrocodone products	86,258	8.0	16.1	59,052	113,463
Hydromorphone products	14,337	1.3	13.3	10,606	18,069
Meperidine products	1,350	0.1	39.9	295	2,406
Methadone	63,031	5.8	12.0	48,180	77,881
Morphine products	31,731	2.9	22.5	17,754	45,709
Oxycodone products	148,449	13.7	20.9	87,649	209,249
Propoxyphene products	9,526	0.9	33.1	3,347	15,705
Nonsteroidal anti-inflammatory agents	35,570	3.3	8.6	29,589	41,551
Ibuprofen	27,339	2.5	9.5	22,229	32,448
Naproxen	6,235	0.6	13.7	4,563	7,906
Salicylates products	13,922	1.3	11.6	10,753	17,092
Misc. pain reliever products	76,580	7.1	7.3	65,666	87,494
Acetaminophen products	52,995	4.9	6.8	45,960	60,030
Tramadol products	15,349	1.4	12.3	11,657	19,041

Table 16. ED visits involving nonmedical use of pharmaceuticals, by selected drugs, 2009 (continued)

Drug category and selected drugs (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Anorexiants	1,698	0.2	28.8	738	2,657
Anticonvulsants	42,073	3.9	7.2	36,103	48,043
Antiemetic/antivertigo agents	2,667	0.2	24.4	1,390	3,943
Anti-Parkinson agents	4,775	0.4	17.3	3,160	6,389
Anxiolytics, sedatives, and hypnotics	363,270	33.6	14.8	257,597	468,943
Barbiturates	11,824	1.1	17.3	7,819	15,830
Benzodiazepines	312,931	29.0	16.3	212,783	413,079
Alprazolam	112,552	10.4	16.8	75,422	149,681
Clonazepam	57,633	5.3	15.5	40,071	75,195
Diazepam	25,150	2.3	11.6	19,426	30,873
Lorazepam	36,582	3.4	8.0	30,845	42,318
Misc. anxiolytics, sedatives, and hypnotics	57,351	5.3	7.7	48,746	65,956
Diphenhydramine	13,321	1.2	8.3	11,151	15,491
Hydroxyzine	3,690	0.3	16.4	2,506	4,873
Zolpidem	29,127	2.7	9.9	23,497	34,757
CNS stimulants	21,742	2.0	9.1	17,848	25,635
Amphetamine-dextroamphetamine	8,656	0.8	16.2	5,902	11,410
Caffeine	2,021	0.2	21.3	1,175	2,867
Dextroamphetamine	*	*	*	*	*
Methylphenidate	4,953	0.5	14.9	3,508	6,399
General anesthetics	*	*	*	*	*
Muscle relaxants	50,878	4.7	19.4	31,525	70,231
Carisoprodol	29,980	2.8	19.3	18,662	41,299
Cyclobenzaprine	11,178	1.0	20.0	6,804	15,553
Misc. CNS agents	2,284	0.2	21.3	1,331	3,237
Respiratory agents	35,867	3.3	6.3	31,440	40,293
Antihistamines	9,439	0.9	17.6	6,188	12,691
Bronchodilators	3,123	0.3	18.3	2,002	4,244
Decongestants	1,108	0.1	35.0	348	1,867
Expectorants	4,172	0.4	18.6	2,652	5,691
Upper respiratory products	15,481	1.4	9.7	12,548	18,414
Respiratory agents NTA	5,699	0.5	15.0	4,028	7,370

Table 16. ED visits involving nonmedical use of pharmaceuticals, by selected drugs, 2009 (continued)

Drug category and selected drugs (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Cardiovascular agents	46,416	4.3	8.5	38,685	54,148
Antiadrenergic agents, centrally acting	5,258	0.5	18.8	3,323	7,194
Beta-adrenergic blocking agents	16,204	1.5	11.9	12,437	19,972
Calcium channel blocking agents	6,428	0.6	13.9	4,680	8,176
Diuretics	7,563	0.7	16.8	5,065	10,060
Cardiovascular agents NTA	23,539	2.2	8.8	19,499	27,579
Gastrointestinal agents	14,657	1.4	11.1	11,457	17,857
Hormones	10,602	1.0	11.8	8,140	13,065
Metabolic agents	30,841	2.9	8.2	25,867	35,814
Nutritional products	7,776	0.7	15.0	5,487	10,066
Drug unknown	150,002	13.9	28.5	66,067	233,938

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(3) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both methadone and tramadol will appear twice in this table). The sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.

NOTE: CI = confidence interval. CNS = central nervous system. NOS = not otherwise specified. NTA = not tabulated above. RSE = relative standard error. An asterisk (*) indicates that an estimate with an RSE greater than 50% or an estimate based on fewer than 30 visits has been suppressed.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Anxiolytics, sedatives, and hypnotics (drugs to treat anxiety and insomnia) were found in 33.6 percent of visits related to nonmedical use of pharmaceuticals. Benzodiazepines (anti-anxiety drugs) were involved in 29.0 percent of ED visits, with alprazolam (e.g., Xanax) indicated in 10.4 percent of such visits.

Among other major categories of drugs, psychotherapeutic agents (antidepressants and antipsychotics) were involved in 12.3 percent of ED visits related to nonmedical use of pharmaceuticals, with respiratory agents and cardiovascular agents each involved in about 3 to 5 percent of these ED visits. Also appearing in the range of 3 to 5 percent were muscle relaxants and anticonvulsants.

When population size and sampling error are taken into account, visits for nonmedical use of pharmaceuticals did not differ between males and females (349.2 and 354.0 visits per 100,000 population, respectively; Table 17 and Figure 5). The rate of ED visits for patients in age categories between 18 and 34 were all over 500 visits per 100,000 population, with lower levels observed for younger and older patients.

Table 17. ED visits and rates involving nonmedical use of pharmaceuticals, by patient demographics, 2009

Patient demographics	ED visits	Percent of ED visits	Rate of ED visits per 100,000 population (1)
Total ED visits, nonmedical use (2)	**1,079,683**	**100.0**	**351.7**
Gender	—	—	—
Male	528,810	49.0	349.2
Female	550,641	51.0	354.0
Unknown	233	<0.1	—
Age	—	—	—
0–5 years	7,977	0.7	31.3
6–11 years	3,591	0.3	14.8
12–17 years	66,003	6.1	266.7
18–20 years	75,768	7.0	573.5
21–24 years	102,594	9.5	596.5
25–29 years	136,699	12.7	630.6
30–34 years	107,164	9.9	538.8
35–44 years	199,182	18.4	479.6
45–54 years	194,458	18.0	436.1
55–64 years	102,487	9.5	294.6
65 years and older	83,628	7.7	211.3
Unknown	130	<0.1	—
Race/ethnicity	—	—	—
White	772,837	71.6	—
Black	117,671	10.9	—
Hispanic	99,723	9.2	—
Other or two or more race/ethnicities	13,566	1.3	—
Unknown	75,885	7.0	—

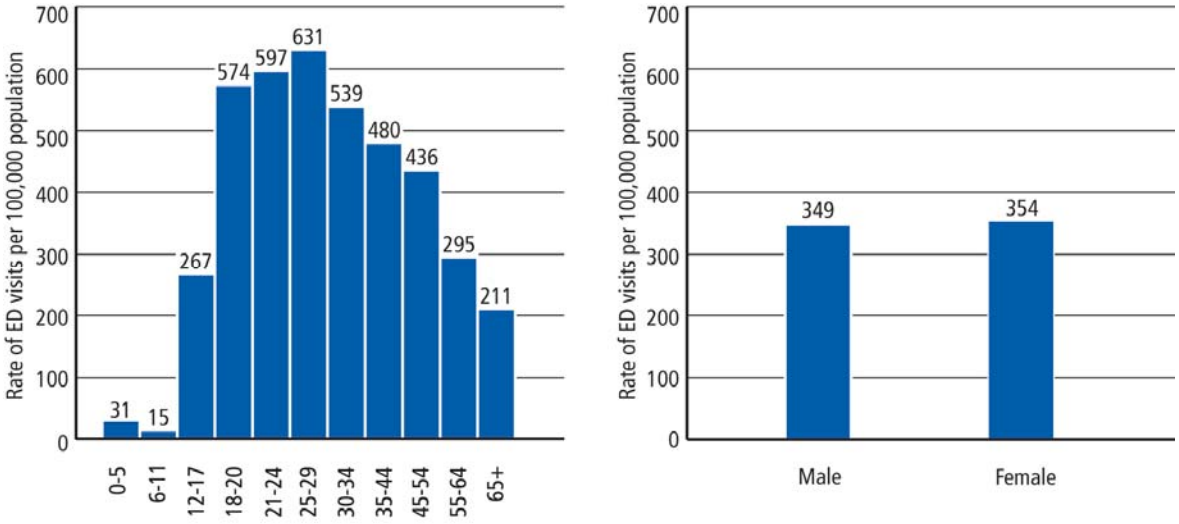
(1) All rates are ED visits per 100,000 population. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

NOTE: A dash (—) indicates a blank cell. Rates are not provided for race and ethnicity subgroups because of data limitations.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Figure 5. Rates of ED visits per 100,000 population involving nonmedical use of pharmaceuticals, by age and gender, 2009



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

In terms of race and ethnicity, 71.6 percent of visits related to nonmedical use of pharmaceuticals involved patients who were White, 10.9 percent were Black, and 9.2 percent were Hispanic. DAWN does not produce population-based rates for race/ethnicity categories because race/ethnicity information is often missing on ED records.

Some form of follow-up was observed for 38.7 percent of patients (Table 18). That included admission to the hospital (26.5%), transfer to another facility (9.7%), or referral to detox/treatment (2.6%). The remainder (54.2%) of patients were treated and released to home or had other outcomes. This distribution of outcomes is similar to that found for ED visits involving illicit drugs (Table 8).

Table 18. ED visits and rates involving nonmedical use of pharmaceuticals, by patient disposition, 2009

Patient disposition	ED visits	Percent of ED visits	Rate of ED visits per 100,000 population (1)
Total ED visits, nonmedical use (2)	**1,079,683**	**100.0**	**351.7**
Treated and released	**641,202**	**59.4**	**208.9**
Discharged home	584,982	54.2	190.5
Released to police/jail	28,602	2.6	9.3
Referred to detox/treatment	27,617	2.6	9.0
Admitted to this hospital	**285,671**	**26.5**	**93.1**
ICU/critical care	85,695	7.9	27.9
Surgery	2,424	0.2	0.8
Chemical dependency/detox	2,881	0.3	0.9
Psychiatric unit	32,649	3.0	10.6
Other inpatient unit	162,021	15.0	52.8
Other disposition	**152,810**	**14.2**	**49.8**
Transferred	104,910	9.7	34.2
Left against medical advice	18,891	1.7	6.2
Died	2,973	0.3	1.0
Other	21,270	2.0	6.9
Not documented	4,766	0.4	1.6

(1) All rates are ED visits per 100,000 population. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

NOTE: An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

5.2 Trends in ED Visits Involving Nonmedical Use of Pharmaceuticals, 2004–2009

This section presents the trends in the estimates of ED visits involving nonmedical use of pharmaceuticals for the period 2004 through 2009 (Table 19). Differences between years are presented in terms of the percentage increase or decrease in visits in 2009 compared with the estimates for 2004 (long-term trends) and for 2007 and 2008 (short-term trends). Only statistically significant changes are discussed and displayed in the table.

Table 19. Trends in ED visits involving nonmedical use of pharmaceuticals, by selected drugs, 2004–2009

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Total ED visits, nonmedical use (3,4)	**536,247**	**669,214**	**741,425**	**855,838**	**971,914**	**1,079,683**	**101**	**26**	**11**
Pharmaceuticals	**536,247**	**689,214**	**741,425**	**855,838**	**971,914**	**1,079,683**	**101**	**26**	**11**
Psychotherapeutic agents	91,268	101,451	112,856	119,787	124,331	132,482	45	—	—
Antidepressants	66,917	67,051	79,682	82,009	80,881	89,070	—	—	—
MAO inhibitors	*	*	*	*	*	*	—	—	—
SSRI antidepressants	32,285	30,374	35,370	37,446	39,780	39,814	—	—	—
Tricyclic antidepressants	12,412	14,515	16,564	16,600	13,246	18,303	—	—	—
Misc. antidepressants	9,414	7,452	7,561	9,687	6,956	8,563	—	—	—
Antipsychotics	35,198	44,393	44,733	52,752	55,005	58,018	65	—	—
Central nervous system agents	402,246	489,351	532,584	586,323	718,119	791,385	97	35	10
Pain relievers	241,578	294,251	323,579	363,621	458,210	516,045	114	42	13
Antimigraine agents	868	1,018	1,191	2,284	1,877	1,175	—	—	—
Cox-2 inhibitors	1,935	765	*	635	*	1,034	—	—	—
Opiates/opioids	172,726	217,594	247,669	286,521	366,815	416,458	141	45	14
Opiates/opioids, unspecified	31,846	52,670	50,978	52,997	66,585	84,144	164	—	26
Narcotic pain relievers	144,644	168,376	201,280	237,143	305,885	342,628	137	44	—
Buprenorphine products	*	*	4,440	7,136	12,544	14,266	—	100	—
Codeine products	7,171	6,180	6,928	5,648	8,235	7,958	—	—	—
Fentanyl products	9,823	11,211	16,012	15,947	20,179	20,945	113	—	—
Hydrocodone products	39,844	47,192	57,550	65,734	89,051	86,258	116	—	—
Hydromorphone products	3,385	4,714	6,780	9,497	12,142	14,337	324	51	—
Meperidine products	782	383	1,440	997	1,435	1,350	—	—	—
Methadone	36,806	42,684	45,130	53,950	63,629	63,031	71	—	—
Morphine products	13,966	15,762	20,416	29,591	28,818	31,731	127	—	—

Table 19. Trends in ED visits involving nonmedical use of pharmaceuticals, by selected drugs, 2004–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Oxycodone products	41,701	52,943	64,888	76,587	105,214	148,449	256	94	41
Propoxyphene products	6,744	7,648	6,220	7,401	13,364	9,526	—	—	—
Nonsteroidal anti-inflammatory agents	27,362	28,837	27,662	30,822	30,343	35,570	—	—	—
Ibuprofen	22,127	22,268	20,541	20,892	23,539	27,339	—	—	—
Naproxen	4,715	5,190	6,651	7,208	4,525	6,235	—	—	—
Salicylates products	9,580	12,123	10,399	9,724	13,005	13,922	—	—	—
Misc. pain reliever products	44,857	51,881	54,313	56,534	69,146	76,580	71	35	—
Acetaminophen products	39,167	43,558	44,314	43,872	49,859	52,995	—	—	—
Tramadol products	4,849	5,918	6,048	8,039	11,850	15,349	217	91	30
Anorexiants	*	1,757	1,168	758	1,526	1,698	—	—	—
Anticonvulsants	28,652	27,641	31,169	35,403	37,439	42,073	—	—	—
Antiemetic/antivertigo agents	1,678	1,771	1,360	1,646	1,661	2,667	—	—	—
Anti-Parkinson agents	2,472	1,692	3,816	3,764	3,802	4,775	93	—	—
Anxiolytics, sedatives, and hypnotics	177,394	227,486	233,875	259,983	325,041	363,270	105	—	12
Barbiturates	11,721	14,693	10,991	9,877	9,603	11,824	—	—	—
Benzodiazepines	143,546	189,704	195,625	218,640	271,698	312,931	118	—	15
Alprazolam	46,526	57,419	65,236	80,313	104,762	112,552	142	—	—
Clonazepam	28,178	30,648	33,557	40,920	48,385	57,633	105	—	—
Diazepam	15,619	18,433	19,936	19,674	26,518	25,150	—	—	—
Lorazepam	17,674	23,210	23,720	26,213	36,602	36,582	107	40	—

Table 19. Trends in ED visits involving nonmedical use of pharmaceuticals, by selected drugs, 2004–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Misc. anxiolytics, sedatives, and hypnotics	31,554	35,561	40,626	43,960	58,983	57,351	82	30	—
Diphenhydramine	10,452	10,294	12,291	12,539	13,531	13,321	—	—	—
Hydroxyzine	2,363	2,179	2,678	2,447	5,647	3,690	—	—	—
Zolpidem	12,792	14,730	17,257	18,464	28,262	29,127	128	58	—
CNS stimulants	9,801	10,965	13,892	18,561	18,768	21,742	122	—	—
Amphetamine-dextroamphetamine	2,303	2,669	5,027	6,372	6,500	8,656	276	—	—
Caffeine	2,736	4,567	4,407	2,165	1,876	2,021	—	—	—
Dextroamphetamine	*	*	*	*	*	*	—	—	—
Methylphenidate	2,446	2,519	2,192	4,782	3,173	4,953	103	—	—
General anesthetics	*	*	*	*	*	*	—	—	—
Muscle relaxants	25,934	33,695	38,918	40,769	54,151	50,878	96	—	—
Carisoprodol	14,736	20,082	24,505	27,128	34,155	29,980	103	—	—
Cyclobenzaprine	6,183	7,629	7,142	6,197	12,748	11,178	—	80	—
Misc. CNS agents	869	900	999	924	2,034	2,284	163	147	—
Respiratory agents	22,286	28,017	28,867	31,008	31,414	35,867	61	—	—
Antihistamines	5,761	4,429	4,130	5,096	8,282	9,439	—	85	—
Bronchodilators	2,294	3,043	2,920	3,043	3,046	3,123	—	—	—
Decongestants	1,864	1,309	1,511	1,758	1,160	1,108	—	—	—
Expectorants	832	1,960	2,125	2,293	2,089	4,172	401	82	100
Upper respiratory products	10,314	15,837	15,115	16,677	14,901	15,481	—	—	—
Respiratory agents NTA	2,903	3,692	4,296	4,655	3,660	5,699	96	—	56
Cardiovascular agents	27,396	37,095	36,343	35,608	41,522	46,416	69	30	—

Table 19. Trends in ED visits involving nonmedical use of pharmaceuticals, by selected drugs, 2004–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Antiadrenergic agents, centrally acting	3,616	5,125	4,810	4,751	6,197	5,258	—	—	—
Beta-adrenergic blocking agents	7,094	9,824	11,729	11,668	13,000	16,204	128	—	—
Calcium channel blocking agents	3,115	5,434	5,227	4,493	5,857	6,428	106	—	—
Diuretics	3,625	5,332	5,102	5,467	4,814	7,563	109	—	—
Cardiovascular agents NTA	14,930	18,881	17,338	17,879	22,359	23,539	—	—	—
Gastrointestinal agents	9,249	7,286	10,544	11,051	13,273	14,657	—	—	—
Hormones	5,600	7,099	7,981	8,572	8,715	10,602	89	—	—
Metabolic agents	10,944	20,864	23,305	26,662	25,225	30,841	182	—	—
Nutritional products	4,897	5,562	4,663	6,761	6,020	7,776	—	—	—
Drug unknown	38,083	45,877	76,416	131,111	131,479	150,002	294	—	—

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) This column denotes statistically significant ($p < 0.05$) increases or decreases between estimates for the periods shown.

(3) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(4) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both methadone and tramadol will appear twice in this table). The sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.

NOTE: CNS = central nervous system. NOS = not otherwise specified. NTA = not tabulated above. An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed. A dash (—) indicates a blank cell.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

As noted below, large increases were observed between 2004 and 2009 in the number of ED visits involving nonmedical use of pharmaceuticals. It is likely that there are multiple causes contributing to these increases. Some portion may be associated with the greater number of prescriptions being written, making prescription drugs more accessible and able to be diverted. Also, as more people are taking prescription medications as part of their regular health care, there is more risk that drugs taken as prescribed will interact with other drugs that are being used nonmedically. It is beyond the scope of this report to explore the causes behind the growing numbers of ED visits involving misuse or abuse of pharmaceuticals, and further analysis is needed.

Medical emergencies related to nonmedical use of pharmaceuticals increased 101 percent in the period from 2004 to 2009, rising from about a half million visits (536,247 visits) to over one million visits (1,079,683 visits). Contributing to this rise were significant long-term increases in the number of visits involving narcotic pain relievers, which increased 137 percent, or over 197,000 visits, beyond its 2004 level of 144,644 visits. ED visits for narcotic pain relievers that more than doubled over this period were fentanyl, hydrocodone, hydromorphone, morphine, and oxycodone.

Between 2004 and 2009, the number of visits involving drugs for anxiety and insomnia increased 105 percent overall—a jump of more than 180,000 visits over the 2004 level of 177,394 visits. Benzodiazepines have shown a regular upward trend and accounted for almost 170,000 of that increase.

Two drugs commonly used to treat attention deficit hyperactivity disorder (ADHD), amphetamine-dextroamphetamine (e.g., Adderall®) and methylphenidate (e.g., Ritalin), saw a 276 percent and 103 percent increase, respectively. The general drug category in which these two drugs fall, central nervous system stimulants, saw a 122 percent increase, with a total of 21,742 visits in 2009.

Medical emergencies involving the misuse or abuse of respiratory condition medications (e.g., antihistamines, bronchodilators, decongestants, and related combination products) experienced a 61 percent increase since 2004, with a total of 35,867 visits in 2009. With 4,172 visits in 2009, expectorants jumped over 400 percent since 2004, with a 100 percent increase since 2008.

ED visits involving antipsychotics have also seen a steady increase. With 58,018 visits in 2009, antipsychotics experienced a net increase of 65 percent since 2004.

Increases were seen for cardiovascular agents between 2004 and 2009 (69%). In particular, beta-adrenergic blocking agents (e.g., beta blockers) experienced a 128 percent increase. Beta blockers relieve stress on the heart and are more commonly prescribed among older populations. However, while the increases in cardiovascular agents may signal an increase in their misuse, they may simply reflect an increase in visits where cardiovascular agents were taken as prescribed but interacted with other drugs that were being used nonmedically.

6. DRUG-RELATED SUICIDE ATTEMPTS

6.1 ED Visits Involving Drug-Related Suicide Attempts, 2009

In 2007, more than 34,000 suicides occurred in the United States, and suicide was the second leading cause of death for adults aged 25 to 34.[12] This is the equivalent of 1 suicide every 15 minutes, or 11.3 suicides per 100,000 population. Substance abuse is strongly associated with attempts at suicide. Evidence suggests that one third of those who died by suicide were positive for alcohol at the time of death and that nearly one in five had evidence of opiates. As attempted suicide is a primary risk factor for subsequent attempts, the ED is an excellent point at which to identify individuals at higher risk. DAWN data provide a unique window to study life-threatening suicide attempts that involve drugs in respect to the kinds of drugs involved, the characteristics of the patients, and the follow-up treatments provided. DAWN reports on suicide attempts involving all types of illicit drugs and prescription drugs as well as over-the-counter products and attempts involving alcohol alone for patients aged 20 or younger. DAWN cases are not limited to drug overdoses. Suicide attempts involving firearms, for example, are included as DAWN cases if drugs are noted as being involved at the time of the suicide attempt.[13]

DAWN estimates there were almost 200,000 (198,403) ED visits resulting from drug-related suicide attempts in 2009 (Table 20). Almost all (94.2%) involved a prescription drug or over-the-counter medication; about two thirds (65.1%) involved multiple drugs; just under one third (31.2%) involved alcohol; and about a fifth (17.9%) involved illicit drugs.

Found in 38.1 percent of visits, pain relievers were one of the more common types of drug involved in drug-related suicide attempts. Narcotic pain relievers were observed in 14.9 percent of visits, acetaminophen products in 12.1 percent, and nonsteroidal anti-inflammatory agents (e.g., ibuprofen) in 9.6 percent. Among the narcotic pain relievers, hydrocodone and oxycodone products were seen in 6.9 and 5.5 percent of visits, respectively. Benzodiazepines (anti-anxiety drugs) followed pain relievers at 28.7 percent, with alprazolam (e.g., Xanax) and clonazepam (e.g., Klonopin) accounting for 11.7 and 8.1 percent of visits, respectively. At 26.4 percent, psychotherapeutic drugs (antidepressants and antipsychotics) occurred at a level similar to benzodiazepines. Antidepressants appear in 18.2 percent of visits, with sertraline (e.g., Zoloft), fluxetine (e.g., Prozac), and citalopram (e.g., Celexa®) each accounting for around 2 percent of visits. Antipsychotics, as a whole, appear in 12.1 percent of visits. At 10.3 percent, the newer types of atypical antipsychotics account for most of those visits. Quetiapine (e.g., Seroquel®) was the most common atypical antipsychotic (6.2%).

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[12] Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control (NCIPC). (2010). *Web-based Injury Statistics Query and Reporting System (WISQARS)*. Retrieved June 6, 2011, from http://www.cdc.gov/injury/wisqars/index.html.

[13] Excluded are suicide-related behaviors documented as something other than actual attempts (e.g., suicidal ideation, suicidal gesture, or suicidal thoughts).

Table 20. ED visits involving drug-related suicide attempts, by selected drugs, 2009

Drug category and selected drugs (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Total ED visits, suicide attempts (2,3)	**198,403**	**100.0**	**8.2**	**166,539**	**230,268**
Single drug	69,241	34.9	9.9	55,841	82,640
Multiple drugs	129,162	65.1	7.9	109,120	149,205
Alcohol (all ages)	61,827	31.2	7.8	52,382	71,273
Aged 20 or younger	4,556	2.3	20.8	2,628	6,249
Illicit drugs	**35,586**	**17.9**	**16.3**	**24,240**	**46,932**
Cocaine	17,967	9.1	23.9	9,559	26,375
Heroin	5,019	2.5	20.9	2,960	7,077
Marijuana	14,176	7.1	18.0	9,186	19,165
Stimulants	3,429	1.7	26.4	1,654	5,205
Amphetamines	2,035	1.0	28.1	915	3,155
Methamphetamine	1,814	0.9	40.0	390	3,238
MDMA (Ecstasy)	1,038	0.5	24.3	543	1,533
GHB	*	*	*	*	*
Flunitrazepam (Rohypnol)	*	*	*	*	*
Ketamine	*	*	*	*	*
LSD	*	*	*	*	*
PCP	1,212	0.6	39.9	263	2,161
Misc. hallucinogens	*	*	*	*	*
Inhalants	347	0.2	41.2	67	627
Combinations NTA	*	*	*	*	*
Pharmaceuticals	**186,886**	**94.2**	**8.1**	**157,058**	**216,714**
Psychotherapeutic agents	52,392	26.4	10.4	41,728	63,056
Antidepressants	36,154	18.2	8.7	29,992	42,316
Phenylpiperazines	8,300	4.2	13.1	6,174	10,426
SSNRI antidepressants	4,275	2.2	16.0	2,931	5,619
Duloxetine	1,636	0.8	20.5	979	2,293
Venlafaxine	2,344	1.2	19.3	1,456	3,233
SSRI antidepressants	17,548	8.8	10.2	14,038	21,058
Citalopram	3,810	1.9	19.9	2,326	5,294
Fluoxetine	5,307	2.7	11.9	4,068	6,547
Paroxetine	1,777	0.9	28.3	791	2,764
Sertraline	4,526	2.3	13.2	3,356	5,697
Tetracyclic antidepressants	1,185	0.6	28.0	536	1,835
Tricyclic antidepressants	4,600	2.3	22.5	2,576	6,625
Misc. antidepressants	4,026	2.0	19.5	2,490	5,562
Bupropion	3,744	1.9	17.9	2,427	5,061
Antipsychotics	23,910	12.1	16.8	16,023	31,798
Atypical antipsychotics	20,499	10.3	16.6	13,812	27,185
Olanzapine	1,738	0.9	20.8	1,029	2,447
Quetiapine	12,219	6.2	20.7	7,264	17,174

Table 20. ED visits involving drug-related suicide attempts, by selected drugs, 2009 (continued)

Drug category and selected drugs (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Risperidone	2,014	1.0	30.6	806	3,221
Phenothiazine antipsychotics	1,288	0.6	34.3	421	2,156
Misc. antipsychotic agents	3,477	1.8	25.2	1,760	5,194
Haloperidol	*	*	*	*	*
Lithium	2,663	1.3	18.7	1,688	3,638
Central nervous system agents	143,595	72.4	8.4	120,028	167,163
Pain relievers	75,545	38.1	9.6	61,318	89,772
Opiates/opioids	32,886	16.6	11.1	25,718	40,054
Opiates/opioids, unspecified	3,800	1.9	17.6	2,486	5,114
Narcotic pain relievers	29,595	14.9	12.3	22,489	36,701
Codeine products	1,512	0.8	19.1	946	2,078
Hydrocodone products	13,701	6.9	10.1	10,979	16,422
Hydromorphone products	227	0.1	49.4	7	447
Methadone	2,474	1.2	22.1	1,404	3,545
Morphine products	1,423	0.7	23.1	778	2,068
Oxycodone products	10,945	5.5	22.9	6,025	15,866
Propoxyphene products	1,410	0.7	23.2	770	2,051
Nonsteroidal anti-inflammatory agents	19,127	9.6	13.7	13,978	24,277
Salicylates products	6,887	3.5	16.0	4,725	9,049
Misc. pain reliever products	27,074	13.6	9.8	21,891	32,257
Acetaminophen products	24,072	12.1	10.5	19,113	29,032
Tramadol products	2,305	1.2	17.0	1,537	3,073
Anorexiants	*	*	*	*	*
Anticonvulsants	13,299	6.7	11.9	10,205	16,393
Anxiolytics, sedatives, and hypnotics	77,623	39.1	7.7	65,962	89,285
Barbiturates	1,605	0.8	28.0	724	2,486
Benzodiazepines	56,851	28.7	7.5	48,518	65,183
Alprazolam	23,250	11.7	10.2	18,595	27,905
Clonazepam	16,060	8.1	9.4	13,111	19,009
Diazepam	6,120	3.1	15.4	4,273	7,967
Lorazepam	9,897	5.0	16.2	6,758	13,037
Temazepam	1,817	0.9	25.5	910	2,725
Misc. anxiolytics, sedatives, and hypnotics	27,222	13.7	10.9	21,433	33,011
Buspirone	1,309	0.7	43.1	204	2,414
Diphenhydramine	8,384	4.2	15.4	5,861	10,907
Doxylamine	1,364	0.7	33.4	472	2,256
Hydroxyzine	2,843	1.4	16.4	1,929	3,756
Zolpidem	10,815	5.5	15.8	7,475	14,155

Table 20. ED visits involving drug-related suicide attempts, by selected drugs, 2009 (continued)

Drug category and selected drugs (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
CNS stimulants	3,369	1.7	22.0	1,918	4,820
Muscle relaxants	8,350	4.2	17.2	5,540	11,160
Skeletal muscle relaxants	7,892	4.0	18.8	4,982	10,801
Carisoprodol	2,516	1.3	21.3	1,464	3,568
Cyclobenzaprine	3,955	2.0	22.1	2,243	5,668
Respiratory agents	7,807	3.9	17.0	5,213	10,400
Antihistamines	2,475	1.2	37.9	636	4,315
Upper respiratory products	3,166	1.6	27.4	1,466	4,866
Cardiovascular agents	10,665	5.4	14.5	7,637	13,694
Antiadrenergic agents, centrally acting	1,204	0.6	29.9	499	1,909
Beta-adrenergic blocking agents	3,829	1.9	19.9	2,337	5,320
Gastrointestinal agents	3,040	1.5	20.7	1,809	4,270
Hormones	2,028	1.0	16.9	1,356	2,699
Metabolic agents	4,911	2.5	20.8	2,906	6,916
Antidiabetic agents	3,596	1.8	23.9	1,909	5,284
Nutritional products	1,665	0.8	22.9	918	2,412
Drug unknown	11,305	5.7	13.4	8,330	14,281

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(3) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both cocaine and marijuana will appear twice in this table). The sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.

NOTE: CI = confidence interval. CNS = central nervous system. NTA = not tabulated above. RSE = relative standard error. An asterisk (*) indicates that an estimate with an RSE greater than 50% or an estimate based on fewer than 30 visits has been suppressed.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Illicit drugs were involved in 17.9 percent of visits. Cocaine and marijuana were the more commonly involved illicit drugs and appeared in 9.1 and 7.1 percent of visits, respectively.[14]

After population size and sampling error are taken into account, the rate of drug-related suicide attempt visits for females (77.4 visits per 100,000 population) was higher than that for males (51.5 visits per 100,000) (Table 21 and Figure 6). In respect to age, rates ranged from 11.1 visits per 100,000 population for those aged 65 or older to 132.1 visits for those aged 18 to 20.

Considering race/ethnicity, 63.0 percent of the suicide attempts involved patients who were White, 14.1 percent were Black, 13.3 percent were Hispanic, 1.6 percent were of other or multiple race/ethnic groups, and 8.0 percent were of unknown race/ethnicity. DAWN does not produce population-based rates for race/ethnicity categories because race/ethnicity information is often missing from ED records.

[14] Percentages add to greater than 100 percent because visits often involve multiple drugs.

Table 21. ED visits involving drug-related suicide attempts, by patient demographics, 2009

Patient demographics	ED visits	Percent of ED visits	Rate of ED visits per 100,000 population (1)
Total ED visits, suicide attempts (2)	**198,403**	**100.0**	**64.6**
Gender	—	—	—
Male	77,971	39.3	51.5
Female	120,418	60.7	77.4
Unknown	*	*	—
Age	—	—	—
0–5 years	*	*	*
6–11 years	*	*	*
12–17 years	20,719	10.4	83.7
18–20 years	17,457	8.8	132.1
21–24 years	21,390	10.8	124.4
25–29 years	25,336	12.8	116.9
30–34 years	22,496	11.3	113.1
35–44 years	41,211	20.8	99.2
45–54 years	34,728	17.5	77.9
55–64 years	10,650	5.4	30.6
65 years and older	4,381	2.2	11.1
Unknown	*	*	—
Race/ethnicity	—	—	—
White	125,036	63.0	—
Black	27,884	14.1	—
Hispanic	26,462	13.3	—
Other or two or more race/ethnicities	3,237	1.6	—
Unknown	15,784	8.0	—

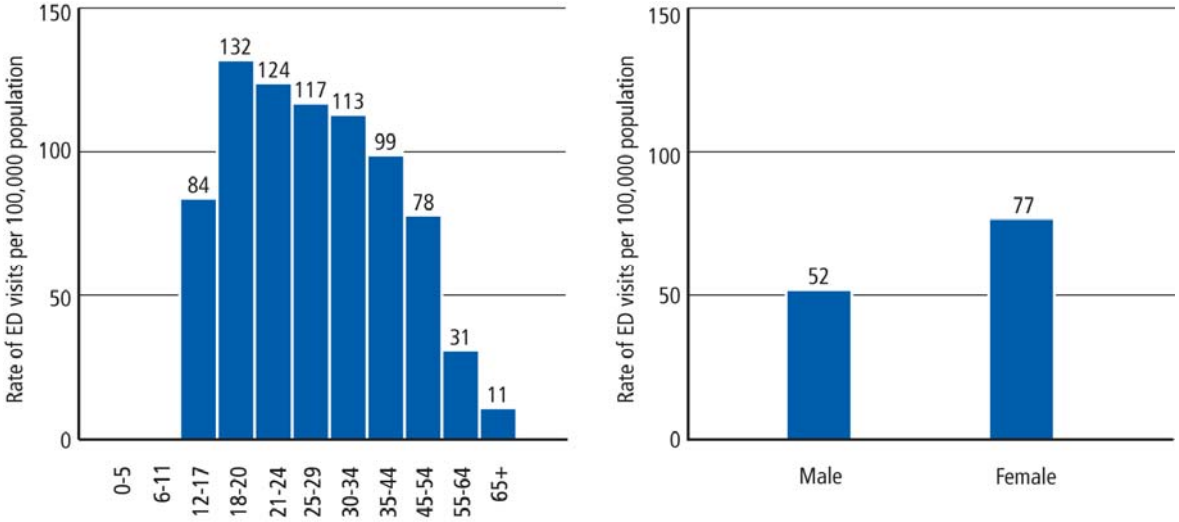
(1) All rates are ED visits per 100,000 population. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

NOTE: An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed. A dash (—) indicates a blank cell. Rates are not provided for race and ethnicity subgroups because of data limitations.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Figure 6. Rates of ED visits per 100,000 population involving drug-related suicide attempts, by age and gender, 2009



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Almost half (47.0%) of the patients attempting suicide were admitted for inpatient hospital care: a fifth (19.1%) were admitted to an intensive or critical care unit (ICU), while about half that number (10.5%) were admitted to psychiatric units (Table 22). A quarter (25.4%) were transferred to another health care facility, and 2.8 percent were discharged with a referral to detox/treatment. In all, 72.7 percent of patients had some form of follow-up. The remainder of patients were treated and discharged to home (17.5%) or had other outcomes.

DAWN does not record deaths for patients who died and were not brought to the ED or for patients who died after admission to inpatient units of the hospital. Therefore, the total number of persons who die from drug-related suicide attempts is greater than reported by DAWN.

Table 22. ED visits involving drug-related suicide attempts, by patient disposition, 2009

Patient disposition	ED visits	Percent of ED visits	Rate of ED visits per 100,000 population (1)
Total ED visits, suicide attempts (2)	**198,403**	**100.0**	**64.6**
Treated and released	**42,886**	**21.6**	**14.0**
Discharged home	34,752	17.5	11.3
Released to police/jail	2,548	1.3	0.8
Referred to detox/treatment	5,586	2.8	1.8
Admitted to this hospital	**93,247**	**47.0**	**30.4**
ICU/critical care	37,800	19.1	12.3
Surgery	*	*	*
Chemical dependency/detox	*	*	*
Psychiatric unit	20,879	10.5	6.8
Other inpatient unit	33,988	17.1	11.1
Other disposition	**62,270**	**31.4**	**20.3**
Transferred	50,417	25.4	16.4
Left against medical advice	594	0.3	0.2
Died	*	*	*
Other	*	*	*
Not documented	902	0.5	0.3

(1) All rates are ED visits per 100,000 population. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

NOTE: An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

6.2 Trends in ED Visits Involving Drug-Related Suicide Attempts, 2004–2009

This section presents the trends in the estimates of drug-related ED visits involving suicide attempts for the period 2004 through 2009. Differences between years are presented in terms of the percentage increase or decrease in visits in 2009 compared with the estimates for 2004 (long-term trends) and for 2007 and 2008 (short-term trends). Only statistically significant changes are discussed and displayed in the tables.

With just under 200,000 (198,403) visits in 2009, the number of drug-related suicide attempts has been stable from 2004 to 2009 (Table 23). There have been changes in the types of drugs involved, though. A significant rise was observed between 2004 and 2009 in the involvement of two pain relievers—hydrocodone (e.g., Vicodin) and oxycodone (e.g., OxyContin)—and three anti-anxiety drugs—alprazolam (e.g., Xanax), clonazepam (e.g., Klonopin), and zolpidem (e.g., Ambien) (Table 24).

Table 23. Trends in ED visits for drug-related suicide attempts, by selected drugs, 2004–2009

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Total ED visits, suicide attempts (3,4)	**161,586**	**151,568**	**182,805**	**197,053**	**199,469**	**198,403**	—	—	—
Illicit drugs	**34,763**	**33,784**	**42,148**	**37,319**	**36,735**	**35,586**	—	—	—
Cocaine	19,520	19,628	26,510	26,462	19,614	17,967	—	—	—
Heroin	4,579	3,167	4,265	4,444	4,249	5,019	—	—	—
Marijuana	12,074	11,955	15,272	12,115	17,285	14,176	—	—	—
Stimulants	4,535	5,410	4,829	2,665	2,788	3,429	—	—	—
Amphetamines	1,560	1,646	2,228	878	1,404	2,035	—	132	—
Methamphetamine	3,136	3,853	2,877	1,795	1,553	1,814	—	—	—
MDMA (Ecstasy)	*	529	1,239	481	745	1,038	—	—	—
GHB	*	*	*	*	*	*	—	—	—
Flunitrazepam (Rohypnol)	*	*	*	*	*	*	—	—	—
Ketamine	*	*	*	*	*	*	—	—	—
LSD	*	*	*	*	*	*	—	—	—
PCP	*	*	*	768	*	1,212	—	—	—
Misc. hallucinogens	*	*	*	*	*	*	—	—	—
Inhalants	*	794	*	*	*	347	—	—	—
Combinations NTA	*	*	*	*	*	*	—	—	—
Pharmaceuticals	145,503	138,454	169,050	185,307	188,651	186,886	—	—	—
Psychotherapeutic agents	44,940	39,145	52,450	57,111	58,604	52,392	—	—	-11
Antidepressants	33,366	27,086	36,677	38,870	40,985	36,154	—	—	—
Phenylpiperazines	7,015	6,639	9,029	8,018	9,598	8,300	—	—	—
SSNRI antidepressants	3,193	2,941	4,392	6,404	5,808	4,275	—	—	—
Duloxetine	*	861	1,541	2,948	1,931	1,636	—	—	—
Venlafaxine	3,179	2,080	2,858	3,457	3,717	2,344	—	—	—
SSRI antidepressants	18,513	13,377	16,973	18,884	19,988	17,548	—	—	—

Table 23. Trends in ED visits for drug-related suicide attempts, by selected drugs, 2004–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Citalopram	2,115	886	3,047	3,358	3,563	3,810	—	—	—
Fluoxetine	3,477	3,292	3,923	3,790	5,730	5,307	—	—	—
Paroxetine	4,509	2,927	2,054	2,071	2,013	1,777	-61	—	—
Sertraline	4,852	4,109	4,263	5,413	4,197	4,526	—	—	—
Tetracyclic antidepressants	1,749	811	2,200	1,303	1,120	1,185	—	—	—
Tricyclic antidepressants	3,555	3,008	4,681	4,152	5,470	4,600	—	—	—
Misc. antidepressants	3,337	2,681	3,806	3,939	4,630	4,026	—	—	—
Bupropion	3,324	2,570	3,589	3,880	4,137	3,744	—	—	—
Antipsychotics	17,807	17,129	22,491	25,479	25,451	23,910	—	—	—
Atypical antipsychotics	15,016	14,300	19,429	20,250	21,228	20,499	—	—	—
Olanzapine	2,541	2,334	2,666	933	1,961	1,738	—	—	—
Quetiapine	8,308	8,649	10,756	14,051	13,522	12,219	—	—	—
Risperidone	3,255	2,036	2,536	2,367	2,309	2,014	—	—	—
Phenothiazine antipsychotics	956	680	1,574	*	1,076	1,288	—	—	—
Misc. antipsychotic agents	2,821	2,354	2,568	3,842	4,250	3,477	—	—	—
Haloperidol	*	1,070	1,181	855	1,214	*	—	—	—
Lithium	1,832	1,281	1,298	2,751	2,948	2,663	—	—	—
Central nervous system agents	110,097	103,698	129,735	143,384	142,931	143,595	—	—	—
Pain relievers	61,095	54,858	67,623	78,948	74,467	75,545	—	—	—
Opiates/opioids	18,939	20,359	27,185	31,476	30,067	32,886	74	—	—
Opiates/opioids, unspecified	2,363	2,819	3,129	1,893	3,605	3,800	—	101	—
Narcotic pain relievers	16,928	17,801	24,470	29,886	26,817	29,595	75	—	—
Codeine products	1,750	2,656	2,349	1,637	2,315	1,512	—	—	—
Hydrocodone products	7,034	7,035	8,998	13,238	11,676	13,701	95	—	—
Hydromorphone products	*	*	262	796	770	227	—	-71	—
Methadone	1,287	1,596	1,772	3,192	2,008	2,474	—	—	—

Table 23. Trends in ED visits for drug-related suicide attempts, by selected drugs, 2004–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Morphine products	714	1,210	*	1,690	1,161	1,423	—	—	—
Oxycodone products	5,340	4,229	7,842	9,351	8,760	10,945	105	—	—
Propoxyphene products	1,888	2,129	2,811	1,754	1,559	1,410	—	—	—
Nonsteroidal anti-inflammatory agents	19,114	14,117	15,956	18,810	18,657	19,127	—	—	—
Salicylates products	6,211	4,645	5,400	5,976	5,351	6,887	—	—	—
Misc. pain reliever products	22,864	22,692	27,371	32,968	29,388	27,074	—	—	—
Acetaminophen products	20,701	21,017	25,312	29,861	26,406	24,072	—	—	—
Tramadol products	1,742	1,515	1,719	2,816	3,057	2,305	—	—	—
Anorexiants	*	*	654	*	250	*	—	—	—
Anticonvulsants	10,957	9,389	12,580	11,803	14,486	13,299	—	—	—
Anxiolytics, sedatives, and hypnotics	52,653	52,022	68,177	72,637	78,990	77,623	47	—	—
Barbiturates	1,948	1,219	2,031	1,663	1,480	1,605	—	—	—
Benzodiazepines	36,995	35,676	50,431	53,509	55,823	56,851	54	—	—
Alprazolam	11,354	14,530	15,633	19,167	21,220	23,250	105	—	—
Clonazepam	9,402	9,064	14,173	14,455	14,571	16,060	71	—	—
Diazepam	4,630	3,968	5,909	6,912	5,313	6,120	—	—	—
Lorazepam	6,065	5,182	6,682	9,527	9,973	9,897	—	—	—
Temazepam	2,539	1,803	2,661	2,398	2,608	1,817	—	—	—
Misc. anxiolytics, sedatives	16,790	17,522	21,527	23,349	28,253	27,222	62	—	—
Buspirone	268	*	516	950	1,653	1,309	—	—	—
Diphenhydramine	7,458	6,583	7,756	7,618	8,414	8,384	—	—	—
Doxylamine	454	1,325	1,090	1,098	2,315	1,364	—	—	—
Hydroxyzine	2,346	1,795	1,956	2,027	3,310	2,843	—	—	—
Zolpidem	4,355	4,972	6,674	7,403	9,533	10,815	148	46	—
CNS stimulants	1,654	1,782	1,949	2,208	3,221	3,369	104	—	—

Table 23. Trends in ED visits for drug-related suicide attempts, by selected drugs, 2004–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Muscle relaxants	5,921	5,785	7,072	9,772	8,053	8,350	—	—	—
Skeletal muscle relaxants	5,867	5,677	6,698	9,587	7,722	7,892	—	—	—
Carisoprodol	1,864	2,038	3,811	4,301	3,452	2,516	—	—	—
Cyclobenzaprine	2,966	2,784	2,096	3,839	3,438	3,955	—	—	—
Respiratory agents	8,361	7,662	8,415	10,175	9,152	7,807	—	—	—
Antihistamines	2,059	1,650	1,627	3,813	2,979	2,475	—	—	—
Upper respiratory products	4,818	4,207	3,982	4,067	4,640	3,166	—	—	—
Cardiovascular agents	7,667	5,814	7,965	7,873	13,140	10,665	—	—	—
Antiadrenergic agents, centrally acting	995	912	1,929	790	1,715	1,204	—	—	—
Beta-adrenergic blocking agents	2,105	1,916	1,999	2,501	5,094	3,829	—	—	—
Gastrointestinal agents	2,276	2,542	2,236	2,010	3,606	3,040	—	—	—
Hormones	1,123	545	1,577	2,016	2,167	2,028	—	—	—
Metabolic agents	2,145	3,044	3,719	2,252	3,173	4,911	129	118	—
Antidiabetic agents	1,841	2,580	2,941	1,438	2,749	3,596	—	150	—
Nutritional products	1,333	1,105	1,066	2,077	1,789	1,665	—	—	—
Drug unknown	4,015	6,725	6,704	9,322	11,363	11,305	182	—	—

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) This column denotes statistically significant ($p < 0.05$) increases or decreases between estimates for the periods shown.

(3) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(4) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both cocaine and marijuana will appear twice in this table). The sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.

NOTE: CNS = central nervous system. NTA = not tabulated above. An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed. A dash (—) indicates a blank cell.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Table 24. Drug categories and drugs with increasing involvement in drug-related suicide attempt ED visits, 2004–2009

Drug category and selected drugs (1,2)	Increase in visits, 2004–2009	Percent increase in visits, 2004–2009 (3)
Narcotic pain relievers	12,667	75
Hydrocodone products	6,667	95
Oxycodone products	5,605	105
Drugs for anxiety and insomnia	24,970	47
Benzodiazepines	19,856	54
Alprazolam	11,896	105
Clonazepam	6,658	71
Other drugs for anxiety and insomnia	10,432	62
Zolpidem	6,460	148

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(3) This column denotes statistically significant ($p < 0.05$) increases or decreases between estimates for the periods shown.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

7. SEEKING DETOX SERVICES

7.1 ED Visits Involving Seeking Detox Services, 2009

The category of visits referred to as "seeking detox" includes nonemergency requests for admission for detoxification and visits to obtain medical clearance before entry to a detox program as well as acute emergencies in which an individual is experiencing withdrawal symptoms and seeking detox.[15] Because detox may be sought through other avenues (e.g., direct admission to a hospital, services provided through private clinics, entry into programs outside the community), the overall demand for detox services is most likely higher than suggested by DAWN estimates.

DAWN estimates that there were 205,407 drug-related ED visits for patients seeking detox or substance abuse treatment services during 2009 (Table 25). Visits for almost three quarters (69.2%) of patients seeking detox involved multiple drugs. On average, 34.8 percent of visits associated with seeking detox involved alcohol.[16] Cocaine was observed in 29.2 percent of visits, heroin in 28.4 percent, marijuana in 18.3 percent, and stimulants in 5.4 percent. Other illicit drugs were seen at lower levels. Among pharmaceuticals, narcotic pain relievers were observed in 38.2 percent of visits, including oxycodone at 22.2 percent. Benzodiazepines (anti-anxiety drugs) were observed in 23.7 percent of visits, with alprazolam (e.g., Xanax) at 13.5 percent and clonazepam (e.g., Klonopin) at 4.1 percent.

When population size and sampling error are taken into account, the rate of seeking detox visits for males (62.9 per 100,000 population) was higher than that for females (37.1 per 100,000 population) (Table 26, Figure 7). Rates of seeking detox visits were over 100 visits per 100,000 population for those aged 18 to 44, peaking at 188.8 for those aged 21 to 24.

In terms of race/ethnicity, the majority (73.4%) of seeking detox visits involved patients who were White, and 13 percent were Black. DAWN does not produce population-based rates for race/ethnicity categories because race/ethnicity information is often missing in ED records.

Over 60 percent (64.6%) of ED patients classified as seeking detox obtained some follow-up: 36.6 percent were admitted to the hospital, 20.9 percent were referred to detox or treatment services, and 7.1 percent were transferred to another facility (Table 27). The plurality of those admitted to the hospital were sent to the chemical dependency/detox unit. The remaining patients were treated and discharged home (29.3%) or had other outcomes.

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[15] Some detox programs, in the hospital or the community, require medical clearance before a person can be admitted to a program. Medical clearance establishes whether a person has any special medical needs (e.g., person is diabetic and needs insulin) or is not suitable to mingle with other patients in the program (e.g., person has an infectious disease or is mentally unstable).

[16] The role of alcohol may be underrepresented here because, for patients aged 21 and older, DAWN captures alcohol use only when it is combined with the use of other drugs.

Table 25. ED visits involving seeking detox services, by selected drugs, 2009

Drug category and selected drugs (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Total ED visits, seeking detox (2,3)	**205,407**	**100.0**	**27.6**	**94,479**	**316,336**
Single drug	63,213	30.8	22.6	35,268	91,157
Multiple drugs	142,194	69.2	30.3	57,834	226,555
Alcohol (all ages)	71,414	34.8	23.9	37,983	104,845
Aged 20 or younger	5,054	2.5	25.8	2,495	7,613
Illicit drugs	**131,141**	**63.8**	**21.6**	**75,502**	**186,781**
Cocaine	60,076	29.2	23.8	32,014	88,138
Heroin	58,233	28.4	19.2	36,374	80,092
Marijuana	37,513	18.3	33.6	12,808	62,218
Stimulants	11,085	5.4	34.2	3,650	18,520
Amphetamines	2,699	1.3	49.3	91	5,306
Methamphetamine	9,580	4.7	34.1	3,185	15,975
MDMA (Ecstasy)	1,042	0.5	39.9	227	1,857
GHB	*	*	*	*	*
Flunitrazepam (Rohypnol)	*	*	*	*	*
Ketamine	*	*	*	*	*
LSD	*	*	*	*	*
PCP	1,134	0.6	29.9	469	1,798
Misc. hallucinogens	*	*	*	*	*
Inhalants	*	*	*	*	*
Combinations NTA	245	0.1	45.9	24	465
Pharmaceuticals	**123,194**	**60.0**	**37.3**	**33,151**	**213,237**
Psychotherapeutic agents	2,267	1.1	38.0	579	3,955
Antidepressants	1,769	0.9	49.1	68	3,470
Antipsychotics	531	0.3	35.1	165	896
Central nervous system agents	113,903	55.5	37.3	30,691	197,114
Pain relievers	90,378	44.0	40.9	17,848	162,907
Opiates/opioids	87,667	42.7	41.3	16,669	158,664
Opiates/opioids, unspecified	10,560	5.1	35.9	3,138	17,983
Narcotic pain relievers	78,423	38.2	42.1	13,771	143,075
Codeine products	624	0.3	40.3	131	1,117
Fentanyl products	1,644	0.8	33.7	558	2,731
Hydrocodone products	*	*	*	*	*
Hydromorphone products	3,184	1.5	32.5	1,157	5,210
Methadone	*	*	*	*	*
Morphine products	3,597	1.8	29.3	1,535	5,659
Oxycodone products	45,588	22.2	40.6	9,336	81,839

Table 25. ED visits involving seeking detox services, by selected drugs, 2009 (continued)

Drug category and selected drugs (1)	ED visits (2,3)	Percent of ED visits (3)	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Anxiolytics, sedatives, and hypnotics	49,768	24.2	37.9	12,757	86,778
Barbiturates	766	0.4	42.5	127	1,405
Benzodiazepines	48,769	23.7	38.4	12,100	85,438
Alprazolam	27,647	13.5	44.2	3,709	51,586
Clonazepam	8,475	4.1	35.5	2,575	14,374
Diazepam	3,019	1.5	31.9	1,130	4,908
Lorazepam	2,437	1.2	31.3	941	3,934
CNS stimulants	1,994	1.0	29.8	830	3,158
Muscle relaxants	2,332	1.1	44.0	321	4,344
Respiratory agents	*	*	*	*	*
Cardiovascular agents	90	<0.1	21.6	52	128
Drug unknown	11,624	5.7	49.4	368	22,881

(1) The classification of drugs used in DAWN is derived from the Multum Lexicon, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the Lexicon can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(3) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both cocaine and marijuana will appear twice in this table). The sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.

NOTE: CI = confidence interval. CNS = central nervous system. NTA = not tabulated above. RSE = relative standard error. An asterisk (*) indicates that an estimate with an RSE greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Table 26. ED visits involving seeking detox services, by patient demographics, 2009

Patient demographics	ED visits	Percent of ED visits	Rate of ED visits per 100,000 population (1)
Total ED visits, seeking detox (2)	**205,407**	**100.0**	**66.9**
Gender	—	—	—
Male	129,161	62.9	85.3
Female	76,225	37.1	49.0
Unknown	*	*	—
Age	—	—	—
0–5 years	*	*	*
6–11 years	*	*	*
12–17 years	1,138	0.6	4.6
18–20 years	17,370	8.5	131.5
21–24 years	32,481	15.8	188.8
25–29 years	35,422	17.2	163.4
30–34 years	27,163	13.2	136.6
35–44 years	43,575	21.2	104.9
45–54 years	37,705	18.4	84.6
55–64 years	9,813	4.8	28.2
65 years and older	705	0.3	1.8
Unknown	*	*	—
Race/ethnicity	—	—	—
White	150,707	73.4	—
Black	26,615	13.0	—
Hispanic	12,416	6.0	—
Other or two or more race/ethnicities	1,183	0.6	—
Unknown	14,487	7.1	—

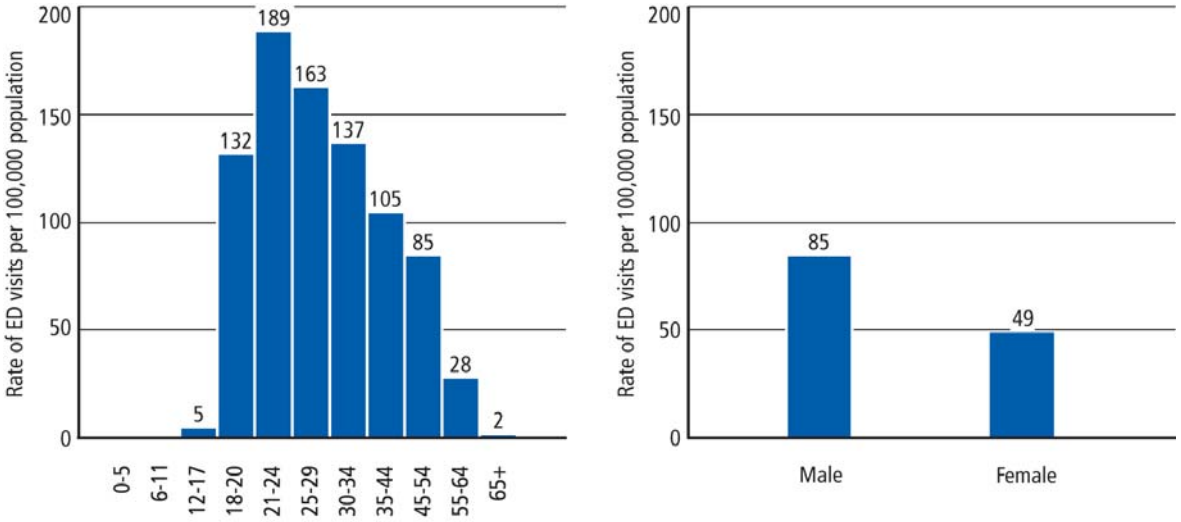
(1) All rates are ED visits per 100,000 population. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

NOTE: An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed. A dash (—) indicates a blank cell. Rates are not provided for race and ethnicity subgroups because of data limitations.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Figure 7. Rates of ED visits per 100,000 population involving seeking detox services, by age and gender, 2009



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Table 27. ED visits involving seeking detox services, by patient disposition, 2009

Patient disposition	ED visits	Percent of ED visits	Rate of ED visits per 100,000 population (1)
Total ED visits, seeking detox (2)	**205,407**	**100.0**	**66.9**
Treated and released	**103,716**	**50.5**	**33.8**
Discharged home	60,111	29.3	19.6
Released to police/jail	*	*	*
Referred to detox/treatment	42,925	20.9	14.0
Admitted to this hospital	**75,166**	**36.6**	**24.5**
ICU/critical care	*	*	*
Surgery	*	*	*
Chemical dependency/detox	34,010	16.6	11.1
Psychiatric unit	8,491	4.1	2.8
Other inpatient unit	*	*	*
Other disposition	**26,525**	**12.9**	**8.6**
Transferred	14,552	7.1	4.7
Left against medical advice	5,796	2.8	1.9
Died	*	*	*
Other	*	*	*
Not documented	531	0.3	0.2

(1) All rates are ED visits per 100,000 population. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

NOTE: An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

7.2 Trends in ED Visits Involving Seeking Detox Services, 2004–2009

This section presents the trends in the estimates of ED visits involving seeking detox services for the period 2004 through 2009 (Table 28). Differences between years are presented in terms of the percentage increase or decrease in visits in 2009 compared with the estimates for 2004 (long-term trends) and for 2007 and 2008 (short-term trends). Only statistically significant changes are discussed and displayed in the table.

The number of patients seeking detox services through the ED was stable from 2004 through 2009. With one noteworthy exception, the specific types of drugs involved in seeking detox have also remained constant. The exception is the anti-anxiety drug clonazepam, which has seen a 461 percent increase in involvement since 2004, peaking at over 8,000 visits in 2009.

Table 28. Trends in ED visits involving seeking detox services, by selected drugs, 2004–2009

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Total ED visits, seeking detox (3,4)	**141,867**	**126,226**	**118,355**	**139,908**	**177,879**	**205,407**	—	—	—
Illicit drugs	**110,792**	**101,244**	**92,385**	**106,660**	**124,371**	**131,141**	**—**	**—**	**—**
Cocaine	62,989	56,061	57,738	65,124	68,824	60,076	—	—	—
Heroin	47,035	40,895	34,462	42,242	51,932	58,233	—	—	—
Marijuana	25,965	22,486	22,104	25,970	32,887	37,513	—	—	—
Stimulants	11,760	15,402	8,128	7,161	12,418	11,085	—	—	—
Amphetamines	*	*	2,034	979	2,658	2,699	—	—	—
Methamphetamine	*	*	6,211	6,287	9,908	9,580	—	—	—
MDMA (Ecstasy)	882	511	483	654	775	1,042	—	—	—
GHB	*	*	*	*	*	*	—	—	—
Flunitrazepam (Rohypnol)	*	*	*	*	*	*	—	—	—
Ketamine	*	*	*	*	*	*	—	—	—
LSD	*	*	*	*	71	*	—	—	—
PCP	827	729	989	*	1,478	1,134	—	—	—
Misc. hallucinogens	*	*	*	*	*	*	—	—	—
Inhalants	*	*	*	*	*	*	—	—	—
Combinations NTA	*	191	*	216	85	245	—	—	—
Pharmaceuticals	**48,663**	**44,739**	**44,469**	**59,691**	**94,966**	**123,194**	**—**	**—**	**—**
Psychotherapeutic agents	1,419	1,380	1,364	1,654	3,671	2,267	—	—	-38
Antidepressants	1,024	1,195	1,141	1,314	1,894	1,769	—	—	—
Antipsychotics	459	259	457	536	*	531	—	—	—

Table 28. Trends in ED visits involving seeking detox services, by selected drugs, 2004–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Central nervous system agents	44,905	41,265	40,704	52,829	86,040	113,903	—	—	—
Pain relievers	34,730	30,114	31,690	42,776	69,602	90,378	—	—	—
Opiates/opioids	33,296	29,330	30,786	41,241	65,630	87,667	—	—	—
Opiates/opioids, unspecified	4,507	4,246	4,467	4,746	8,123	10,560	—	—	—
Narcotic pain relievers	29,894	25,550	26,880	37,040	58,488	78,423	—	—	—
Codeine products	650	347	426	*	768	624	—	—	—
Fentanyl products	704	1,265	1,054	1,359	1,126	1,644	—	—	—
Hydrocodone products	8,114	8,929	8,092	10,425	21,595	*	—	—	—
Hydromorphone products	962	617	*	*	1,447	3,184	—	—	—
Methadone	8,109	4,172	5,294	6,886	10,022	*	—	—	—
Morphine products	1,638	2,399	3,002	3,341	5,066	3,597	—	—	—
Oxycodone products	15,917	14,028	14,721	18,880	34,301	45,588	—	—	—
Anxiolytics, sedatives, and hypnotics	15,748	16,533	16,799	20,365	42,178	49,768	—	—	—
Barbiturates	852	684	530	722	551	766	—	—	—
Benzodiazepines	14,717	15,734	15,801	19,301	41,576	48,769	—	—	—
Alprazolam	6,061	6,253	7,063	9,138	*	27,647	—	—	—
Clonazepam	1,510	1,805	2,119	2,635	5,683	8,475	461	—	—
Diazepam	2,975	2,058	1,431	3,172	*	3,019	—	—	—
Lorazepam	1,012	987	1,479	1,980	2,847	2,437	—	—	—
Temazepam	*	*	*	*	*	*	—	—	—
CNS stimulants	*	829	589	1,049	*	1,994	—	—	—
Muscle relaxants	1,356	1,204	1,214	1,701	1,381	2,332	—	—	—

Table 28. Trends in ED visits involving seeking detox services, by selected drugs, 2004–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Respiratory agents	*	*	*	*	348	*	—	—	—
Cardiovascular agents	*	285	302	632	227	90	—	-86	—
Drug unknown	3,203	2,944	3,175	6,368	10,515	11,624	—	—	—

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) This column denotes statistically significant ($p < 0.05$) increases or decreases between estimates for the periods shown.

(3) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(4) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both cocaine and marijuana will appear twice in this table). The sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.

NOTE: CNS = central nervous system. NTA = not tabulated above. An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed. A dash (—) indicates a blank cell.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

8. ADVERSE REACTIONS TO PHARMACEUTICALS

8.1 ED Visits Involving Adverse Reactions to Pharmaceuticals, 2009

DAWN began collecting data on adverse reaction–related ED visits following the 2003 redesign.[17] Changes to the case definition and case-finding methodology introduced by the redesign required that each ED record be reviewed to identify ED visits that were related to recent drug use. This change opened the door for inclusion of adverse drug reactions, malicious poisonings, and accidental poisonings that were not previously collected in DAWN. This chapter represents the first time that ED visits related to adverse drug reaction have been included in the annual ED publication.

Adverse reactions to pharmaceuticals are a growing problem in the United States. It is likely that there are multiple causes contributing to increases in adverse reactions. Some portion may be associated with the greater number of prescriptions being written and more people taking prescription drugs as part of their medical care. Additionally, people of all ages are increasingly being prescribed multiple drugs simultaneously, which, in turn, increases the possibility for unintended interactions. Polypharmacy is particularly common among older populations who are placed on long-term medication for chronic conditions, and the number of older persons in the nation is growing.[18] While it is beyond the scope of this report to assess the precise impact of these different causes, DAWN data provide insight concerning the number and characteristics of medical emergencies resulting from the recent use of prescription drugs, over-the-counter pharmaceuticals, or other therapeutic substances used as prescribed or indicated. Included in DAWN are ED visits related to side effects, drug-drug interactions, and drug-alcohol interactions. To be classified as an adverse event, illicit drugs cannot be present.[19]

As with all ED visits that DAWN considers to be drug related, the involvement of a drug must be documented in the ED records. If the relationship between a drug and an adverse reaction is not recognized, a visit will not be considered drug related and will not be captured by DAWN. Also, adverse reactions that are identified in different medical settings (e.g., during a visit to the doctor's office or while a patient is already hospitalized) will not be captured by DAWN. Therefore, the total number of people experiencing adverse drug reactions is greater than reported by DAWN.

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17 For information on the DAWN redesign, see Substance Abuse and Mental Health Services Administration (SAMHSA), Office of Applied Studies (OAS). (2002). *Drug Abuse Warning Network: Development of a new design (Methodology report).* DAWN Series M-4, DHHS Publication No. (SMA) 02-3754. Rockville, MD. Available at http://dawninfo.samhsa.gov/files/report.pdf.

18 Gurwitz, J. H., Field, T. S., Harrold, L. R., Rothschild, J., Debellis, K., Seger, A. C., Bates, D. W. (2003). Incidence and preventability of adverse drug events among older persons in the ambulatory setting. *JAMA, 289*(9), 1107–1116.

19 While adverse reactions are typically limited to pharmaceuticals, a small number involve drugs classified as illicit by DAWN for which there are legitimate medicinal uses, e.g., nitrous oxide when used by a dentist for sedation, cocaine when used as topical anesthetic for eye surgery.

For 2009, DAWN estimates that 2,287,273 ED visits, or 745.0 visits per 100,000 population, involved adverse reactions to prescription medicines, over-the-counter drugs, or other types of pharmaceuticals (Table 29). This represents about half of all drug-related ED visits. Of the total number of ED visits for adverse reaction to pharmaceuticals, 18.6 percent involved multiple drugs. Alcohol is a contributing factor in just 1.1 percent of adverse reaction visits.

With reference to the specific types of drugs involved, adverse reactions show a very different pattern from nonmedical use of pharmaceuticals. Whereas nonmedical use clusters around certain types of drugs (e.g., 31.7% of nonmedical use visits involve a narcotic pain reliever, with oxycodone being the most commonly involved at 13.7%), adverse reactions involve more types of drugs and at lower levels. For example, narcotic pain relievers accounted for only 9.5 percent of adverse reaction visits, and while oxycodone is still one of the more commonly found narcotic pain relievers, it was involved in just 2.8 percent of visits. Among non-narcotic pain relievers, nonsteroidal anti-inflammatory agents (e.g., ibuprofen and naproxen products) were in evidence in 3.1 percent of adverse reaction visits. Other central nervous system agents appearing at higher levels were drugs to treat insomnia and anxiety (4.6%), with benzodiazepines (anti-anxiety drugs) being the most common among those (2.8%).

Anti-infectives (e.g., penicillins) were found in 20.9 percent of adverse reaction visits, cardiovascular agents in 10.8 percent, coagulation modifiers in 9.5 percent, and metabolic agents in 7.6 percent. Among anti-infectives, penicillins were involved in 5.6 percent of adverse reaction visits, followed by sulfonamides (e.g., sulfa drugs) at 3.3 percent, quinolones (e.g., Cipro®) at 2.9 percent, cephalosporins (e.g., Keflex®) at 2.3 percent, and macrolides (e.g., Zithromax®) at 2.1 percent. Cardiovascular agents appearing most often were angiotensin-converting enzyme (ACE) inhibitors (e.g., Prinivil®, Zestrila®) at 3.2 percent and beta blockers (e.g., Lopressor®, Toprol XL®) at 2.5 percent. The coagulation modifiers more commonly seen were blood thinners, such as coumarins (e.g., Coumadin®), at 8.2 percent. Metabolic agents include antidiabetic agents, such as insulin and antihyperlipidemic agents (e.g., lipid-lowering drugs). The most common of the lipid-lowering drugs were HMG-CoA reductase inhibitors, also known as statins (e.g., Lipitor®).

Table 29. ED visits involving adverse reaction to pharmaceuticals, 2009

Drug category and selected drugs (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Total ED visits, adverse reaction (2,3)	**2,287,273**	**100.0**	**6.1**	**2,012,178**	**2,562,367**
Single drug	1,862,796	81.4	6.0	1,645,545	2,080,048
Multiple drugs	424,476	18.6	8.3	355,538	493,414
Alcohol (all ages)	24,541	1.1	10.2	19,640	29,441
Illicit drugs	**626**	**<0.1**	**42.3**	**106**	**1,145**
Pharmaceuticals	**2,286,911**	**>99.9**	**6.1**	**2,011,989**	**2,561,832**
Alternative medicines	11,682	0.5	11.0	9,158	14,207
Herbal products	6,178	0.3	13.8	4,504	7,852
Nutraceutical products	5,799	0.3	13.9	4,216	7,382
Anti-infectives	476,960	20.9	6.0	421,075	532,844
Amebicides	16,626	0.7	8.5	13,863	19,389
Antiviral agents	15,648	0.7	12.5	11,811	19,484
Neuraminidase inhibitors	7,733	0.3	14.3	5,564	9,901
Cephalosporins	52,408	2.3	8.4	43,807	61,009
Glycopeptide antibiotics	6,475	0.3	21.0	3,807	9,143
Lincomycin derivatives	23,867	1.0	13.6	17,522	30,212
Macrolide derivatives	48,960	2.1	7.8	41,459	56,461
Penicillins	128,109	5.6	6.2	112,424	143,794
Aminopenicillins	82,140	3.6	6.5	71,606	92,675
Beta-lactamase inhibitors	30,276	1.3	10.6	24,005	36,547
Natural penicillins	15,229	0.7	11.2	11,874	18,584
Quinolones	67,151	2.9	9.0	55,328	78,974
Sulfonamides	75,904	3.3	7.6	64,563	87,245
Tetracyclines	21,688	0.9	10.6	17,204	26,173
Urinary anti-infectives	13,266	0.6	10.3	10,598	15,934
Antineoplastics	104,936	4.6	14.3	75,519	134,353
Biologicals	5,396	0.2	18.7	3,417	7,375
Cardiovascular agents	248,007	10.8	9.5	202,044	293,970
Antiadrenergic agents, centrally acting	10,205	0.4	15.1	7,181	13,230
Clonidine	9,402	0.4	14.6	6,707	12,097
Beta-adrenergic blocking agents	58,179	2.5	8.9	47,991	68,368
Cardioselective beta blockers	42,266	1.8	10.1	33,878	50,654
Atenolol	12,345	0.5	15.9	8,503	16,187
Non-cardioselective beta blockers	15,509	0.7	11.7	11,938	19,080
Calcium channel blocking agents	30,354	1.3	10.1	24,332	36,375
Diuretics	44,758	2.0	13.6	32,787	56,729
Loop diuretics	22,191	1.0	15.9	15,271	29,111
Thiazide diuretics	20,483	0.9	16.5	13,874	27,092

Table 29. ED visits involving adverse reaction to pharmaceuticals, 2009 (continued)

Drug category and selected drugs (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Cardiovascular agents NTA	162,525	7.1	10.3	129,663	195,388
Angiotensin-converting enzyme inhibitors	72,219	3.2	12.2	55,012	89,426
Angiotensin II inhibitors	15,680	0.7	12.8	11,761	19,600
Antiadrenergic agents, peripherally acting	8,212	0.4	15.1	5,779	10,644
Antianginal agents	11,636	0.5	14.9	8,240	15,031
Antihypertensive combinations	24,437	1.1	11.9	18,722	30,153
Inotropic agents	20,036	0.9	16.0	13,762	26,310
Vasopressors	6,240	0.3	11.7	4,814	7,666
Central nervous system agents	591,418	25.9	7.2	508,025	674,810
Pain relievers	387,168	16.9	8.3	324,317	450,020
Antimigraine agents	7,519	0.3	15.6	5,219	9,820
Cox-2 inhibitors	6,233	0.3	24.9	3,185	9,280
Opiates/opioids	225,583	9.9	9.2	184,975	266,192
Opiates/opioids, unspecified	7,803	0.3	21.4	4,531	11,074
Narcotic pain relievers	218,366	9.5	9.0	179,812	256,919
Codeine products	18,458	0.8	11.9	14,148	22,768
Fentanyl products	14,315	0.6	16.6	9,669	18,961
Hydrocodone products	79,877	3.5	10.5	63,515	96,240
Hydromorphone products	10,916	0.5	19.7	6,700	15,133
Methadone	9,798	0.4	13.6	7,180	12,416
Morphine products	17,499	0.8	16.4	11,865	23,133
Oxycodone products	65,146	2.8	12.8	48,749	81,543
Propoxyphene products	12,202	0.5	10.5	9,685	14,719
Nonsteroidal anti-inflammatory agents	70,024	3.1	7.3	60,009	80,039
Ibuprofen	34,292	1.5	10.2	27,422	41,162
Naproxen products	15,784	0.7	11.9	12,111	19,457
Salicylates products	42,967	1.9	14.3	30,946	54,989
Acetaminophen products	22,997	1.0	9.7	18,617	27,377
Tramadol products	25,884	1.1	12.0	19,799	31,969
Anorexiants	7,195	0.3	8.6	5,979	8,411
Anticonvulsants	86,835	3.8	7.9	73,416	100,254
Topiramate	5,815	0.3	13.2	4,313	7,317
Dibenzazepine anticonvulsants	10,194	0.4	13.1	7,569	12,820
Carbamazepine	6,110	0.3	15.2	4,295	7,925
Fatty acid derivative anticonvulsants	13,001	0.6	9.6	10,555	15,448
Divalproex sodium	11,840	0.5	10.7	9,358	14,322

Table 29. ED visits involving adverse reaction to pharmaceuticals, 2009 (continued)

Drug category and selected drugs (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Gamma-aminobutyric acid analogs	21,782	1.0	10.1	17,460	26,105
Gabapentin	14,048	0.6	9.4	11,452	16,644
Hydantoin anticonvulsants	26,436	1.2	15.1	18,603	34,269
Phenytoin	26,426	1.2	15.1	18,594	34,259
Pyrrolidine anticonvulsants	4,681	0.2	14.4	3,360	6,002
Triazine anticonvulsants	8,463	0.4	8.5	7,054	9,871
Antiemetic/antivertigo agents	8,511	0.4	11.1	6,661	10,361
Anti-Parkinson agents	10,974	0.5	13.1	8,149	13,800
Anticholinergic anti-Parkinson agents	5,141	0.2	22.3	2,889	7,393
Dopaminergic anti-Parkinsonism agents	6,270	0.3	21.9	3,575	8,965
Anxiolytics, sedatives, and hypnotics	104,332	4.6	10.7	82,424	126,241
Benzodiazepines	63,494	2.8	13.1	47,194	79,793
Alprazolam	16,321	0.7	18.8	10,292	22,350
Clonazepam	13,687	0.6	14.3	9,861	17,514
Diazepam	7,604	0.3	20.2	4,589	10,618
Lorazepam	19,190	0.8	13.9	13,976	24,404
Diphenhydramine	12,508	0.5	11.7	9,644	15,373
Hydroxyzine	5,920	0.3	13.6	4,338	7,501
Zolpidem	19,951	0.9	12.9	14,923	24,978
Skeletal muscle relaxants	26,264	1.2	12.2	20,003	32,525
Carisoprodol	4,580	0.2	22.7	2,545	6,615
Cyclobenzaprine	9,952	0.4	10.4	7,915	11,990
Cholinesterase inhibitors	7,085	0.3	13.6	5,201	8,969
Coagulation modifiers	217,347	9.5	14.0	157,894	276,800
Anticoagulants	194,696	8.5	14.2	140,577	248,816
Coumarins and indandiones	188,089	8.2	14.5	134,684	241,494
Heparins	9,883	0.4	15.0	6,972	12,793
Antiplatelet agents	26,078	1.1	17.9	16,919	35,238
Gastrointestinal agents	82,161	3.6	8.5	68,422	95,899
Antacids	8,210	0.4	13.7	6,008	10,412
Antidiarrheals	6,758	0.3	16.2	4,617	8,899
GI stimulants	6,858	0.3	15.2	4,815	8,900
Laxatives	23,274	1.0	12.4	17,605	28,943
Proton pump inhibitors	22,787	1.0	10.2	18,227	27,347
Hormones	119,153	5.2	6.8	103,368	134,939
Adrenal cortical steroids	49,403	2.2	7.5	42,151	56,655
Sex hormones	27,603	1.2	9.0	22,758	32,447

Table 29. ED visits involving adverse reaction to pharmaceuticals, 2009 (continued)

Drug category and selected drugs (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Contraceptives	7,190	0.3	16.3	4,897	9,483
Progestins	9,937	0.4	10.4	7,917	11,957
Thyroid drugs	13,428	0.6	13.9	9,765	17,092
Immunologic agents	100,342	4.4	9.3	82,124	118,561
Bacterial vaccines	14,160	0.6	11.7	10,919	17,402
Viral vaccines	53,898	2.4	10.1	43,184	64,613
Metabolic agents	173,823	7.6	10.2	138,914	208,731
Antidiabetic agents	139,211	6.1	12.4	105,443	172,979
Insulin	98,246	4.3	13.4	72,533	123,959
Non-sulfonylureas	20,778	0.9	13.5	15,294	26,262
Sulfonylureas	26,240	1.1	17.7	17,115	35,366
Thiazolidinediones	6,525	0.3	19.0	4,092	8,959
Antihyperlipidemic agents	36,387	1.6	14.3	26,217	46,556
HMG-CoA reductase inhibitors	29,618	1.3	15.4	20,657	38,580
Miscellaneous agents	50,102	2.2	10.1	40,179	60,025
Genitourinary tract agents	13,729	0.6	12.3	10,414	17,044
Impotence agents	4,264	0.2	16.9	2,854	5,674
Local injectable anesthetics	19,502	0.9	16.3	13,277	25,726
Nutritional products	66,900	2.9	9.4	54,585	79,214
Iron products	8,864	0.4	16.9	5,920	11,808
Minerals and electrolytes	11,819	0.5	18.2	7,606	16,032
Oral nutritional supplements	20,186	0.9	16.7	13,596	26,775
Vitamin and mineral products	9,097	0.4	15.5	6,327	11,867
Vitamins	23,517	1.0	8.7	19,516	27,517
Psychotherapeutic agents	157,437	6.9	6.7	136,719	178,154
Antidepressants	91,391	4.0	7.8	77,449	105,332
Phenylpiperazine antidepressants	9,400	0.4	16.5	6,353	12,447
SSNRI antidepressants	17,570	0.8	15.1	12,373	22,767
Duloxetine	8,884	0.4	18.6	5,639	12,129
SSRI antidepressants	48,214	2.1	9.1	39,635	56,793
Sertraline	10,745	0.5	12.5	8,118	13,372
Tetracyclic antidepressants	3,673	0.2	15.1	2,589	4,756
Tricyclic antidepressants	8,364	0.4	14.1	6,049	10,678
Bupropion	9,522	0.4	11.6	7,363	11,681
Antipsychotics	79,002	3.5	7.5	67,369	90,635
Atypical antipsychotics	49,619	2.2	7.9	41,890	57,348
Quetiapine	16,654	0.7	9.3	13,627	19,682
Risperidone	10,539	0.5	13.6	7,733	13,345

Table 29. ED visits involving adverse reaction to pharmaceuticals, 2009 (continued)

Drug category and selected drugs (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Phenothiazine antipsychotics	11,532	0.5	16.2	7,864	15,199
Haloperidol	7,887	0.3	11.3	6,141	9,633
Lithium	12,904	0.6	21.1	7,560	18,247
Radiologic agents	20,294	0.9	11.0	15,906	24,682
Radiocontrast agents	19,454	0.9	10.9	15,279	23,629
Respiratory agents	95,293	4.2	9.0	78,390	112,196
Antihistamines	25,546	1.1	15.2	17,956	33,136
Bronchodilators	21,685	0.9	12.9	16,221	27,148
Adrenergic bronchodilators	13,630	0.6	11.2	10,633	16,627
Bronchodilator combinations	7,094	0.3	22.2	4,009	10,179
Decongestants	6,293	0.3	17.1	4,184	8,402
Expectorants	6,229	0.3	15.7	4,307	8,151
Upper respiratory products	26,705	1.2	9.2	21,888	31,522
Respiratory agents NTA	17,560	0.8	13.0	13,101	22,019
Topical agents	50,301	2.2	7.3	43,123	57,480
Dermatological agents	28,001	1.2	9.3	22,917	33,085
Ophthalmic preparations	10,605	0.5	13.1	7,886	13,324

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(3) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both penicillin and tramadol will appear twice in this table). The sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.

NOTE: CI = confidence interval. NTA = not tabulated above. RSE = relative standard error.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

When population size and sampling error are taken into account, women had notably more visits than men (895.6 and 589.9 visits per 100,000 population, respectively; Table 30 and Figure 8). For children aged 5 and under, the rate of ED visits for adverse reactions was 635.2 visits per 100,000 population. The rate dropped to a low of 222.6 visits for children aged 6 to 11 and then rose consistently to reach a high of 1,856.8 visits for patients aged 65 or older.

Table 30. ED visits and rates involving adverse reaction to pharmaceuticals, by patient demographics, 2009

Patient demographics	ED visits	Percent of ED visits	Rate of ED visits per 100,000 population (1)
Total ED visits, adverse reaction (2)	**2,287,273**	**100.0**	**745.0**
Gender	—	—	—
Male	893,404	39.1	589.9
Female	1,393,101	60.9	895.6
Unknown	767	<0.1	—
Age	—	—	—
0–5 years	161,892	7.1	635.2
6–11 years	54,128	2.4	222.6
12–17 years	76,425	3.3	308.8
18–20 years	71,340	3.1	539.9
21–24 years	97,936	4.3	569.4
25–29 years	124,952	5.5	576.4
30–34 years	116,824	5.1	587.4
35–44 years	254,267	11.1	612.2
45–54 years	298,168	13.0	668.7
55–64 years	296,456	13.0	852.2
65 years and older	734,766	32.1	1,856.8
Unknown	*	*	—
Race/ethnicity	—	—	—
White	1,540,562	67.4	—
Black	275,207	12.0	—
Hispanic	196,198	8.6	—
Other or two or more race/ethnicities	49,493	2.2	—
Unknown	225,813	9.9	—

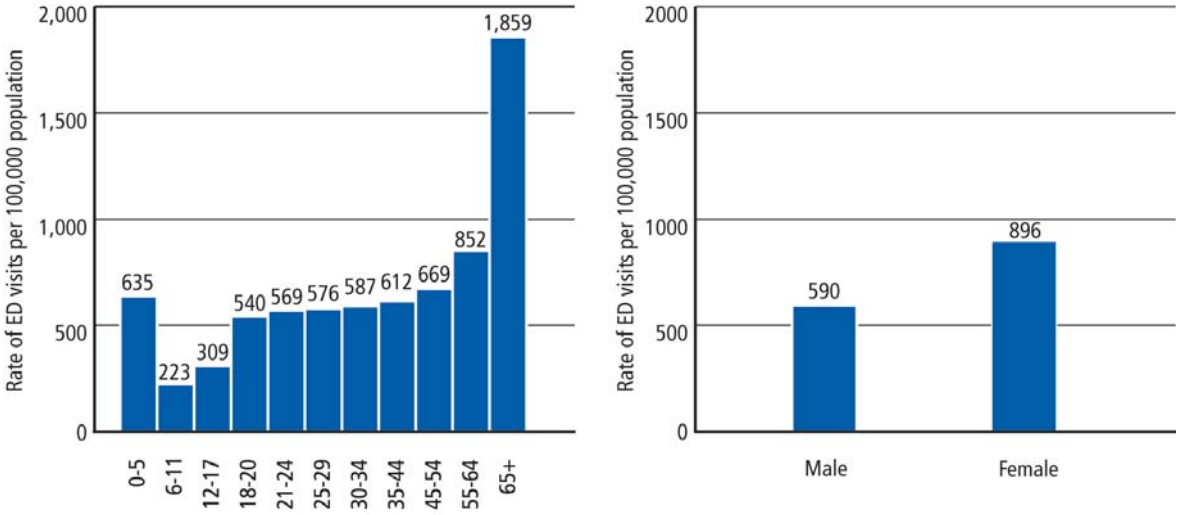
(1) All rates are ED visits per 100,000 population. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

NOTE: An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed. A dash (—) indicates a blank cell. Rates are not provided for race and ethnicity subgroups because of data limitations.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Figure 8. Rates of ED visits per 100,000 population involving adverse reaction to pharmaceuticals, by age and gender, 2009



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

In terms of race and ethnicity, 67.4 percent of visits related to adverse reaction to pharmaceuticals involved patients who were White, 12.0 percent were Black, and 8.6 percent were Hispanic. DAWN does not produce population-based rates for race/ethnicity categories because race/ethnicity information is often missing on ED records.

The majority (76.3%) of patients were treated and released (Table 31). About a fifth (20.9%) of patients were admitted to the hospital, and the remainder (2.8%) had other outcomes.

Table 31. ED visits and rates involving adverse reaction to pharmaceuticals, by patient disposition, 2009

Patient disposition	ED visits	Percent of ED visits	Rate of ED visits per 100,000 population (1)
Total ED visits, adverse reaction (2)	**2,287,273**	**100.0**	**745.0**
Treated and released	**1,744,758**	**76.3**	**568.3**
Discharged home	1,738,252	76.0	566.2
Released to police/jail	4,476	<0.1	1.5
Referred to detox/treatment	2,030	<0.1	0.7
Admitted to this hospital	**477,478**	**20.9**	**155.5**
ICU/critical care	49,586	2.2	16.2
Surgery	*	*	*
Chemical dependency/detox	*	*	*
Psychiatric unit	4,206	<0.1	1.4
Other inpatient unit	412,100	18.0	134.2
Other disposition	**65,037**	**2.8**	**21.2**
Transferred	32,874	1.4	10.7
Left against medical advice	13,587	0.6	4.4
Died	1,012	<0.1	0.3
Other	11,368	<0.1	3.7
Not documented	6,197	<0.1	2.0

(1) All rates are ED visits per 100,000 population. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

NOTE: An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

8.2 Trends in ED Visits Involving Adverse Reaction to Pharmaceuticals, 2005–2009

This section presents the trends in the estimates of ED visits involving adverse reactions for the period 2005 through 2009 (Table 32). Differences between years are presented in terms of the percentage increase or decrease in visits in 2009 compared with the estimates for 2005 (long-term trends) and for 2007 and 2008 (short-term trends).[20] Only statistically significant changes are discussed and displayed in the table.

[20] Due to data limitations in 2004, long-term trends for adverse reaction visits are assessed for the period 2005–2009, not 2004–2009.

ED visits resulting from adverse reactions to pharmaceuticals increased 83 percent in the period from 2005 to 2009, rising from about 1.3 million visits to over 2.2 million. Categories of drugs contributing over 100,000 additional visits in 2009 over 2005 were anti-infectives (170,725 more visits in 2009 compared with 2005), pain relievers (163,894 more), and cardiovascular agents (131,737 more). Drugs contributing at lower absolute levels but showing high rates of increasing involvement included the following:

- nutritional products (150% increase, with 66,900 visits in 2009);
- benzodiazepines (149% increase, with 63,494 visits in 2009);
- gastrointestinal agents (130% increase, with 82,161 visits in 2009);
- oxycodone (128% increase, with 65,146 visits in 2009);
- hormones (125% increase, with 119,153 visits in 2009);
- antineoplastics (116% increase, with 104,936 visits in 2009);
- antidepressants (96% increase, with 157,437 visits in 2009);
- antipsychotics (96% increase, with 79,002 visits in 2009);
- anticonvulsants (96% increase, with 86,835 visits in 2009);
- hydrocodone products (89% increase, with 79,877 visits in 2009);
- anticoagulants (80% increase, with 194,696 visits in 2009); and
- respiratory agents (56% increase, with 95,293 visits in 2009).

Appearing for the first time at measurable level in 2007, neuraminidase inhibitors (e.g., Tamiflu®, Relenza®) jumped from 385 visits in 2007 to 1,181 visits in 2008 and 7,733 visits in 2009. That represented a 1,908 percent increase from 2007 to 2009 and a 555 percent increase from 2008 to 2009. These increases may be associated with increased prescribing resulting from the Food and Drug Administration's approval of the use of Tamiflu in 2005 for children aged 1 to 12 and from the spike in prescribing in 2009 associated with concerns of an H1N1 pandemic.[21,22]

[21] FDA approves Tamiflu for prevention of influenza in children under age 12. (2005, December 22). FDA News Release. Retrieved June 6, 2011, from http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/2005/ucm108541.htm.

[22] Centers for Disease Control and Prevention (CDC). (2010, June 16). *The 2009 H1N1 pandemic: Summary highlights, April 2009–April 2010.* Retrieved June 6, 2011, from http://www.cdc.gov/h1n1flu/cdcresponse.htm.

Table 32. Trends in ED visits involving adverse reaction to pharmaceuticals, by selected drugs, 2005–2009

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2005, 2009 (2,3)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Total ED visits, adverse reaction (4,5)	**749,805**	**1,250,377**	**1,526,010**	**1,908,928**	**2,157,128**	**2,287,273**	**83**	**—**	**—**
Illicit drugs	**995**	*****	*****	*****	**646**	**626**	**—**	**—**	**—**
Pharmaceuticals	**749,329**	**1,250,361**	**1,525,430**	**1,908,772**	**2,156,601**	**2,286,911**	**83**	**—**	**—**
Alternative medicines	3,418	6,536	6,069	9,409	11,268	11,682	79	—	—
Herbal products	2,981	5,302	4,577	6,099	5,199	6,178	—	—	—
Nutraceutical products	*	1,164	1,387	3,102	6,055	5,799	398	87	—
Anti-infectives	208,541	306,234	367,212	426,490	487,827	476,960	56	—	—
Amebicides	5,170	7,895	11,875	14,814	17,459	16,626	111	—	—
Antiviral agents	3,478	5,225	6,583	7,155	13,896	15,648	199	119	—
Neuraminidase inhibitors	*	*	*	385	1,181	7,733		1,908	555
Cephalosporins	27,478	38,438	44,792	48,713	53,648	52,408	—	—	—
Glycopeptide antibiotics	1,708	3,046	2,296	4,075	4,412	6,475	—	—	47
Lincomycin derivatives	5,225	8,824	11,966	19,436	20,529	23,867	170	—	—
Macrolide derivatives	21,356	39,981	42,982	42,478	47,074	48,960	—	—	—
Penicillins	72,479	97,297	104,690	122,906	134,296	128,109	—	—	—
Aminopenicillins	43,738	60,338	70,428	73,006	88,165	82,140	—	—	—
Beta-lactamase inhibitors	17,942	23,696	21,632	30,549	27,492	30,276	—	—	—
Natural penicillins	10,298	12,877	12,808	18,077	17,920	15,229	—	—	—
Quinolones	31,321	46,791	59,683	65,308	76,114	67,151	44	—	—
Sulfonamides	24,490	36,868	47,622	59,681	75,391	75,904	106	27	—
Tetracyclines	7,263	10,200	16,476	18,662	18,226	21,688	113	—	—
Urinary anti-infectives	4,977	6,690	8,259	12,772	13,414	13,266	98	—	—
Antineoplastics	19,625	48,560	51,262	70,595	94,681	104,936	116	49	—
Biologicals	1,279	3,003	3,535	4,105	4,964	5,396	—	—	—

Table 32. Trends in ED visits involving adverse reaction to pharmaceuticals, by selected drugs, 2005–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2005, 2009 (2,3)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Cardiovascular agents	73,341	116,270	170,233	207,347	238,191	248,007	113	—	—
Antiadrenergic agents, centrally acting	2,130	4,676	6,309	5,663	8,808	10,205	118	80	—
Clonidine	2,094	4,545	5,974	4,999	8,489	9,402	107	88	—
Beta-adrenergic blocking agents	14,731	24,669	40,653	56,551	54,778	58,179	136	—	—
Cardioselective beta blockers	10,802	18,086	29,710	42,708	41,126	42,266	134	—	—
Atenolol	3,726	6,085	8,609	13,223	9,909	12,345	103	—	—
Non-cardioselective beta blockers	3,933	5,605	9,942	12,427	12,850	15,509	177	—	—
Calcium channel blocking agents	9,243	12,742	18,200	22,935	22,926	30,354	138	—	—
Diuretics	11,811	19,020	33,782	42,430	46,030	44,758	135	—	—
Loop diuretics	5,184	6,946	17,498	18,503	21,910	22,191	219	—	—
Thiazide diuretics	6,148	10,164	14,267	22,168	21,973	20,483	102	—	—
Cardiovascular agents NTA	46,314	71,561	108,716	126,359	154,385	162,525	127	29	—
Angiotensin-converting enzyme inhibitors	17,486	27,100	38,781	53,707	69,041	72,219	166	34	—
Angiotensin II inhibitors	4,643	6,879	12,939	14,899	14,581	15,680	128	—	—
Antiadrenergic agents, peripherally acting	2,157	3,337	5,353	6,701	7,297	8,212	146	—	—
Antianginal agents	2,543	3,597	6,135	7,043	9,729	11,636	224	65	—
Antihypertensive combinations	5,829	10,418	16,498	21,105	27,423	24,437	135	—	—
Inotropic agents	7,767	13,028	21,294	19,772	17,373	20,036	—	—	—
Vasopressors	3,471	4,497	6,912	4,588	3,983	6,240	—	—	57

Table 32. Trends in ED visits involving adverse reaction to pharmaceuticals, by selected drugs, 2005–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2005, 2009 (2,3)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Central nervous system agents	207,512	337,020	400,031	490,575	566,190	591,418	75	—	—
Pain relievers	134,510	223,275	266,367	321,149	363,841	387,168	73	—	—
Antimigraine agents	4,302	3,882	3,854	5,087	5,486	7,519	94	—	—
Cox-2 inhibitors	11,165	3,639	4,843	4,463	5,459	6,233	—	—	—
Opiates/opioids	71,794	119,239	142,204	178,507	202,311	225,583	89	26	—
Opiates/opioids, unspecified	1,115	2,751	3,362	4,068	3,620	7,803	184	92	116
Narcotic pain relievers	70,815	116,671	138,911	174,720	198,891	218,366	87	—	—
Codeine products	9,982	13,224	13,640	17,347	15,758	18,458	—	—	—
Fentanyl products	5,162	8,000	10,608	12,405	13,172	14,315	79	—	—
Hydrocodone products	24,670	42,258	52,307	62,948	80,270	79,877	89	27	—
Hydromorphone products	1,299	4,252	4,109	6,845	9,670	10,916	157	59	—
Methadone	2,538	4,788	7,599	5,156	13,116	9,798	105	90	—
Morphine products	4,973	9,436	9,563	13,231	14,043	17,499	85	—	—
Oxycodone products	16,939	28,511	36,404	54,433	54,868	65,146	128	—	—
Propoxyphene products	4,816	8,703	9,397	9,505	11,110	12,202	—	—	—
Nonsteroidal anti-inflammatory agents	30,496	55,753	61,150	72,242	70,859	70,024	—	—	—
Ibuprofen	12,348	31,651	29,514	34,768	34,479	34,292	—	—	—
Naproxen products	10,077	10,399	15,041	17,265	17,505	15,784	—	—	—
Salicylates products	9,488	24,348	36,447	40,774	47,700	42,967	76	—	—
Acetaminophen products	7,340	15,491	17,033	20,482	17,405	22,997	—	—	32
Tramadol products	6,207	10,091	12,746	16,946	23,756	25,884	156	53	—
Anorexiants	3,257	2,931	5,312	4,080	7,833	7,195	145	76	—

Table 32. Trends in ED visits involving adverse reaction to pharmaceuticals, by selected drugs, 2005–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2005, 2009 (2,3)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Anticonvulsants	31,371	44,281	59,924	73,256	83,018	86,835	96	—	—
Topiramate	2,883	3,407	3,715	5,256	4,314	5,815	71	—	—
Dibenzazepine anticonvulsants	5,317	7,016	8,110	9,281	8,887	10,194	—	—	—
Carbamazepine	3,717	4,773	4,594	6,619	6,522	6,110	—	—	—
Fatty acid derivative anticonvulsants	5,009	7,668	10,105	9,935	13,305	13,001	70	—	—
Divalproex sodium	4,822	7,220	9,191	9,302	12,554	11,840	—	—	—
Gamma-aminobutyric acid analogs	4,282	5,395	8,797	14,526	21,094	21,782	304	50	—
Gabapentin	4,282	4,829	5,184	8,844	11,377	14,048	191	59	—
Hydantoin anticonvulsants	10,381	16,452	20,425	26,200	25,890	26,436	—	—	—
Phenytoin	10,280	16,443	20,425	26,017	25,877	26,426	—	—	—
Pyrrolidine anticonvulsants	666	*	1,634	3,698	5,135	4,681	—	—	—
Triazine anticonvulsants	4,524	5,791	9,172	8,319	10,397	8,463	—	—	—
Antiemetic/antivertigo agents	2,763	3,942	4,980	6,395	7,899	8,511	116	—	—
Anti-Parkinson agents	3,061	3,578	7,856	7,443	9,228	10,974	207	—	—
Anticholinergic anti-Parkinson agents	1,646	1,798	2,734	2,769	4,036	5,141	186	—	—
Dopaminergic anti-Parkinsonism agents	1,551	1,831	5,115	4,710	4,803	6,270	242	—	—
Anxiolytics, sedatives, and hypnotics	31,134	49,038	57,467	79,269	100,700	104,332	113	32	—
Benzodiazepines	14,214	25,520	33,482	48,129	61,880	63,494	149	—	—
Alprazolam	3,682	7,200	11,287	15,582	18,593	16,321	127	—	—
Clonazepam	2,647	4,369	6,214	9,191	12,294	13,687	213	—	—
Diazepam	1,907	3,721	3,144	6,989	7,020	7,604	104	—	—
Lorazepam	4,091	7,010	9,142	12,391	17,166	19,190	174	55	—

Table 32. Trends in ED visits involving adverse reaction to pharmaceuticals, by selected drugs, 2005–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2005, 2009 (2,3)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Diphenhydramine	7,296	10,476	10,867	10,657	11,248	12,508	—	—	—
Hydroxyzine	2,620	3,354	3,424	3,998	6,101	5,920	77	—	—
Zolpidem	4,627	6,111	6,680	12,417	16,188	19,951	226	61	—
Skeletal muscle relaxants	6,345	11,683	14,493	20,974	25,132	26,264	125	—	—
Carisoprodol	1,043	1,728	2,234	4,083	8,812	4,580	165	—	—
Cyclobenzaprine	2,581	4,613	4,789	8,267	8,631	9,952	116	—	—
Cholinesterase inhibitors	1,229	1,800	2,862	4,702	6,375	7,085	294	—	—
Coagulation modifiers	47,507	121,062	143,412	194,326	220,473	217,347	80	—	—
Anticoagulants	42,304	108,180	125,687	167,926	189,574	194,696	80	—	—
Coumarins and indandiones	41,146	106,287	122,673	160,823	183,009	188,089	77	—	—
Heparins	1,817	4,342	5,785	9,955	10,359	9,883	128	—	—
Antiplatelet agents	5,354	13,756	20,831	29,938	33,043	26,078	—	—	—
Gastrointestinal agents	24,045	35,761	50,142	61,400	72,443	82,161	130	—	—
Antacids	1,289	2,545	4,031	4,872	6,225	8,210	223	—	—
Antidiarrheals	1,876	4,097	5,478	6,019	6,859	6,758	—	—	—
GI stimulants	3,454	3,337	3,470	6,426	11,928	6,858	105	—	—
Laxatives	4,604	8,844	11,980	15,924	23,467	23,274	163	—	—
Proton pump inhibitors	7,829	10,048	17,256	18,491	17,750	22,787	127	—	—
Hormones	33,480	52,910	74,408	94,166	109,397	119,153	125	—	—
Adrenal cortical steroids	19,213	29,505	37,292	44,431	44,756	49,403	67	—	—
Sex hormones	5,801	7,867	12,269	18,298	24,031	27,603	251	51	—
Contraceptives	2,158	1,266	2,851	4,357	6,813	7,190	468	—	—
Progestins	2,284	3,716	3,874	6,348	8,293	9,937	167	—	—

Table 32. Trends in ED visits involving adverse reaction to pharmaceuticals, by selected drugs, 2005–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2005, 2009 (2,3)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Thyroid drugs	3,137	3,265	8,370	9,961	14,007	13,428	311	—	—
Immunologic agents	19,334	36,717	49,824	63,817	82,071	100,342	173	57	—
Bacterial vaccines	3,076	5,661	8,971	11,561	11,579	14,160	150	—	—
Viral vaccines	7,262	15,123	19,891	22,327	30,390	53,898	256	141	77
Metabolic agents	21,050	92,603	132,808	195,442	172,272	173,823	88	—	—
Antidiabetic agents	12,658	77,587	114,712	165,384	135,334	139,211	79	—	—
Insulin	7,500	54,671	78,002	120,861	93,553	98,246	80	—	—
Non-sulfonylureas	1,783	7,972	16,853	18,853	19,142	20,778	161	—	—
Sulfonylureas	2,076	13,956	25,276	31,174	27,549	26,240	—	—	—
Thiazolidinediones	1,687	7,303	8,395	10,852	6,529	6,525	—	-40	—
Antihyperlipidemic agents	7,920	13,839	19,581	32,765	37,633	36,387	163	—	—
HMG-CoA reductase inhibitors	6,081	10,148	14,312	23,457	27,442	29,618	192	—	—
Miscellaneous agents	16,103	20,617	25,885	33,417	40,568	50,102	143	50	—
Genitourinary tract agents	7,026	7,032	11,082	11,146	16,357	13,729	95	—	—
Impotence agents	1,277	2,314	4,187	4,280	5,124	4,264	84	—	—
Local injectable anesthetics	3,949	6,332	7,088	10,549	9,267	19,502	208	85	110
Nutritional products	16,160	26,801	38,103	44,579	63,435	66,900	150	50	—
Iron products	1,612	2,892	3,303	5,015	6,835	8,864	206	77	—
Minerals and electrolytes	1,999	2,843	6,124	7,982	13,360	11,819	316	—	—
Oral nutritional supplements	440	7,999	10,935	14,771	15,445	20,186	152	—	—
Vitamin and mineral combinations	2,136	2,106	4,270	5,748	9,642	9,097	332	—	—
Vitamins	10,219	11,549	14,522	14,226	24,426	23,517	104	65	—

Table 32. Trends in ED visits involving adverse reaction to pharmaceuticals, by selected drugs, 2005–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2005, 2009 (2,3)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Psychotherapeutic agents	68,915	81,337	112,045	133,497	149,590	157,437	94	—	—
Antidepressants	42,051	46,693	65,452	76,216	84,600	91,391	96	—	—
Phenylpiperazine antidepressants	3,123	3,826	6,408	7,838	7,184	9,400	146	—	—
SSNRI antidepressants	4,736	7,200	12,888	14,610	20,081	17,570	144	—	—
Duloxetine	*	2,738	6,623	6,609	12,221	8,884	224	—	—
SSRI antidepressants	23,697	23,364	33,198	39,922	42,621	48,214	106	—	—
Sertraline	6,230	6,527	7,902	9,385	10,829	10,745	—	—	—
Tetracyclic antidepressants	1,165	1,658	2,530	2,946	3,331	3,673	121	—	—
Tricyclic antidepressants	3,094	4,316	5,103	8,168	5,874	8,364	94	—	42
Bupropion	7,416	8,801	8,795	6,868	10,353	9,522	—	39	—
Antipsychotics	30,356	40,323	55,940	65,818	75,531	79,002	96	—	—
Atypical antipsychotics	19,298	25,662	39,541	40,038	51,803	49,619	93	—	—
Quetiapine	5,207	8,063	12,622	13,825	15,818	16,654	107	—	—
Risperidone	4,101	7,259	11,836	7,787	11,330	10,539	—	—	—
Phenothiazine antipsychotics	5,083	7,479	6,964	12,300	7,925	11,532	—	—	46
Haloperidol	2,839	3,823	6,024	6,010	7,890	7,887	106	—	—
Lithium	3,931	4,342	6,779	9,438	15,399	12,904	197	—	—
Radiologic agents	6,990	12,520	14,290	17,896	18,600	20,294	62	—	—
Radiocontrast agents	6,974	12,416	13,888	17,777	18,435	19,454	57	—	—
Respiratory agents	39,516	61,165	68,383	82,690	90,144	95,293	56	—	—
Antihistamines	12,798	14,970	20,657	24,816	24,170	25,546	71	—	—
Bronchodilators	7,148	10,670	12,765	16,982	22,749	21,685	103	—	—
Adrenergic bronchodilators	4,552	7,286	8,866	10,600	11,725	13,630	87	—	—
Bronchodilator combinations	1,780	2,304	2,496	5,293	*	7,094	208	—	—

Table 32. Trends in ED visits involving adverse reaction to pharmaceuticals, by selected drugs, 2005–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2005, 2009 (2,3)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Decongestants	2,920	5,061	5,754	7,464	6,641	6,293	—	—	—
Expectorants	1,824	4,789	3,814	5,607	5,955	6,229	—	—	—
Upper respiratory combinations	12,788	22,251	17,910	20,244	21,834	26,705	—	—	—
Respiratory agents NTA	4,104	8,163	11,535	13,824	17,960	17,560	115	—	—
Topical agents	18,064	28,982	36,336	42,967	42,894	50,301	74	—	—
Dermatological agents	10,667	17,192	20,660	24,011	23,370	28,001	63	—	—
Ophthalmic preparations	2,674	4,479	7,627	8,053	8,488	10,605	137	—	—

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) This column denotes statistically significant ($p < 0.05$) increases or decreases between estimates for the periods shown.

(3) Due to data limitations in 2004, long-terms trends for adverse reaction visits are assessed for the period 2005–2009, not 2004–2009.

(4) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(5) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both penicillin and tramadol will appear twice in this table). The sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.

NOTE: NTA = not tabulated above. An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed. A dash (—) indicates a blank cell.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

9. ACCIDENTAL INGESTION OF DRUGS

9.1 ED Visits Involving Accidental Ingestion of Drugs, 2009

As with adverse reaction ED visits, DAWN began collecting data on drug-related accidental ingestion following the 2003 redesign. This chapter represents the first time that such ED visits have been included in the annual ED publication. To be classified by DAWN as an accidental ingestion ED visit, a drug must have been taken unintentionally or without it being known which drug was actually taken. The drug may be taken by the patient or given to the patient by someone else (e.g., a parent giving medication to a child).[23]

Because of its significance as an entirely preventable health risk, this chapter focuses on the characteristics of accidental ingestion ED visits for children aged 5 and under. As soon as infants learn to crawl and especially once they learn to walk, their mobility, curiosity, and tendency to put things in their mouths make many substances in the home a potential danger.[24] Pharmaceutical products belonging to other household members present a particularly critical danger to children because, due to their physiology and smaller size, unintended ingestions of even small amounts can lead to medical emergencies requiring care in an ED.[25,] This combination of propensity, accessibility and susceptibility is evidenced in poison control centers, where over half (51.9%) of human exposure calls involve children aged 5 and under and where 15 of the top 25 substances involved in pediatric exposure are drugs.[26]

The danger of accidental ingestion of drugs by children is even more apparent in the 2009 DAWN findings, where two thirds (65.9%) of the 95,098 accidental ingestion ED visits involved children aged 5 and under. The rate of these ED visits was 20 times higher for children aged 5 and under than for adults: 246.0 ED visits per 100,000 children aged 5 and under compared with 12.1 for the general adult population (Figure 9).

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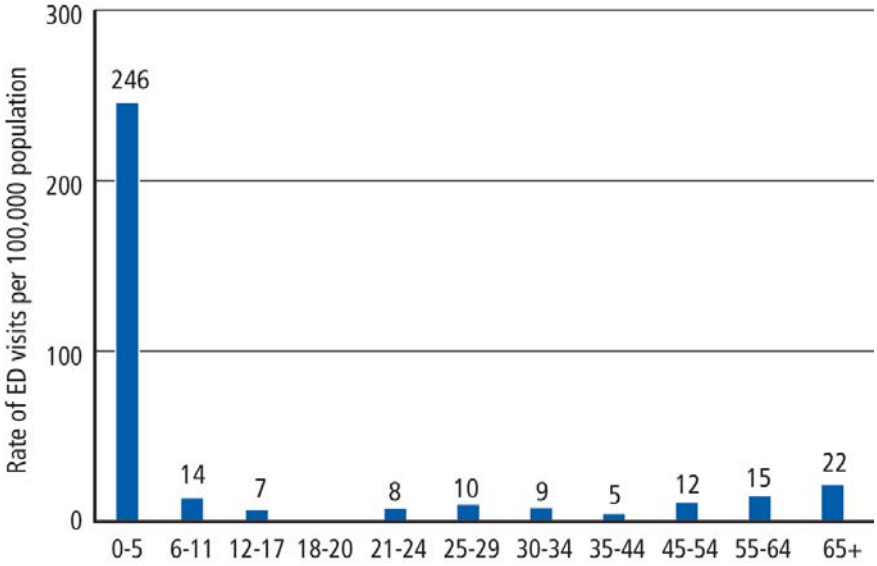
[23] A visit is not considered as resulting from accidental ingestion if a patient took too much of his or her own medications because he or she forgot having taken a dose earlier.

[24] Ma, D. (2009). Keep curious kids safe by poison proofing your home. *AAP News, 30*(11), 2. Retrieved June 6, 2011, from http://aapnews.aappublications.org/cgi/reprint/30/11/2-c.

[25] Centers for Disease Control and Prevention (CDC). (2006). Nonfatal, unintentional medication exposures among children—United States, 2001–2003. *Morbidity and Mortality Weekly Report, 55*(1), 1–5. Retrieved June 6, 2011, from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5501a1.htm.

[26] Bronstein, A. C., Spyker, D. A., Cantilena, L. R., Jr., Green, J. L., Rumack, B. H., & Giffin, S. L. (2010). *2009 Annual report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 27th Annual Report*. *Clinical Toxicology, 48*, 979–1178 (quotation on p. 1007). Retrieved June 6, 2011, from http://www.aapcc.org/dnn/portals/0/2009%20Ar.pdf.

Figure 9. Rates of ED visits per 100,000 population involving accidental ingestion of pharmaceuticals, by age, 2009



Drugs recognized as being particularly dangerous when accidentally ingested by children include calcium channel blockers ("heart pills"), camphor-containing salves (when ingested), narcotic pain medications (e.g., oxycodone, hydrocodone), salicylates (e.g., aspirin), antidepressants (e.g., Elavil®, Wellbutrin®, Zyban®), antidiabetic medications, blood pressure medicines (e.g., clonidine), eye drops (e.g., Clear Eyes®), and nasal sprays (e.g., Afrin®).[27]

DAWN found that cardiovascular agents were one of the more commonly involved drugs, with 14.5 percent of visits (Table 33). Of these, beta blockers, calcium channel blocking agents, and angiotensin-converting enzyme (ACE) inhibitors accounted for 3.8, 2.6, and 2.6 percent of visits, respectively. Among pain relievers, acetaminophen products were involved in 13.3 percent of accidental ingestion visits, narcotic pain relievers in 7.6 percent, nonsteroidal anti-inflammatory agents (e.g., ibuprofen and naproxen products) in 6.2 percent, and aspirin products in 1.0 percent. Anxiolytics, sedatives, hypnotics (drugs to treat insomnia and anxiety) were found in 11.3 percent of visits, with just over half of those being some type of benzodiazepines (5.9%).

[27] Eldridge, D. L., Mutter, K. W., & Holstege, C. P. (2010). An evidence-based review of single pills and swallows that can kill a child. *Pediatric Emergency Medicine Practice, 7*(3).

Table 33. ED visits involving accidental ingestion of drugs by patients aged 5 and under, 2009

Drug category and selected drugs (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Total ED visits (2,3)	**62,696**	**100.0**	**6.7**	**54,485**	**70,906**
Alcohol	*	*	*	*	*
Illicit drugs	**862**	**1.4**	**48.0**	**51**	**1,672**
Pharmaceuticals	**61,894**	**98.7**	**6.5**	**54,013**	**69,776**
Anti-infectives	1,283	2.0	22.2	725	1,841
Cardiovascular agents	9,104	14.5	14.9	6,438	11,770
Antiadrenergic agents, centrally acting	792	1.3	30.7	316	1,269
Beta-adrenergic blocking agents	2,372	3.8	17.7	1,551	3,192
Calcium channel blocking agents	1,656	2.6	38.1	420	2,891
Diuretics	627	1.0	42.9	100	1,155
Cardiovascular agents NTA	4,685	7.5	19.8	2,868	6,503
Angiotensin-converting enzyme inhibitors	1,629	2.6	37.0	448	2,810
Central nervous system agents	29,419	46.9	8.5	24,513	34,325
Analgesics	17,793	28.4	9.6	14,433	21,153
Aspirin products	605	1.0	40.1	129	1,081
Acetaminophen products	8,348	13.3	15.5	5,809	10,887
Nonsteroidal anti-inflammatory products	3,896	6.2	21.1	2,284	5,507
Opiates/opioids	4,767	7.6	19.2	2,977	6,556
Narcotic analgesics	4,755	7.6	19.2	2,966	6,545
Buprenorphine products	1,126	1.8	37.1	306	1,945
Hydrocodone products	1,291	2.1	37.5	342	2,240
Anticonvulsants	1,877	3.0	24.3	984	2,771
Anxiolytics, sedatives, and hypnotics	7,065	11.3	13.4	5,212	8,918
Benzodiazepines	3,688	5.9	15.1	2,597	4,780
Alprazolam	975	1.6	20.9	576	1,374
Clonazepam	1,216	1.9	26.7	578	1,853
Lorazepam	804	1.3	36.8	225	1,384
Misc. anxiolytics, sedatives, and hypnotics	3,482	5.6	18.3	2,235	4,730
Diphenhydramine	2,121	3.4	20.0	1,290	2,953
CNS stimulants	1,625	2.6	19.8	995	2,255
Amphetamine-dextroamphetamine	924	1.5	30.7	368	1,480
Muscle relaxants	1,125	1.8	24.9	576	1,674
Coagulation modifiers	492	0.8	44.7	61	923
Gastrointestinal agents	2,261	3.6	17.8	1,470	3,051
Laxatives	393	0.6	46.5	35	752
Hormones	1,500	2.4	17.5	985	2,016
Thyroid drugs	811	1.3	34.3	265	1,357
Metabolic agents	2,405	3.8	22.5	1,344	3,466
Antidiabetic agents	785	1.3	26.3	381	1,189
Sulfonylureas	380	0.6	33.5	131	630

Table 33. ED visits involving accidental ingestion of drugs by patients aged 5 and under, 2009 (continued)

Drug category and selected drugs (1)	ED visits	Percent of ED visits	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Antihyperlipidemic agents	1,456	2.3	33.0	514	2,397
Nutritional products	2,891	4.6	15.3	2,024	3,759
Vitamin and mineral products	1,308	2.1	29.3	556	2,059
Vitamins	809	1.3	34.5	261	1,356
Psychotherapeutic agents	5,195	8.3	15.3	3,639	6,752
Antidepressants	3,646	5.8	14.5	2,609	4,683
Antipsychotics	1,690	2.7	27.9	765	2,616
Respiratory agents	5,330	8.5	14.7	3,794	6,866
Antihistamines	1,009	1.6	31.1	394	1,623
Bronchodilators	*	*	*	*	*
Upper respiratory products	2,646	4.2	20.0	1,609	3,682
Topical agents	5,595	8.9	11.9	4,289	6,900

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(3) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both aspirin and antihistamines will appear twice in this table). The sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.

NOTE: CI = confidence interval. CNS = central nervous system. NTA = not tabulated above. RSE = relative standard error. An asterisk (*) indicates that an estimate with an RSE greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Topical agents, drugs to treat respiratory conditions, and psychotherapeutic agents each accounted for an additional 8 to 9 percent of visits. Topical agents (8.9%) included anesthetics (e.g., benzocaine) that are found in gels for teething pain (e.g., Ora-Jel®), antihistamines (e.g., calamine lotion), and anti-infectives (e.g., hydrogen peroxide). Drugs to treat respiratory conditions (8.5%) included antihistamines, bronchodilators, and a broad range of combination products used to treat upper respiratory conditions. Psychotherapeutic agents (8.3%) primarily involved antidepressants (5.8%).

Other types of drugs involved in 5 percent or fewer visits were nutritional products (e.g., vitamins; 4.6%); gastrointestinal agents (e.g., laxatives; 3.6%); medications containing diphenhydramine, a drug commonly used to treat cold and allergy symptoms (3.4%); anti-infectives (e.g., penicillins; 2.0%); central nervous system stimulants (e.g., ADHD drugs; 2.6%); antidiabetic agents (1.3%); antiadrenergic agents (primarily the blood pressure medicine clonidine; 1.3%); and ophthalmic preparations (e.g., eye drops; 0.1%). Estimates for nasal preparations were suppressed.[28]

Illicit drugs were involved (1.4%) in accidental ingestion ED visits for patients aged 5 and under. A negligible number of visits involved alcohol.

[28] DAWN collects drug information at a very detailed level, and it would be possible to determine what portion of topical agents involved camphor. Such analysis was beyond the scope of this report.

DAWN found no gender differences for accidental ingestion (Table 34). In terms of race and ethnicity, 55.3 percent of visits related to accidental ingestion of drugs by patients aged 5 and under involved patients who were White, 12.5 percent who were Black, and 17.1 percent who were Hispanic. DAWN does not produce population-based rates for race/ethnicity categories because race/ethnicity information is often missing on ED records.

Table 34. ED visits and rates involving accidental ingestion of drugs by patients aged 5 and under, patient demographics, 2009

Patient demographics	ED visits	Percent of ED visits	Rate of ED visits per 100,000 population (1)
Total ED visits, accidental ingestion (2)	**62,696**	**100.0**	**246.0**
Gender	—	—	—
Male	32,808	52.3	251.9
Female	29,888	47.7	239.9
Unknown	*	*	—
Race/ethnicity	—	—	—
White	34,642	55.3	—
Black	7,824	12.5	—
Hispanic	10,743	17.1	—
Other or two or more race/ethnicities	794	1.3	—
Unknown	8,693	13.9	—

(1) All rates are ED visits per 100,000 population. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(2) Estimates of ED visits are based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

NOTE: A dash (—) indicates a blank cell. Rates are not provided for race and ethnicity subgroups because of data limitations.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

The large majority (89.9%) of patients aged 5 and under were treated and discharged home (Table 35). Just under 10 percent received more extensive follow-up care: either admission to the hospital (4.9%), or transfer to another facility (4.0%). The remainder (1.1%) had other dispositions.

Table 35. ED visits and rates involving accidental ingestion of drugs by patients aged 5 and under, by patient disposition, 2009

Patient disposition	ED visits	Percent of ED visits	Rate of ED visits per 100,000 population (1)
Total ED visits, accidental ingestion (2)	**62,696**	**100.0**	**246.0**
Treated and released	**56,376**	**89.9**	**221.2**
Discharged home	56,335	89.9	221.1
Released to police/jail	*	*	*
Referred to detox/treatment	*	*	*
Admitted to this hospital	**3,102**	**4.9**	**12.2**
ICU/critical care	265	0.4	1.0
Surgery	*	*	*
Chemical dependency/detox	*	*	*
Psychiatric unit	*	*	*
Other inpatient unit	2,834	4.5	11.1
Other disposition	**3,217**	**5.1**	**12.6**
Transferred	2,510	4.0	9.8
Left against medical advice	*	*	*
Died	*	*	*
Other	*	*	*
Not documented	*	*	—

(1) All rates are ED visits per 100,000 population. Population estimates are drawn from the set of United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009) issued by the U.S. Census Bureau.

(2) Estimates of ED visits are based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

NOTE: An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed. A dash (—) indicates a blank cell.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

9.2 Trends in ED Visits Involving Accidental Ingestion of Drugs by Patients Aged 5 and Under, 2004–2009

This section presents the trends in the estimates of ED visits involving accidental ingestion of drugs by patients aged 5 and under for the period 2004 through 2009 (Table 36). Differences between years are presented in terms of the percentage increase or decrease in visits in 2009 compared with the estimates for 2004 (long-term trends) and for 2007 and 2008 (short-term trends). Only statistically significant changes are discussed and displayed in the table.

Medical emergencies related to accidental ingestions by patients aged 5 and under were stable from 2004 to 2009, though increases were observed for particular drug groups. Specifically, involvement of narcotic pain relievers increased 198 percent since 2004, with a 77 percent increase between 2008 and 2009 leading to just under 5,000 visits in 2009. Drugs to treat insomnia and anxiety increased 83 percent in the period from 2004 to 2009, rising to just over 7,000 visits in 2009. DAWN's finding echoes reports by the American Association of Poison Controls Centers (AAPCC) concerning the rise in involvement of pain relievers and sedatives. AAPCC 2009 data found that "all analgesic exposures including opioids and sedatives are increasing year after year." Similar increases were found by CDC when tracking opiate-related poisoning deaths.[29]

[29] Centers for Disease Control and Prevention (CDC). (2010). QuickStats: Number of poisoning deaths involving opioid analgesics and other drugs or substances—United States, 1999–2007. *Morbidity and Mortality Weekly Report (MMWR), 59*(32), 1026. Retrieved June 6, 2011, from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5932a6.htm.

Table 36. Trends in ED visits involving accidental ingestion of drugs by patients aged 5 and under, by selected drugs, 2004–2009

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Total ED visits, accidental ingestion (3,4)	**50,503**	**44,663**	**57,422**	**65,408**	**69,121**	**62,696**	**—**	**—**	**—**
Alcohol	*	*	*	*	*	*	—	—	—
Illicit drugs	*	*	*	*	*	**862**	—	—	—
Pharmaceuticals	**50,098**	**44,477**	**57,318**	**64,783**	**68,440**	**61,894**	**—**	**—**	**—**
Anti-infectives	1,242	930	1,564	1,624	1,925	1,283	—	—	—
Cardiovascular agents	7,300	7,287	9,329	11,277	10,883	9,104	—	—	—
Antiadrenergic agents, centrally acting	884	1,264	2,427	2,009	1,661	792	—	—	—
Beta-adrenergic blocking agents	2,267	2,448	2,741	2,986	3,299	2,372	—	—	—
Calcium channel blocking agents	1,108	876	524	1,637	1,049	1,656	—	—	—
Diuretics	977	*	729	1,761	416	627	—	-64	—
Cardiovascular agents NTA	3,308	3,113	3,289	4,913	5,696	4,685	—	—	—
Angiotensin-converting enzyme inhibitors	834	1,057	886	1,245	3,028	1,629	—	—	—
Central nervous system agents	21,536	16,437	26,036	25,680	28,186	29,419	—	—	—
Analgesics	12,048	9,631	14,451	13,593	14,572	17,793	—	—	—
Aspirin products	724	666	1,367	1,757	539	605	—	—	—
Acetaminophen products	6,198	4,760	5,915	5,523	7,008	8,348	—	—	—
Nonsteroidal anti-inflammatory products	2,635	2,108	4,681	3,785	4,581	3,896	—	—	—
Opiates/opioids	1,599	1,871	2,810	2,450	2,766	4,767	198	—	—
Narcotic analgesics	1,596	1,866	2,798	2,434	2,679	4,755	198	—	77
Buprenorphine/combinations	*	*	*	*	495	1,126	—	—	—
Hydrocodone/combinations	*	662	776	617	915	1,291	—	—	—
Anticonvulsants	2,447	1,764	832	861	1,944	1,877	—	—	—
Anxiolytics, sedatives, and hypnotics	3,854	3,045	5,706	6,260	8,035	7,065	83	—	—
Benzodiazepines	1,870	1,424	3,041	3,361	5,325	3,688	—	—	—
Alprazolam	*	*	*	856	608	975	—	—	—

Table 36. Trends in ED visits involving accidental ingestion of drugs by patients aged 5 and under, by selected drugs, 2004–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Clonazepam	584	680	1,133	*	3,103	1,216	—	—	—
Lorazepam	*	171	782	1,334	951	804	—	—	—
Misc. anxiolytics, sedatives, and hypnotics	1,876	1,490	2,741	3,315	2,641	3,482	—	—	—
Diphenhydramine	1,513	880	1,900	2,478	1,802	2,121	—	—	—
CNS stimulants	1,919	894	2,451	3,717	1,859	1,625	—	—	—
Amphetamine-dextroamphetamine	*	*	1,179	*	358	924	—	—	—
Muscle relaxants	*	472	1,616	451	1,134	1,125	—	150	—
Coagulation modifiers	*	480	*	*	369	492	—	—	—
Gastrointestinal agents	2,423	2,102	2,345	2,950	3,300	2,261	—	—	—
Laxatives	*	960	*	*	1,033	393	—	—	—
Hormones	564	1,665	1,444	1,613	2,818	1,500	166	—	—
Thyroid drugs	*	793	960	746	*	811	—	—	—
Metabolic agents	*	2,724	2,291	3,296	3,444	2,405	—	—	—
Antidiabetic agents	*	2,060	1,414	2,343	2,705	785	—	-67	-71
Sulfonylureas	*	1,557	637	1,168	1,904	380	—	—	-80
Antihyperlipidemic agents	*	932	808	*	444	1,456	—	—	—
Nutritional products	2,649	2,188	2,168	4,837	2,333	2,891	—	—	—
Vitamin and mineral combinations	1,750	996	1,156	698	854	1,308	—	—	—
Vitamins	*	576	192	*	197	809	—	—	—
Psychotherapeutic agents	4,499	5,182	6,486	4,870	5,969	5,195	—	—	—
Antidepressants	2,845	3,838	5,351	3,227	4,286	3,646	—	—	—
Antipsychotics	1,667	1,441	1,230	1,667	2,034	1,690	—	—	—
Respiratory agents	7,163	5,287	5,531	9,831	7,111	5,330	—	-46	—
Antihistamines	1,398	1,322	646	1,260	1,761	1,009	—	—	—
Bronchodilators	*	290	588	779	452	*	—	—	—

Table 36. Trends in ED visits involving accidental ingestion of drugs by patients aged 5 and under, by selected drugs, 2004–2009 (continued)

Drug category and selected drugs (1)	ED visits, 2004	ED visits, 2005	ED visits, 2006	ED visits, 2007	ED visits, 2008	ED visits, 2009	Percent change, 2004, 2009 (2)	Percent change, 2007, 2009 (2)	Percent change, 2008, 2009 (2)
Upper respiratory combinations	3,835	2,363	2,587	4,135	3,302	2,646	—	—	—
Topical agents	2,376	2,082	3,226	3,553	5,964	5,595	135	—	—

(1) The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2011 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The classification was modified to meet DAWN's unique requirements (2010). The Multum Licensing Agreement governing use of the *Lexicon* can be found in Appendix A and on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

(2) This column denotes statistically significant ($p < 0.05$) increases or decreases between estimates for the periods shown.

(3) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

(4) ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both aspirin and antihistamines will appear twice in this table). The sum of visits by drug will be greater than the total, and the sum of percentages by drug will be greater than 100.

NOTE: CNS = central nervous system. NTA = not tabulated above. An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed. A dash (—) indicates a blank cell.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

APPENDIX A

MULTUM *LEXICON* END-USER LICENSE AGREEMENT, 2009

Every effort has been made to ensure that the information provided by Lexi-Comp, Inc. ("Lexi-Comp") is accurate, up-to-date, and complete, but no guarantee is made to that effect. In addition, the drug information contained herein may be time sensitive. Lexi-Comp information has been compiled for use by healthcare practitioners and end-users in the United States. Lexi-Comp does not warrant that uses outside of the United States are appropriate.

Lexi-Comp's drug information does not endorse drugs, diagnose patients or recommend therapy. Lexi-Comp's drug information is an informational resource designed to assist licensed healthcare practitioners in caring for their patients and/or to serve end-users viewing this Lexi-Comp Product as a supplement to, and not a substitute for, the expertise, skill, knowledge and judgment of healthcare practitioners. Healthcare practitioners should use their professional judgment in using the information provided. The absence of a warning for a given drug or drug combination in no way should be construed to indicate that the drug or drug combination is safe, effective or appropriate for any given patient. Lexi-Comp and its affiliates do not assume any responsibility for any aspect of healthcare administered with the aid of information Lexi-Comp and its affiliates provides.

The information contained herein is not intended to cover all possible uses, directions, precautions, warnings, drug interactions, allergic reactions, or adverse effects. If you have questions about the drugs you are taking, check with your doctor, nurse or pharmacist.

The Multum Licensing Agreement can be found on the Internet at http://dawninfo.samhsa.gov/drug_vocab.

APPENDIX B

GLOSSARY OF DAWN TERMS, 2009 UPDATE

This glossary defines terms used in data collection activities, analyses, and publications associated with the emergency department (ED) component of the Drug Abuse Warning Network (DAWN).

Accidental ingestion: This category of drug-related ED visits includes those involving the accidental ingestion of a drug, for example, childhood drug poisonings and individuals who take the wrong medication by mistake. It includes a caregiver administering the wrong medicine by mistake. It does not include a patient taking more medicine than directed because the patient forgot to take it earlier.

Adverse reaction: This category of drug-related ED visits represents the consequences of using a prescription or over-the-counter pharmaceutical for therapeutic purposes and includes visits related to adverse drug reactions, side effects, drug-drug interactions, and drug-alcohol interactions. Although adverse reactions are typically limited to pharmaceuticals, a small number of adverse reaction visits involve illicit drugs (a) for which there are legitimate pharmaceutical versions, and (b) pharmaceutical inhalants (such as anesthetic gases).

Alcohol use: DAWN notes whether alcohol was involved in addition to other drug(s) for patients of all ages. Because alcohol is considered an illicit drug for minors, alcohol without the involvement of other drugs is considered a drug-related ED visit for patients under the age of 21. (See **Drug misuse or abuse** and **Underage drinking.**)

Case description: A description of how the drug or drugs were related to the patient's ED visit. The case description, in conjunction with other documentation in the ED medical record, is used to determine whether the ED visit is reportable to DAWN. It is copied verbatim from the patient's chart when possible.

Case type: See **Type of case.**

Case type other: See **Drug misuse or abuse.**

Confidence interval (CI): An interval estimate, that is, a range of values around a point estimate that takes sampling error into account. The accepted standard of confidence is 95 percent. Technically, a 95 percent CI means that, if repeated samples were drawn from the same population of hospitals using the same sampling and data collection procedures, the true population value would fall within the confidence interval 95 percent of the time. Practically, a 95 percent CI summarizes both the estimate and its margin of error in a straightforward way with a reasonable degree of confidence.

Diagnosis: The condition(s) for which the patient was treated as determined by the clinician after evaluation.

Disposition: The location or facility to which an ED patient was referred, transferred, or released.

Treated and released includes three categories:

- *Discharged home*—"Home" is used as a broad category to mean the patient's residence. Home is generally used for persons who live locally; however, for students at nearby universities, home means their university; for travelers who get sick on the road, it may mean their hotel or wherever they are staying; and so on.
- *Released to police/jail*—Patients that are released to police/jail were usually brought to the ED by the police for treatment of an acute medical problem or for medical clearance before being placed in the jail population.
- *Referred to detox/treatment*—The chart indicates that the patient was referred to a substance abuse treatment or detox program, facility, or provider.

Admitted to this hospital includes five categories of inpatient units:

- intensive or critical care unit,
- surgery,
- chemical dependency/detox,
- psychiatric unit, and
- other inpatient unit (the inpatient unit was not specified or does not match one of the preceding units).

Other disposition includes five categories:

- *Transferred*—The patient was transferred to another health care facility.
- *Left against medical advice*—The patient left the treatment setting without a physician's approval.
- *Died*—The patient died after arriving in the ED but before being discharged, admitted, or transferred.
- *Other*—The discharge status is documented in the patient's chart but does not fit into any of the preceding categories.
- *Not documented*—The patient's discharge status was not documented in the medical chart.

Drug: A substance that is (a) used as a medication or in the preparation of medication; (b) an illicit substance that causes addiction, habituation, or a marked change in consciousness; or (c) both. Substances reportable to DAWN include alcohol, illicit drugs (e.g., club drugs, cocaine, heroin, marijuana, stimulants), nonpharmaceutical inhalants, prescription drugs (e.g., drugs for attention deficit hyperactivity disorder, antibiotics, antidepressants, antipsychotics, anticoagulants, beta blockers, birth control pills, hormone replacement, insulin, muscle relaxants, pain relievers,

sleeping aids), drugs used in treatment of medical conditions (e.g., respiratory therapy, chemotherapy, radiation therapy), vaccines, dietary supplements, vitamins, and other over-the-counter pharmaceutical products. DAWN publications use the term "drug" to refer to any of these substances. Multiple substances can be reported for each DAWN case. Therefore, the total number of drugs exceeds the total number of DAWN cases reported.

Drug category: A generic grouping of related pharmaceuticals or other substances reported to DAWN, based on the classification system developed by Multum Information Services, a subsidiary of the Cerner Corporation, and modified for use with DAWN. The Multum *Lexicon* is available at http://www.multum.com/. In general, the Multum drug categories reflect the therapeutic uses for prescription and over-the-counter pharmaceuticals.

Additional clarification is provided for the following drug categories, because these are unique to DAWN:

- *Alcohol alone*—DAWN treats alcohol as an illicit drug for minors. Therefore, DAWN collects data on ED visits involving alcohol and no other drugs if the patient is under the age of 21.
- *Alcohol-in-combination*—DAWN records whether alcohol was involved in all drug-related ED visits for patients of all ages.

Drug misuse or abuse: A group of ED visits defined broadly to include all visits associated with illicit drugs, alcohol use in combination with other drugs, alcohol use alone among those younger than 21 years, and nonmedical use of pharmaceuticals. (See also **Alcohol use, Illicit drug use, Nonmedical use of pharmaceuticals,** and **Underage drinking.**)

Drug-related ED visit: This category includes any ED visit related to recent drug use. To be a DAWN case, the ED visit must have involved a drug, either as the direct cause of the visit or as a contributing factor. (See also **Single-drug case.**) One patient may make repeated visits to an ED or to several EDs, thus producing a number of visits. The number of unique patients involved in the reported drug-related ED visits cannot be estimated because no direct patient identifiers are collected by DAWN.

There are some circumstances in which ED visits are not reviewed for DAWN. These include persons who left before being seen by a physician, visits for suture removal, and direct admission to the hospital through the ED for women in labor.

Estimate: A statistical estimate is the value of a parameter (such as the number of drug-related ED visits) for the universe that is derived by applying sampling weights and other adjustments to data from a sample. Estimates of drug-related ED visits are calculated by applying weights and adjustments to the data provided by the sampled hospitals participating in DAWN. The sampling weights reflect the probability of selection; separate adjustment factors account for nonresponse, data quality, and the known total of ED visits delivered by the universe of eligible hospitals as identified by the American Hospital Association (AHA) Annual Survey Database (ASDB) for the relevant time period.

GHB: Gamma hydroxybutyrate, a hallucinogen and depressant frequently combined with alcohol and other beverages. Also used by bodybuilders to aid in fat reduction and muscle building. For further information, see http://www.drugabuse.gov/infofacts/infofactsindex.html.

Hospital emergency department (ED): An emergency department (ED) (also known as an emergency room) is a medical treatment facility, specializing in acute care of patients who present without prior appointment, either by their own means or by ambulance. EDs are usually found in hospitals or other primary care centers. Only EDs in hospitals that meet DAWN's eligibility criteria may participate in DAWN. For information on drug-related ED visits, DAWN relies exclusively on medical records maintained by EDs. No patients, ED staff, or other records are consulted. DAWN is based on a sample of hospitals; in the cases where there are multiple EDs in a hospital, records from all the EDs are reviewed to identify drug-related cases. (See **Universe.**)

Illicit drug use: This category of drug-related ED visits includes all visits related to the use of illicit or illegal drugs. Illicit drugs include

- cocaine,
- heroin,
- marijuana,
- stimulants (including amphetamines and methamphetamine),
- MDMA,
- GHB,
- flunitrazepam (Rohypnol),
- ketamine,
- LSD,
- PCP,
- other hallucinogens,
- nonpharmaceutical inhalants,
- combinations of illicit drugs, and
- alcohol when used by patients under the age of 21.

Additional clarification is provided for the following drug categories:

- *Stimulants*—This drug category includes amphetamines, methamphetamine, and other illicit stimulants and excludes central nervous system stimulant medications, such as methylphenidate. Amphetamines and methamphetamine are combined for analysis because medical records and toxicology tests often generically refer to either drug as "amphetamines."
- *Amphetamines*—Although there are nonillicit (pharmaceutical) amphetamines, the whole of the amphetamine class of substances is grouped with illicit stimulants because it is considered a major substance of abuse. See **Illicit drug use** for the list of drugs reported individually by DAWN as major substances of abuse.
- *Inhalants*—This category includes (a) anesthetic gases, and (b) any nonpharmaceutical substance that has psychoactive effects when inhaled, sniffed, or snorted. Excluded from

the inhalant category are carbon monoxide and nonpharmaceutical inhalants if the exposure was accidental (e.g., inhaling paint fumes while painting a closet).

Anesthetic gases—Anesthetic gases are presumed to have been inhaled. Included in this category are, for example, nitrous oxide, ether, and chloroform.

Nonpharmaceuticals—The route of administration for psychoactive nonpharmaceuticals is not assumed and must be documented in ED records specifically as inhalation. Psychoactive nonpharmaceuticals, when inhaled, fall into three main categories: volatile solvents, nitrites, and chlorofluorohydrocarbons. Examples of substances in each of these three categories include the following:

- **Volatile solvents**—This category of inhalants includes adhesives (model airplane glue, rubber cement, household glue), aerosols (spray paint, hairspray, air freshener, deodorant, fabric protector), solvents and gases (nail polish remover, paint thinner, correction fluid and thinner, toxic markers, pure toluene, lighter fluid, gasoline, carburetor cleaner, octane booster), cleaning agents (dry cleaning fluid, spot remover, degreaser), food products (vegetable cooking spray; dessert topping spray such as whipped cream or "whippets"), and gases (butane, propane, helium).
- **Nitrites**—This category of inhalants includes amyl nitrites ("poppers," "snappers") and butyl nitrites ("rush," "locker room," "bolt," "climax," video head cleaner).
- **Chlorofluorohydrocarbons**—Freons are an example of this category of inhalants.

- *Combinations not tabulated above (NTA)*—This category includes combinations composed of two or more major substances of abuse that are mixed and taken together. For example, "speedball," which usually refers to the combination of heroin and cocaine taken at once, would be classified as a "Combination NTA," whereas heroin and cocaine used separately would be classified separately in the categories heroin and cocaine. Combinations consisting of a major substance of abuse and another substance are classified in the category of the major substance (e.g., heroin with scopolamine is classified as heroin).

LSD: d-lysergic acid diethylamide, a hallucinogen usually taken orally. For further information, see http://www.drugabuse.gov/infofacts/infofactsindex.html.

Malicious poisoning: See **Nonmedical use of pharmaceuticals.**

MDMA: Methylenedioxymethamphetamine, a hallucinogen with stimulant effects, usually taken orally. For further information, see http://www.drugabuse.gov/infofacts/infofactsindex.html.

Metropolitan area: An area comprising a relatively large core city or cities and the adjacent geographic areas. Conceptually, these areas are integrated economic and social units with a large population center. Unless otherwise noted, DAWN metropolitan areas correspond to Metropolitan

Statistical Areas (MSAs) established by the Office of Management and Budget (OMB) based on the 2000 decennial census and updated in 2003. DAWN also prepares estimates for subsections of three of the large MSAs that correspond to MSA Divisions; in a fourth MSA, subsections were established by local users of DAWN data.

Nonmedical use of pharmaceuticals: Nonmedical use of pharmaceuticals includes taking more than the prescribed dose of a prescription pharmaceutical or more than the recommended dose of an over-the-counter pharmaceutical or supplement; taking a pharmaceutical prescribed for another individual; deliberate poisoning with a pharmaceutical by another person; and documented misuse or abuse of a prescription drug, an over-the-counter pharmaceutical, or a dietary supplement. Nonmedical use of pharmaceuticals may involve pharmaceuticals alone or pharmaceuticals in combination with illicit drugs or alcohol. Nonmedical use of pharmaceuticals includes prescription and over-the-counter pharmaceuticals in ED visits that are of the following types of cases:

- *Overmedication*—Patient took too much of his/her prescription medication or over-the-counter medication/dietary supplement.
- *Malicious poisoning*—Drug use in which the patient was administered a drug by another person for a malicious purpose (drug-facilitated sexual assault is one type of malicious poisoning, but other types of malicious poisonings, such as product tampering, would be classified in this category as well).
- *Case type other*—All drug-related ED visits that could not be assigned to any of the other seven types (by design, most cases of documented drug abuse will fall into this category).

(See also **Drug misuse or abuse** and **Type of case.**)

Not otherwise specified (NOS): This is the catchall category for substances that are not specifically named but are known to be reportable to DAWN. Terms are classified into an NOS category only when assignment to a more specific category is not possible based on the information in the source documentation (ED patient charts).

Not tabulated above (NTA): This designation is used when drugs or drug categories are not explicitly listed in a table. Low-incidence drugs (or drug categories) falling under a broader drug classification may be summarized into a single row under that classification and labeled as NTA.

Overmedication: See **Nonmedical use of pharmaceuticals.**

Oversampling: Without oversampling, one would expect a sample to resemble the population from which it was drawn. Oversampling implies the deliberate selection of a much higher proportion of certain types of sampling units than would normally be obtained in a simple, random sample. The deliberate selection of certain types of sample units is done to improve the precision of estimates of the properties of these types of sampling units. This is a form of stratified sampling. (See also **Sampling**, **Sample frame**, and **Sampling unit.**) In DAWN, selected metropolitan areas are oversampled so that estimates can be produced for those areas.

***p*-value:** A measure of the probability (*p*) that the difference between two estimates could have occurred by chance, if the estimates being compared were really the same. The larger the *p*-value, the more likely the difference could have occurred by chance. For example, if the difference between two DAWN estimates has a *p*-value of 0.05, it means that there is no more than a 5 percent probability that the difference observed could be due to chance alone.

PCP: Phencyclidine, a hallucinogenic white crystalline powder that is readily soluble in water or alcohol or may be snorted or smoked. For further information, see http://www.drugabuse.gov/infofacts/infofactsindex.html.

Population: See **Universe.**

Precision: The extent to which an estimate agrees with its mean value in repeated sampling. The precision of an estimate is measured inversely by its standard error (SE) or relative standard error (RSE). In DAWN publications, estimates with RSEs greater than 50 percent are regarded as too imprecise to be published. ED table cells where such estimates would have appeared contain the asterisk symbol (*). (See also **Relative standard error.**)

Race/ethnicity: Race/ethnicity data in DAWN are collected retrospectively from the medical record. This approach involves a single question listing six race/ethnicity groups (plus not documented) and allows for multiple responses.[30] For published reports, DAWN collapses the reported race/ethnicity information into four mutually exclusive categories, plus an unknown category, as follows:

- *White*—A person having origins in any of the original peoples of Europe, the Middle East, or North Africa. Those who are identified as White and Hispanic are classified as Hispanic.
- *Black*—A person having origins in any of the Black racial groups of Africa. Those who are identified as Black or African American and Hispanic are classified as Hispanic.
- *Hispanic*—A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race. Those who are identified as Hispanic are classified as Hispanic, regardless of any other race/ethnicity designations.
- *Race/ethnicity not tabulated above*—A person who is an American Indian, Alaska Native, Asian, Native Hawaiian, or Other Pacific Islander, or a person of two or more race/ethnicities.
- *Unknown*—Race/ethnicity is unknown.

Race/ethnicity is missing from ED patient records about 10 to 20 percent of the time, although this varies widely by hospital. In some cases, the race information is ambiguous (e.g., “European”), and detail about multiple races/ethnicities is often missing. Rates of ED visits per 100,000 are not calculated for race/ethnicity categories because of these data limitations.

[30] See Office of Management and Budget, Revisions to the standards for the classification of Federal data on race and ethnicity, 62 Fed. Reg. 58,782 (October 30, 1997).

Rate: A measure of the incidence of drug-related ED visits per 100,000 population. A rate can be calculated for the total population or for any subset defined by characteristics such as age and gender.

Relative standard error (RSE): A measure of an estimate's relative precision. The RSE of an estimate is equal to the estimate's standard error (SE) divided by the estimate itself. For example, an estimate of 2,000 cocaine visits with an SE of 200 visits has an RSE of 0.1 and is multiplied by 100 to change it to a percentage. This resulting RSE percent value is 10 percent. The larger the RSE, the less precise the estimate. Estimates with an RSE of 50 percent or greater are not published by DAWN. (See also **Precision.**)

Sample frame: A list of units from which a sample is drawn. In DAWN, the hospital is the unit used for the ED sample. All members of the sampling frame have a known probability of being selected. A sampling frame is constructed such that there is no duplication and each unit is identifiable. Ideally, the sampling frame and the universe are the same. The sampling frame for the DAWN hospital ED sample is derived from the American Hospital Association (AHA) Annual Survey Database (ASDB). (See also **Universe.**)

Sampling: Sampling is the process of selecting a proper subset of elements from the full population so that the subset can be used to make inference to the population as a whole. A probability sample is one in which each element has a known and positive chance (probability) of selection. A simple random sample is one in which each member has the same chance of selection. In DAWN, a sample of hospitals is selected to make inference to all hospitals; DAWN uses simple random sampling within strata.

Sampling unit: A member of a sample selected from a sampling frame. For the DAWN sample, the units are hospitals, and data are collected for drug-related ED visits at the responding hospitals selected for the sample.

Sampling weights: Numeric coefficients used to derive population estimates from a sample by adjusting for deviations from the original sample design due to unequal probability sampling, variable nonresponse, and other potential sources of bias.

Seeking detox: This category of drug-related ED visits reflects patients seeking substance abuse treatment, drug rehabilitation, or medical clearance for admission to a drug treatment or detoxification unit. They are classified separately because they often reflect administrative practices that vary across hospitals and may vary over time within the same hospital. Seeking detox visits tend to be concentrated in those facilities that operate specialized inpatient units providing substance abuse treatment or detoxification services, and the largest numbers are found in facilities that require medical clearance for entry into such treatment to be granted in their EDs.

Single-drug case: An ED visit in which only one drug was involved. The single drug may be the direct cause of the visit or a contributing factor as determined by the medical evaluation done in the

ED. Because DAWN considers alcohol to be an illicit drug for minors, DAWN includes visits where alcohol is the single drug if the patient is younger than 21 years of age.

Statistically significant: A difference between two estimates is said to be statistically significant if the value of the statistic used to test the difference is larger or smaller than would be expected by chance alone. For DAWN ED estimates, a difference is considered statistically significant if the *p*-value is less than 0.05. (See also ***p*-value.**)

Strata (plural), stratum (singular): Subgroups of a universe within which separate ED samples are drawn. Stratification is used to increase the precision of estimates for a given sample size, or, conversely, to reduce the sample size required to achieve the desired level of precision. The DAWN ED sample is stratified into metropolitan area cells plus an additional cell for the remainder of the United States. To ensure thorough coverage within metropolitan areas, the universe of hospitals in each is allocated into substrata identified by (a) two types of hospital ownership (public, private), and (b) up to four size categories (measured in terms of the number of ED visits annually). This allocation creates up to eight substrata in each metropolitan area stratum. Hospitals in the stratum that covers the rest of the United States are stratified first by census region, type of ownership, and size (also measured in terms of ED visits). A systematic sample is selected from each of the geographic strata.

Suicide attempt: This type of drug-related ED visit captures suicide attempts (e.g., attempted suicide, tried to kill self) that are documented in the medical record and in which a drug was involved. Suicidal gestures, thoughts, or ideation, including attempts to harm oneself, are not included in this category.

Type of case: A classification used to define similar DAWN cases for analysis. Each case must be assigned a type and may not be assigned more than one type. Cases are classified into one of the following eight categories: suicide attempt, seeking detox, alcohol only (age younger than 21), adverse reaction, overmedication, malicious poisoning, accidental ingestion, and other. The case is coded into the first group that meets the inclusion criteria for that group.

Underage drinking: An ED visit where the patient is under age 21 and alcohol is involved. Because DAWN considers alcohol to be an illicit drug for minors, DAWN includes visits where alcohol is the only drug involved and visits where alcohol is present with other drugs.

Universe: The entire set of units for which generalizations are drawn. The universe for the DAWN ED sample is all non-Federal, short-stay, general medical and surgical hospitals in the United States that operate one or more EDs 24 hours a day, 7 days a week. Specialty hospitals, hospital units of institutions, long-term care facilities, pediatric hospitals, hospitals operating part-time EDs, and hospitals operated by the Veterans Health Administration and the Indian Health Service are excluded. The universe of EDs is identified from the American Hospital Association (AHA) Annual Survey Database (ASDB).

APPENDIX C

DAWN METHODOLOGY, 2009

The Drug Abuse Warning Network (DAWN) relies on a longitudinal probability sample of hospitals located throughout the United States, including Alaska and Hawaii. To be eligible for selection into the DAWN sample, a hospital must be a non-Federal, short-stay, general surgical and medical hospital located in the United States, with at least one 24-hour emergency department (ED). This current approach was first implemented in the 2004 data collection year.

DAWN uses the data from the visits classified as DAWN cases in the selected hospitals to calculate various estimates of drug-related ED visits for the Nation as a whole, as well as for specific metropolitan areas. To calculate these estimates and measure their precision requires the application of sampling and weighting methodologies to the DAWN survey.

This appendix documents the participation of sampled hospitals in 2009 and other related survey methodology topics. Additional detail on the DAWN data collection and survey methodology is available at the DAWN Web site (http://dawninfo.samhsa.gov).

C.1 2009 Hospital Participation

For 2009, data submitted from 242 hospitals were used for estimation (Table C1). The overall weighted response rate was 31.8 percent. Among these participating hospitals, about 9.5 million charts out of a universe of 12.0 million eligible charts were reviewed, and 380,125 drug-related ED visits were identified.[31] With about 80 percent of charts reviewed, the average number of drug-related cases per hospital was 1,570 visits with a median of 1,178 visits and a range of 20 to 6,636 visits. Twelve metropolitan areas had sufficient participation to support separate estimates.[32] The metropolitan area response rates ranged from 28.5 percent in the Houston Metropolitan Statistical Area (MSA) to 92.1 percent in the Seattle MSA.

[31] In larger hospitals, DAWN draws a systematic sample of charts to review.

[32] This report does not include estimates made for metropolitan areas. Detailed tables with estimates for metropolitan areas are available on the DAWN Web site (http://dawninfo.samhsa.gov).

Table C1. DAWN sample characteristics, 2009

Geographic area	Total eligible hospitals (1)	Eligible hospitals in sample (1)	Responding hospitals in sample	Response rate for sampled hospitals (%)	Design weight response rate (%)	Visits weighted response rate (%)
Total United States (2,3)	**4,611**	**581**	**242**	**41.7**	**27.5**	**31.8**
Boston-Cambridge-Quincy, MA-NH, MSA	41	29	19	65.5	66.5	65.4
Chicago-Naperville-Joliet, IL-IN-WI, MSA	89	72	31	43.1	44.6	39.5
Denver-Aurora, CO, MSA	17	15	11	73.3	73.3	75.1
Detroit-Warren-Livonia, MI, MSA	38	25	17	68.0	70.6	82.2
Houston-Baytown-Sugar Land, TX, MSA	55	42	13	31.0	33.3	28.5
Dade County Division of Miami-Fort Lauderdale, FL, MSA (4)	22	16	9	56.3	51.7	60.1
Fort Lauderdale Divisions of Miami-Fort Lauderdale-Miami Beach, FL, MSA (5)	29	21	9	42.9	41.0	51.7
Minneapolis-St. Paul-Bloomington, MN-WI, MSA	26	26	12	46.2	46.2	58.6
New York—Five Boroughs (part of Newark-Edison, NY-NJ-PA, MSA) (6)	44	35	22	62.9	59.6	72.6
Phoenix-Mesa-Scottsdale, AZ, MSA	30	26	13	50.0	50.0	56.0
San Francisco Division of San Francisco-Oakland-Fremont, CA, MSA (7)	18	18	6	33.3	33.3	35.3
Seattle-Tacoma-Bellevue, WA, MSA	23	22	19	86.4	86.4	92.0

(1) General, non-Federal, short-stay hospitals in the United States with 24-hour EDs, based on the American Hospital Association Annual Survey, are eligible for DAWN.

(2) The total number of eligible hospitals includes the sampled and participating hospitals from metropolitan areas shown in this table, plus hospitals in the remainder of the United States. Components shown here do not sum to the total.

(3) Unless otherwise noted, DAWN defines metropolitan areas using the MSA and Division definitions issued by the Office of Management and Budget in June 2003 (available at http:/www.whitehouse.gov/omb/bulletins/b03-04.html).

(4) Miami-Miami Beach-Kendall, FL, Division.

(5) Fort Lauderdale-Pompano Beach-Deerfield Beach, FL, and West Palm Beach-Boca Raton-Boynton Beach, FL, Divisions.

(6) Bronx, Kings, New York, Queens, and Richmond Counties, NY.

(7) San Francisco-San Mateo-Redwood City, CA, Division.

NOTE: MSA = Metropolitan Statistical Area.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

Table C2. Drug-related ED visits and drugs, by type of case, 2009

Type of visit	Unweighted sample data	Weighted estimates	RSE (%)	95% CI: Lower bound	95% CI: Upper bound
Drug-related ED visits (1)	—	—	—	—	—
Suicide attempt	15,516	198,403	8.2	166,539	230,268
Seeking detox	23,051	205,407	27.6	94,479	316,336
Alcohol only (age < 21)	13,067	137,369	14.6	98,936	178,291
Adverse reaction	160,534	2,287,273	6.1	2,012,178	2,562,367
Overmedication	32,648	412,971	6.9	357,053	468,888
Malicious poisoning	1,184	14,720	11.7	11,350	18,091
Accidental ingestion	5,846	95,098	4.9	86,049	104,148
Other	128,408	1,244,245	10.0	999,769	1,488,720
Total drug-related ED visits	**380,125**	**4,595,263**	**4.8**	**4,161,740**	**5,028,786**
Total drug misuse or abuse visits	**203,265**	**2,070,439**	**7.2**	**1,779,183**	**2,361,695**
Total ED visits (all reasons)	**11,915,146**	**120,757,002**	**0.0**	—	—
Drugs (2)	—	—	—	—	—
Suicide attempt	34,046	441,409	8.3	369,290	513,527
Seeking detox	48,057	442,418	29.2	189,463	695,373
Alcohol only (age < 21)	13,067	137,369	14.6	98,936	178,291
Adverse reaction	213,358	3,089,862	6.7	2,686,237	3,493,488
Overmedication	59,903	778,790	8.2	653,788	903,791
Malicious poisoning	2,180	26,599	13.1	19,786	33,411
Accidental ingestion	7,614	123,822	4.8	112,250	135,395
Other	219,538	2,231,253	10.1	1,788,147	2,674,359
Drugs in all drug-related ED visits	**597,634**	**7,271,298**	**6.3**	**6,372,337**	**8,170,260**
Drugs in all misuse or abuse ED visits	**360,185**	**3,819,650**	**8.3**	**3,195,252**	**4,444,048**

(1) Estimates of ED visits are based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs.

(2) These are estimates of drugs involved in ED visits. Because a single ED visit may involve multiple drugs, the number of drugs is greater than the number of visits.

NOTE: CI = confidence interval. RSE = relative standard error. A dash (—) indicates a blank cell.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.

C.2 DAWN Data in This Publication

Estimates of ED visits for different types of visits, referred to as DAWN analytic groups, are presented in this publication. Seven groups relate to drug misuse or abuse and include the following:

- all ED visits resulting from medical emergencies involving drug misuse or abuse (2,070,439 visits):
  - ED visits involving illicit drugs (973,591 visits),
  - ED visits involving use of alcohol in combination with other drugs (519,650 visits),
  - ED visits involving underage drinking (199,429 visits),
  - ED visits involving nonmedical use of pharmaceuticals (1,079,683 visits);
- ED visits resulting from drug-related suicide attempts (198,403 visits); and
- ED visits for the purpose of seeking detox services (205,407 visits).

New in 2009, this report provides estimates for ED visits related to adverse reactions to and accidental ingestions of pharmaceuticals, medications, and other health-related products available over-the-counter. These groups are not related to drug abuse or misuse and include the following:

- ED visits resulting from an adverse reaction to a drug (2,287,273 visits); and
- ED visits resulting from accidental ingestion of a drug (95,098 visits).

These categories are defined by drug and type of case, as shown in Table 1. DAWN analytic groups are not mutually exclusive. For example, a visit that involves cocaine and oxycodone will be counted in the illicits analytic group and the nonmedical use of pharmaceuticals analytic group.

Population estimates used to generate rates (visits per 100,000 population) for 2009 are provided in Table C3.

Table C3. U.S. population, by age and gender, 2009

Age	Total United States	Males	Females
Total	**307,006,550**	**151,449,490**	**155,557,060**
0–5 years	25,485,229	13,026,552	12,458,677
6–11 years	24,311,561	12,432,556	11,879,005
12–17 years	24,751,425	12,679,063	12,072,362
18–20 years	13,212,495	6,791,122	6,421,373
21–24 years	17,199,540	8,860,978	8,338,562
25–29 years	21,677,719	11,115,560	10,562,159
30–34 years	19,888,603	10,107,974	9,780,629
35–44 years	41,529,956	20,857,155	20,672,801
45–54 years	44,592,483	21,973,371	22,619,112
55–65 years	34,786,949	16,781,599	18,005,350
65 years and older	39,570,590	16,823,560	22,747,030

SOURCE: U.S. Census Bureau, United States Resident Population Estimates by Age, Sex, Race, and Hispanic Origin (Vintage 2009).

APPENDIX D

RACE AND ETHNICITY IN DAWN, 2009

In October 1997, the Office of Management and Budget (OMB) issued a revised standard protocol for race and ethnicity categories used in Federal data collection systems.[33] The new protocol permitted separate reporting of race and Hispanic ethnicity, and it incorporated the following: (a) ability to capture more than one race for an individual; (b) modifications in nomenclature (e.g., "Black" was changed to "Black or African American"); (c) division of "Asian or Pacific Islander" into two categories ("Asian" and "Native Hawaiian or Other Pacific Islander"); and (d) elimination of the "other" category. The OMB protocol also permitted race and Hispanic ethnicity to be captured in a single data item that allowed for multiple responses. The latter is the protocol used by DAWN.

DAWN collects data retrospectively from patients' ED medical records. Race/ethnicity information, on average, is missing in about 10 to 20 percent of DAWN case records; in some hospitals, it is missing from all records. There is no mechanism to obtain data that is missing from the ED records as patients, their families, or hospital staff members are never interviewed. Additionally, detail concerning the race/ethnicity categories of Asian, American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, two race/ethnicities, and three race/ethnicities are often not documented.

In part due to the limitations in the collection of race/ethnicity data, this and other DAWN publications observe the following conventions:

- Race/ethnicity data are tabulated in five groups: non-Hispanic White, non-Hispanic Black, Hispanic, race/ethnicity not tabulated above, and race/ethnicity unknown.
- All cases reported to DAWN as Hispanic or Latino ethnicity are tabulated as Hispanic.
- If multiple races are reported (including unknown), the episode is coded for the known race(s) only.
- Rates per 100,000 population are not calculated for race/ethnicity groups because missing data would lead to the underestimation of the rates of ED visits for race/ethnicity groups in a potentially biased manner.

For reference, estimates of drug-related ED visits by DAWN's detailed race/ethnicity groups are presented in Table D1.

[33] Revisions to the standards for the classification of Federal data on race and ethnicity, 62 Fed. Reg. 58,782 (October 30, 1997).

Table D1. Drug-related ED visits, by detailed race/ethnicity, 2009

Race/ethnicity	ED visits (1)
Total drug-related ED visits	**4,595,263**
One race/ethnicity	4,474,183
White	2,962,428
Black or African American	667,588
Hispanic	353,179
Asian	7,829
American Indian or Alaska Native	56,962
Native Hawaiian or Other Pacific Islander	7,337
Race unknown	418,859
Two race/ethnicities	*
White + Black or African American	*
White + Hispanic	*
White + Asian	115
White + American Indian or Alaska Native	*
Black or African American + Hispanic	1,994
Black or African American + Asian	*
Black or African American + American Indian/Alaska Native	*
Hispanic + Asian	*
Hispanic + American Indian or Alaska Native	*
Asian + American Indian or Alaska Native	*
Three race/ethnicities	*
White + Black or African American + Hispanic	*
White + Hispanic + Asian	*
White + Asian + Native Hawaiian or Other Pacific Islander	*

(1) Estimates of ED visits are based on a representative sample of general, non-Federal, short-stay hospitals in the United States with 24-hour EDs.

NOTE: An asterisk (*) indicates that an estimate with a relative standard error greater than 50%, or an estimate based on fewer than 30 visits, has been suppressed.

SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2009.