Drug Abuse Warning Network, 2006: National Estimates of Drug-Related Emergency Department Visits

ACKNOWLEDGMENTS

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HIGHLIGHTS

This publication presents national estimates of drug-related visits to hospital emergency departments (EDs) for 2006, based on data from the Drug Abuse Warning Network (DAWN). Also presented are comparisons of 2006 estimates with those for 2004 and 2005. DAWN is a public health surveillance system that monitors drug-related ED visits for the Nation and for selected metropolitan areas. DAWN estimates pertain to the entire United States, including Alaska, Hawaii, and the District of Columbia. The Substance Abuse and Mental Health Services Administration (SAMHSA) 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 national sample of general, non-Federal hospitals operating 24-hour EDs. The sample is national in scope, with oversampling of hospitals in selected metropolitan areas. In each participating hospital, ED medical records are reviewed retrospectively to find the ED visits that were related to recent drug use. All types of drugs—illegal drugs, prescription and over-the-counter (OTC) pharmaceuticals, dietary supplements, and nonpharmaceutical inhalants—are included. Alcohol, when it is the only drug implicated in a visit, is included for patients younger than age 21; alcohol, when it is present in combination with another drug, is included for patients of all ages.

The 2006 estimates introduce several improvements made to the DAWN sampling and estimation methodology. In order to ensure comparability between estimates for 2004, 2005, and 2006, the improvements were applied retrospectively to 2004 and 2005 data, resulting in small changes as compared to early published estimates.

ED visits involving drug misuse/abuse

In 2006, hospitals in the United States delivered a total of 113 million ED visits, and DAWN estimates that 1,742,887 (confidence interval [CI]: 1,451,086 to 2,034,688)[1] ED visits were associated with drug misuse or abuse. Of those ED visits:

- 31% involved illicit drugs only,
- 28% involved pharmaceuticals only,
- 7% involved alcohol only in patients under the age of 21,
- 13% involved illicit drugs with alcohol,
- 10% involved alcohol with pharmaceuticals,
- 8% involved illicit drugs with pharmaceuticals, and
- 3% involved illicit drugs with pharmaceuticals and alcohol.

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[1] The 95% confidence interval (CI) accounts for the margin of error of the estimate. It indicates, with a high degree of confidence, that the true population value was between 1,451,086 and 2,034,688 drug-related ED visits.

Illicit drugs in ED visits

For 2006, DAWN estimates that 958,164 (CI: 690,218 to 1,226,110) ED visits involved an illicit drug. Thus, over half (55%) of all the drug misuse/abuse ED visits during the year involved an illicit drug either alone or in combination with other types of drugs. DAWN estimates that:

- Cocaine was involved in 548,608 ED visits (CI: 374,579 to 722,636),
- Marijuana was involved in 290,563 ED visits (CI: 238,737 to 342,388),
- Heroin was involved in 189,780 ED visits (CI: 119,525 to 260,035),
- Stimulants, including amphetamines and methamphetamine, were involved in 107,575 ED visits (CI: 66,105 to 149,046), and
- Other illicit drugs, such as PCP, Ecstasy, and GHB, were much less frequent than any of the above.

Taking the margin of error into account, cocaine was more frequent than any of the other illicit drugs. The stimulants (amphetamines and methamphetamine) were less frequent than marijuana and as frequent as heroin.

After taking population size and the margin of error into account:

- The rates of ED visits involving cocaine, marijuana, and heroin were higher for males than females, but the rates for stimulants did not differ by gender,
- For cocaine, the rates for patients aged 18 to 54 were similar,[2] with lower rates for younger and older patients,
- For heroin, the rates were highest for patients aged 21 to 54,
- For marijuana, the rates were highest for patients aged 18 to 24, and
- For stimulants, the rates were highest for patients aged 18 to 44.

Alcohol and drug-related ED visits

For 2006, DAWN estimates that 577,521 (CI: 501,944 to 653,048) ED visits involved either alcohol in combination with another drug (all ages) or alcohol alone for patients under the age of 21. This is about one third (33%) of all drug misuse/abuse ED visits. Since DAWN does not account for ED visits involving alcohol alone in adults, the actual number of ED visits involving alcohol is higher. Alcohol is reported to DAWN when it is present in combination with other drugs, regardless of the patient's age.

Alcohol in combination with other drugs

In 2006, DAWN estimates 450,817 (CI: 383,818 to 517,816) ED visits related to use of alcohol in combination with other drugs. Alcohol was most frequently combined with:

- Cocaine alone (101,588 visits),
- Marijuana alone (41,653 visits),
- Cocaine and marijuana (21,241 visits), and
- Heroin alone (14,958 visits).

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[2] That is, the rates for the age categories 18 to 20, 21 to 24, 25 to 29, 30 to 34, 35 to 44, and 45 to 54 were not significantly different.

Alcohol in patients under age 21

DAWN estimates 76,760 (CI: 60,318 to 93,202) alcohol-related ED visits for patients aged 12 to 17, and 105,675 (CI: 82,757 to 128,593) alcohol-related ED visits for patients aged 18 to 20. Alcohol is an illegal drug for both of these age groups.

About two thirds (69%) of the alcohol-related ED visits for minors involved alcohol and no other drug. Taking population size and the margin of error into account:

- The rate of alcohol-only ED visits for patients aged 18 to 20 (581 visits per 100,000 population) was 2.8 times that for patients aged 12 to 17 (204 per 100,000), and
- Males and females had similar rates.

Nonmedical use of pharmaceuticals

For 2006, DAWN estimates that 741,425 (CI: 674,198 to 808,652) ED visits involved nonmedical use of prescription or OTC pharmaceuticals or dietary supplements. The majority of these visits (54%) involved multiple drugs.

Central nervous system (CNS) agents (present in 50% of nonmedical-use visits) and psychotherapeutic agents (44%) were the most frequent drugs reported in the nonmedical-use category of ED visits.

Among the CNS agents, the most frequent drugs were opiate/opioid analgesics (present in 33% of nonmedical-use visits), including single-ingredient formulations (e.g., oxycodone) and combination forms (e.g., hydrocodone with acetaminophen). Methadone, together with single-ingredient and combination forms of oxycodone and hydrocodone, were the most frequent opioids. Once the margin of error is taken into account, these three opioids appeared in similar numbers of visits:

- Hydrocodone/combinations in 57,550 ED visits (CI: 43,701 to 71,398),
- Oxycodone/combinations in 64,888 ED visits (CI: 49,746 to 80,030), and
- Methadone in 45,130 ED visits (CI: 35,870 to 54,389).

It is not possible to know, based on the documentation available in ED medical records, the extent to which the source of these drugs is a legitimate prescription, as opposed to other sources, nor is it possible to distinguish methadone used for treatment of opiate addiction from the methadone in pill form, which is prescribed for pain. In fact, methadone may be one of the most ambiguous drugs to categorize in DAWN. When a patient on opioid replacement therapy presents to an ED, methadone may be routinely documented in the medical record, but without sufficient detail to distinguish whether the methadone specifically was related to the ED visit.

Among the psychotherapeutic agents, the anxiolytics (anti-anxiety agents), sedatives, and hypnotics were the most frequent, occurring in almost a third (32%) of visits associated with nonmedical use of pharmaceuticals. ED visits involving benzodiazepines clearly outnumber those involving any of the other types of psychotherapeutic agents. DAWN estimates that 195,625 (CI: 167,789 to 223,461) ED visits associated with nonmedical use of pharmaceuticals involved benzodiazepines in 2006.

Taking population size and the margin of error into account:

- ED visit rates for nonmedical use of pharmaceuticals did not differ between females and males, and
- ED visit rates were highest for patients aged 18 to 44.

Comparisons in drug misuse and abuse: 2004, 2005, and 2006

In 2006, hospitals in the United States delivered a total of 113 million ED visits, an increase of 3.9% over 2004. The population of the United States increased 2.9%, from 294 million to 302 million, over the same period.

According to DAWN, the total number of ED visits attributable to drug misuse and abuse was stable across 2004, 2005, and 2006. That is, the apparent difference is within the margin of error. Across the different types of drug involvement, changes were detected for visits involving:

- pharmaceuticals alone (i.e., with no other type of drug), which increased 44% from 2004 to 2006;
- pharmaceuticals used in combination with illicit drug(s), which increased 36% from 2004 to 2006; and
- pharmaceuticals used in combination with alcohol, which increased 22% from 2005 to 2006.

Regarding the significant increases detected, it is worthwhile to consider that the number of pharmaceuticals dispensed for legitimate therapeutic uses may be increasing over time, and DAWN estimates are not adjusted to take such increases into account. Nor do DAWN estimates take into account the increases in the population or in ED use between 2004 and 2006.

No significant changes in ED visits from 2004 to 2006, or from 2005 to 2006, were detected for any of the major illicit drugs (cocaine, heroin, marijuana, and stimulants) or for alcohol.

ED visits related to nonmedical use of pharmaceuticals increased 38% in the period from 2004 to 2006. Among the drugs most frequently implicated in nonmedical use, notable changes from 2004 to 2006 occurred for psychotherapeutic agents (31%) and CNS agents (32%). Within these two categories, visits involving benzodiazepines increased 36%, and visits involving opiate/opioid analgesics increased 43%. Among the opiates/opioids, visits involving hydrocodone/combinations increased 44%, and visits involving oxycodone/combinations increased 56%.

DAWN is not able to assess whether increases or decreases in ED visits associated with specific pharmaceuticals are related to changes in the quantity of these pharmaceuticals being prescribed for therapeutic uses.

Special types of drug-related ED visits

Suicide attempts

DAWN estimates 182,805 (CI: 154,185 to 211,424) ED visits for drug-related suicide attempts in 2006.[3] Nearly two thirds (65%) of ED visits for drug-related suicide attempts involved multiple drugs.

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[3] Though a drug was implicated in each visit, these attempts are not limited to drug overdoses.

In these ED visits for drug-related suicide attempts in 2006:

- The large majority of drug-related suicide attempts (92%) involved pharmaceuticals,
- More than half (58%) included psychotherapeutic agents, such as benzodiazepines or antidepressants,
- Slightly less than half (45%) involved CNS agents, primarily analgesics (pain relievers), including both prescription and OTC formulations,
- Nearly one third (30%) involved alcohol (but DAWN data exclude visits for adults when alcohol is the only drug), and
- About one quarter (23%) involved an illicit drug.

Overall, there was no significant change in ED visits for drug-related suicide attempts during the time period from 2004 to 2006, but an increase was detected from 2005 to 2006. Increases were evident from 2004 to 2006, as well as 2005 to 2006, for some of the pharmaceuticals frequently involved in suicide attempts, such as benzodiazepines and opiate/opioid pain relievers.

Seeking detox

DAWN estimates 118,355 (CI: 90,171 to 146,540) drug-related ED visits for patients seeking detoxification or substance abuse treatment services during 2006. However, these visits tend to be concentrated in hospitals with administrative policies that require medical clearance in the ED for admission to these specialized units within the hospital. Therefore, these visits do not encompass the full extent of the demand for these services.

Nearly two thirds (65%) of the seeking detox ED visits involved multiple drugs. Illicit drugs and alcohol were common in these visits:

- Cocaine (49% of visits) and heroin (29%) were followed in frequency by marijuana (19%) and amphetamine or methamphetamine stimulants (7%), and
- Alcohol in combination with another drug was implicated in 40% of seeking detox ED visits.

Among the seeking detox ED visits, nearly 7 out of 10 (69%) received some type of follow-up care, either inpatient admission, referral elsewhere for detox or substance abuse treatment services, or transfer to another health care facility. However, more than one quarter (27%) of seeking detox cases might not have received the care they sought, because they were discharged to home.

No significant changes in ED visits from 2004 to 2006, or from 2005 to 2006, were detected for seeking detox ED visits overall, or for alcohol or the illicit drugs involved in these visits.

INTRODUCTION

This publication presents estimates of drug-related emergency department (ED) visits from the Drug Abuse Warning Network (DAWN) for 2006, with comparison of estimates for 2004 and 2005. DAWN is a public health surveillance system that monitors drug-related ED visits for the Nation and for selected metropolitan areas. The Office of Applied Studies (OAS) of the Substance Abuse and Mental Health Services Administration (SAMHSA), U.S. Department of Health and Human Services, has been responsible for DAWN operations since 1992.

Major features of DAWN

What is a DAWN case?

One of the most important features of DAWN is its expansive definition of a case:

A DAWN case is any ED visit related to recent drug use.

To be a DAWN case, the relationship between the ED visit and the drug use need not be causal; the drug needs only to be implicated in the visit. This approach accommodates cases where one or more drugs were involved but may or may not have directly caused the condition generating the ED visit, but at the same time avoids inclusion of current medications that are unrelated. Only recent drug use is included;[4] the reason a patient used a drug need not be specified; and the criteria are broad enough to encompass all types of drug-related events, including explicit drug abuse. See Appendix C: DAWN Data Collection and Statistical Methods for a full description of DAWN cases and data collected on those cases.

What drugs are included in DAWN?

DAWN collects data on all types of drugs, including:[5]

- Illegal drugs, such as heroin, cocaine, marijuana, and Ecstasy,
- Prescription drugs, such as Prozac®, Vicodin®, OxyContin®, alprazolam, and methylphenidate,
- Over-the-counter (OTC) medications, such as aspirin, acetaminophen, ibuprofen, and multi-ingredient cough and cold remedies,
- Dietary supplements, such as vitamins, herbal remedies, and nutritional products,
- Psychoactive, nonpharmaceutical inhalants,[6]
- Alcohol in combination with other drugs, and
- Alcohol alone, in patients aged less than 21 years.[7]

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[4] That is, patients with a history of drug use (and no recent use) are excluded.

[5] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A.

[6] To be reportable, a nonpharmaceutical substance must be consumed by inhalation, sniffing, or snorting and must have a psychoactive effect when inhaled. An ED visit involving inhalation of a nonpharmaceutical, psychoactive substance qualifies as a DAWN case even if no other drug was present. Carbon monoxide is excluded from the inhalants. Since 2004, cases involving accidental exposures (e.g., exposure to paint fumes while painting a closet) have been excluded as well.

[7] ED visits related to alcohol use alone are excluded for patients aged 21 and over.

In some cases, the medical record includes only nonspecific drug categories (for instance, "benzodiazepines" or "opiates"). These situations are noted in DAWN publications with the abbreviation "NOS" or "Not Otherwise Specified." In addition, due to the multitude of drugs included in the DAWN drug vocabulary, it is not possible to show all drugs or even all types of drugs in this publication. In these situations, a residual group of drugs may be referred to in a table with the abbreviation "NTA" or "Not Tabulated Above."

What is covered in this publication?

While the full array of drug-related ED visits covered by DAWN is very broad, this publication focuses primarily on ED visits involving drug misuse and abuse. The national estimates of ED visits associated with drug misuse and abuse are presented in terms of the following three categories:

- Illicit drugs,
- Alcohol, and
- Nonmedical use of pharmaceuticals.

The illicit drugs category covers ED visits involving the use of substances that are generally illegal. The alcohol category includes alcohol used in combination with other drugs and alcohol used alone in patients under 21, but excludes alcohol used alone in patients aged 21 and over. Nonmedical use of pharmaceuticals includes ED visits related to the misuse or abuse of prescription or OTC medications or dietary supplements. Nonmedical use includes taking a higher than prescribed or recommended dose of a pharmaceutical (i.e., contrary to directions or labeling), taking a pharmaceutical prescribed for another individual, malicious poisoning of the patient by another individual, and substance abuse involving pharmaceuticals.[8]

In addition, this report includes a separate section on two special types of ED visits: drug-related suicide attempts and patients "seeking detox." The latter includes patients who present to the ED seeking detoxification services or entry into a substance abuse treatment program. These visits tend to be concentrated in hospitals with administrative practices requiring medical clearance in the ED for admission to detox or substance abuse treatment units within the hospital. Drug-related ED visits involving suicide attempts or seeking detox are excluded from the category of nonmedical use of pharmaceuticals.

Hospital participation in 2006

For 2006, 205 hospitals submitted data that were used for estimation. The overall weighted response rate was 26.1%. For the 12 oversampled metropolitan areas and divisions, the individual response rates ranged from 30.8% in the Houston metropolitan area to 71.2% in the Detroit metropolitan area. Additional detail on response rates is provided in Appendix C.

DAWN cases are found through a retrospective review of medical records in participating hospitals. Across all participating hospitals in 2006, 9.8 million charts were reviewed to find the drug-related ED visits that met the DAWN case criteria. Based on the review of charts, 346,946 drug-related visits were found and submitted. On average, a

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[8] Excluded are suicide attempts involving pharmaceuticals, accidental ingestions, visits for patients seeking detoxification services or entry into a substance abuse treatment program, and visits associated with the therapeutic use of pharmaceuticals.

DAWN member hospital submitted 1,077 DAWN cases. However, the number of submitted cases varied widely across hospitals, from 7 cases to 6,782 cases (median 820) in a single hospital during 2006.

Estimates in this publication

Estimates in this publication were calculated by applying sampling weights, nonresponse adjustments, and poststratification adjustments to data from the probability sample of hospitals. Only national estimates pertaining to the entire United States—50 States and the District of Columbia—are provided in this publication.

Hospitals eligible for the DAWN sample are non-Federal, short-stay, general medical and surgical hospitals in the United States that operate 24-hour EDs. The American Hospital Association's (AHA) 2001 Annual Survey is the source of the sampling frame. Subsequent AHA surveys are used annually to refresh the sample. For a definition of sampling frame and other technical terms used in this publication, see Appendix B: Glossary of Terms.

The DAWN sample of hospitals includes an oversampling of hospitals in selected metropolitan areas (referred to as oversample areas), supplemented with a sample of hospitals from the remainder of the United States, which includes other metropolitan areas, as well as nonmetropolitan and rural areas. The metropolitan area boundaries correspond to the definitions issued by the Office of Management and Budget (OMB) in June 2003. National estimates are calculated as the sum of the estimates from oversample areas plus the estimate for the remainder of the United States after taking into account nonresponse, the volume of ED visits delivered by the universe of eligible hospitals in each area, and data quality factors. A more detailed discussion of the DAWN sample of hospitals and estimation procedures is provided in Appendix C.

Margin of error for estimates

Since DAWN relies on a sample of hospitals, each estimate produced from the DAWN ED data is subject to sampling variability, referred to as the "margin of error." This is the variation in the estimate that would be observed naturally if different samples were drawn from the same population using the same procedures. The sampling variability of an estimate in this publication is measured by its relative standard error (RSE). The precision of an estimate is inversely related to its sampling variability, as measured by the RSE: the greater the RSE, the lower the precision.

DAWN estimates with RSE values greater than 50% and quantities less than 30 are regarded as too imprecise for publication and are not shown. Three periods ("...") are displayed in the place of suppressed estimates. Ratios (percentages or rates per 100,000 population) based on suppressed estimates are likewise suppressed. Gray shading in a cell indicates that the cell is not applicable. For example, drugs other than alcohol cannot be present in an "alcohol-only" category.

In this publication, 95% confidence intervals (CIs) are included in many of the tables and are cited in the text along with the estimates. A 95% 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% 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 readers unfamiliar with these statistical concepts, additional descriptions and examples are provided in Appendix C.

Comparisons across years

In this publication, between-year changes are assessed by comparing estimates for 2006 to those for 2004 and to those for 2005.

Major changes to DAWN were instituted at the beginning of 2003 as the result of a redesign that altered most of DAWN's core features. Changes included the design of the hospital sample, the drug-related cases eligible for DAWN, the data items submitted on these cases, and the protocol for case finding and quality assurance. These improvements created a permanent disruption in trends. As a result, comparisons cannot be made between old DAWN (2002 and prior years) and the redesigned DAWN (2004 and forward).[9]

Margin of error for comparisons across years

DAWN analysts tested each set of estimates between two years to ascertain if the difference exceeded its margin of error. To be reported in this publication as a change, the difference between estimates for two years must be statistically significant, that is, the difference must exceed the margin of error. Differences that are not statistically significant indicate that there was no real change between the two years. Appendix C provides additional detail on the method of testing for significant differences between estimates for different years.

Estimates adjusted for population size

Standardized measures are needed to make valid comparisons of ED visits across age and gender categories that differ in population size. For age in particular, the size of the underlying population differs considerably across age groups; for example, the number of individuals aged 18 to 20 in the United States is much lower than the number of individuals aged 35 to 44.

This publication reports rates of ED visits per 100,000 persons for unsuppressed estimates. Rates are generated using population data from the U.S. Bureau of the Census.[10] An example of how these rates are generated and the 2006 population estimates used for this publication are found in Appendix C.

Standardized rates are not calculated for race and ethnicity subgroups, because the race and ethnicity categories available to DAWN are much less detailed and contain considerably more missing data than the race and ethnicity categories in the Census data. Appendix D: Race and Ethnicity in DAWN, describes the race and ethnicity data reported to DAWN.

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[9] For DAWN, 2003 was a transition year: 2003 data reflected some of the new features (e.g., the expanded case criteria) but also some of the old (e.g., the old sample of hospitals). Full-year estimates were not published for 2003, and the estimates that were published are not comparable to those from prior or subsequent years.

[10] Population estimates for 2006 are, as of 6/9/2008, from the U.S. Bureau of Census Postcensal Resident Population National Population Dataset, National estimates by demographic characteristics – single year of age, sex and race, and Hispanic Origin, Monthly Population Estimates. Link: http://www.census.gov/popest/datasets.html. File: NC-EST2007-ALLDATA-R-File14.csv.

DRUG MISUSE AND ABUSE IN ED VISITS

F or 2006, DAWN estimates that over 1.7 million ED visits were associated with drug misuse or abuse (Table 1). This estimate includes:

- 958,164 ED visits (CI: 690,218 to 1,226,110) that involved illicit drugs alone or in combination with other drugs,
- 577,521 ED visits (CI: 501,994 to 653,048) that involved the use of alcohol alone or in combination with other drugs, and
- 860,108 ED visits (CI: 787,298 to 932,918) associated with nonmedical use of pharmaceuticals alone or in combination with other drugs.[11]

Of the 1.7 million drug misuse/abuse visits, about two thirds (66%) were associated with a single drug type (illicit drugs, alcohol, or nonmedical use of pharmaceuticals). ED visits involving illicit drugs alone accounted for 31% of all visits related to drug misuse/abuse in 2006. ED visits involving nonmedical use of pharmaceuticals alone accounted for another 28%. About 7% of drug misuse/abuse visits were related to consumption of alcohol (and no other drug) by a minor.[12] The remaining visits (34%) involved some combination of illicit drugs, alcohol, and/or nonmedical use of pharmaceuticals.

This does not suggest that the majority of ED drug misuse/abuse visits involved a single drug. In fact, the typical drug-related ED visit involves multiple drugs, but these may be of a common type. For example, an ED visit involving illicit drugs alone often involves more than one illicit drug (e.g., cocaine and heroin).

ED visits in each of the three major categories—illicit drugs, alcohol, and nonmedical use of pharmaceuticals—are discussed in greater detail in separate sections of this publication.

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[11] These three categories of ED visits are not mutually exclusive, and the sum of the estimates is greater than the total number of drug misuse/abuse visits. See Appendix C for additional detail on the type of ED visits included in each category.

[12] ED patients over the age of 21 for whom alcohol was the only drug associated with their ED visits are not considered DAWN cases.

Table 1

Drug misuse and abuse in ED visits in the U.S., by type of drug involvement: 2006

Drug involvement[1]	Estimated visits[2]	Percent of visits	Relative standard error (RSE)	95% Confidence interval		
				Lower bound	-	Upper bound
All types of drug misuse/abuse	**1,742,887**	**100%**	**8.5**	**1,451,086**	**-**	**2,034,688**
Illicit drugs only	536,554	31%	18.3	343,920	-	729,189
Alcohol only (age < 21)	126,704	7%	12.5	95,766	-	157,642
Pharmaceuticals only	486,276	28%	5.8	430,721	-	541,832
Combinations						
Illicit drugs with alcohol[3]	219,521	13%	13.5	161,230	-	277,812
Illicit drugs with pharmaceuticals	142,535	8%	10.4	113,561	-	171,510
Alcohol with pharmaceuticals	171,743	10%	5.8	152,240	-	191,246
Illicit drugs with alcohol and pharmaceuticals	59,553	3%	9.8	48,079	-	71,028

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[3] DAWN excludes alcohol-only visits for adults. Alcohol, when present with other drugs, is included for all ages.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

ILLICIT DRUGS IN ED VISITS

T o better understand the role of specific drugs and types of drugs in ED visits, this publication provides more detailed analysis of three drug categories: illicit drugs, alcohol, and nonmedical use of pharmaceuticals. This section focuses on ED visits involving illicit drugs.

For 2006, DAWN estimates that 958,164 (CI: 690,218 to 1,226,110) ED visits involved an illicit drug (Table 2). Thus, over half (55%) of all the drug misuse/abuse ED visits during the year involved illicit drugs, either alone or in combination with another drug type.

DAWN estimates that cocaine was involved in 548,608 (CI: 374,579 to 722,636) ED visits. In other words, close to one in three drug misuse/abuse ED visits (31%) involved cocaine.

Marijuana was involved in 290,563 (CI: 238,737 to 342,388) ED visits. Although it was associated with the second highest number of drug misuse/abuse ED visits for illicit drugs, marijuana was involved in approximately half as many ED visits as cocaine.

Heroin was involved in 189,780 (CI: 119,525 to 260,035) ED visits, or approximately 11% of drug misuse/abuse ED visits overall. This is likely an underestimate, though, because some portion of heroin use has been unavoidably classified as an "unspecified opiate." Heroin is an opiate, and some drug screens test for opiates only as a class. Nearly two thirds (64%) of reports of "opiates" submitted to DAWN for 2006 came from toxicology findings, so some unknown quantity of these may have been heroin. The number of drug misuse/abuse ED visits involving unspecified opiates is estimated at 55,674 (CI: 42,590 to 68,757) visits.

Stimulants, including amphetamines and methamphetamine, were involved in 107,575 (CI: 66,105 to 149,046) ED visits, about 6% of drug misuse/abuse ED visits. Amphetamines and methamphetamine are combined for this analysis because some drug screens test for amphetamines only as a class. Consequently, an amphetamine-positive result could indicate amphetamine or methamphetamine. Nearly all (99%) of the reports of amphetamines submitted to DAWN came simply as "amphetamine" and 65% of those were derived from toxicology findings.

Other illicit drugs appeared at much lower frequencies. For 2006, DAWN estimates:

- MDMA (Ecstasy) in 16,749 ED visits (CI: 11,470 to 22,028),
- PCP in 21,960 ED visits (CI: 5,518 to 38,403),
- Miscellaneous hallucinogens in 3,898 ED visits (CI: 2,591 to 5,205),
- LSD in 4,002 ED visits (CI: 1,945 to 6,059),
- GHB in 1,084 ED visits (CI: 517 to 1,652), and
- Ketamine in 270 ED visits (CI: 29 to 511).

Table 2
Illicit drugs in ED visits: 2006

Drug category and selected drugs[1]	Estimated visits[2,3,4]	Relative standard error (RSE)	95% Confidence interval		
			Lower bound	-	Upper bound
Drug-related ED visits					
Total drug misuse/abuse ED visits	**1,742,887**	**8.5**	**1,451,086**	**-**	**2,034,688**
ED visits, illicit drugs	958,164	14.3	690,218	-	1,226,110
Cocaine	548,608	16.2	374,579	-	722,636
Heroin	189,780	18.9	119,525	-	260,035
Marijuana	290,563	9.1	238,737	-	342,388
Stimulants	107,575	19.7	66,105	-	149,046
Amphetamines	32,240	11.4	25,034	-	39,446
Methamphetamine	79,924	25.1	40,653	-	119,194
MDMA (Ecstasy)	16,749	16.1	11,470	-	22,029
GHB	1,084	26.7	517	-	1,652
Flunitrazepam (Rohypnol)	...	...	...	-	...
Ketamine	270	45.6	29	-	511
LSD	4,002	26.2	1,945	-	6,059
PCP	21,960	38.2	5,518	-	38,403
Miscellaneous hallucinogens	3,898	17.1	2,591	-	5,205
Inhalants	5,643	15.9	3,886	-	7,400
Combinations not tabulated above (NTA)	2,055	26.0	1,007	-	3,103

Table 2 (continued)
Table 2 (continued)
Illicit drugs in ED visits: 2006

Drug category and selected drugs[1]	ED visits per 100,000 population[2,3,4]	Relative standard error (RSE)	95% Confidence interval		
			Lower bound	-	Upper bound
ED visits per 100,000 population					
Total drug misuse/abuse ED visits	576.7	8.5	480.1	-	673.2
ED visits, illicit drugs	317.0	14.3	228.4	-	405.7
Cocaine	181.5	16.2	123.9	-	239.1
Heroin	62.8	18.9	39.5	-	86.0
Marijuana	96.1	9.1	79.0	-	113.3
Stimulants	35.6	19.7	21.9	-	49.3
Amphetamines	10.7	11.4	8.3	-	13.1
Methamphetamine	26.4	25.1	13.5	-	39.4
MDMA (Ecstasy)	5.5	16.1	3.8	-	7.3
GHB	0.4	26.7	0.2	-	0.5
Flunitrazepam (Rohypnol)	…	…	…	-	…
Ketamine	0.1	45.6	0.0	-	0.2
LSD	1.3	26.2	0.6	-	2.0
PCP	7.3	38.2	1.8	-	12.7
Miscellaneous hallucinogens	1.3	17.1	0.9	-	1.7
Inhalants	1.9	15.9	1.3	-	2.4
Combinations not tabulated above (NTA)	0.7	26.0	0.3	-	1.0

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[3] ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving both cocaine and heroin will appear twice in this table). Summing ED visits as reported will produce incorrect and inflated counts of ED visits.

[4] Three dots (…) indicate that an estimate with an RSE greater than 50% or an estimate less than 30 has been suppressed.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

When considered in relation to the population of the United States, ED visits associated with illicit drugs vary across major drugs of abuse (Figure 1):

- 182 visits per 100,000 population for cocaine,
- 96 visits per 100,000 population for marijuana,
- 63 visits per 100,000 population for heroin, and
- 36 visits per 100,000 population for stimulants.

Figure 1
Rates of ED visits involving selected illicit drugs: 2006
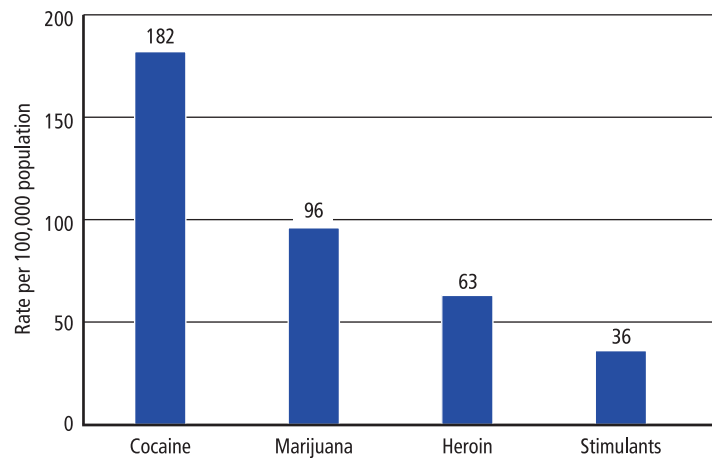
The rates of ED visits involving cocaine, marijuana, and heroin were higher for males than for females, after taking population size and the margin of error into account, but there was not a gender difference for stimulants (Figure 2). For cocaine the rates per 100,000 population were highest among patients aged 18 to 54, with lower rates for younger and older patients (Table 3, Figure 2). For heroin, the rates were highest for patients aged 21 to 54, while the rates for marijuana were highest for patients aged 18 to 24, and the rates for stimulants were highest for patients aged 18 to 44.

In terms of race/ethnicity, 44% of the visits related to any illicit drug use involved patients who were white. However, evaluating the relative frequencies across the race/ethnicity groups is impeded by missing data; race/ethnicity was unknown in 11% of illicit drug-related visits overall, and the percentage was higher for some drugs (e.g., 13% for heroin and 20% for stimulants).

Table 3
Illicit drugs, by patient characteristics: 2006

Patient characteristics	Selected drugs[1]								
	All illicits	Cocaine	Heroin	Marijuana	Stimulants	MDMA (Ecstasy)	GHB	LSD	PCP
Drug-related ED visits[2,3]									
ED visits, illicit drugs	958,164	548,608	189,780	290,563	107,575	16,749	1,084	4,002	21,960
Gender									
Male	631,052	354,268	129,914	195,063	68,638	10,835	824	3,297	15,298
Female	326,846	194,121	59,744	95,478	38,930	5,915	261	705	6,661
Unknown	266	...	...	...	...	...	...	...	...
Age									
0-5 years	855	585	...	...	...	...	...	...	...
6-11 years	...	...	...	...	...	...	...	...	...
12-17 years	58,428	10,984	1,661	44,088	7,740	4,524	...	1,045	1,242
18-20 years	71,973	26,802	8,299	44,146	8,487	3,997	...	1,075	1,718
21-24 years	105,043	47,515	17,119	46,388	16,453	4,217	...	611	5,118
25-29 years	126,699	63,945	26,607	42,626	20,489	1,928	121	...	5,637
30-34 years	107,718	67,820	23,657	28,904	15,000	1,124	175	...	2,714
35-44 years	264,430	181,912	57,155	49,571	26,170	417	...	...	3,088
45-54 years	176,026	122,028	42,662	26,367	10,068	...	...	...	2,271
55-64 years	39,767	23,177	11,049	6,947	2,680	...	...	...	...
65 years and older	5,929	3,499	1,456	1,071	...	...	...	...	...
Unknown	388	300	...	68	...	...	...	...	...
Race/ethnicity									
White	421,775	215,718	78,470	154,081	57,582	8,140	720	2,898	6,087
Black	295,041	213,797	49,522	75,835	6,638	4,392	...	...	...
Hispanic	126,529	63,692	35,781	31,528	...	1,528	...	...	...
Race/ethnicity not tabulated above (NTA)	7,830	3,206	1,656	1,871	1,893	90	...	...	...
Unknown	106,990	52,194	24,351	27,248	21,658	...	130	...	1,625

Table 3 (continued)
Illicit drugs, by patient characteristics: 2006

Patient characteristics	Selected drugs[1]								
	All illicits	Cocaine	Heroin	Marijuana	Stimulants	MDMA (Ecstasy)	GHB	LSD	PCP
ED visits per 100,000 population[2,3]									
ED visits, illicit drugs	**317.0**	**181.5**	**62.8**	**96.1**	**35.6**	**5.5**	**0.4**	**1.3**	**7.3**
Gender									
Male	423.5	237.8	87.2	130.9	46.1	7.3	0.6	2.2	10.3
Female	213.3	126.7	39.0	62.3	25.4	3.9	0.2	0.5	4.3
Age									
0-5 years	3.5	2.4	…	…	…	…	…	…	…
6-11 years	…	…	…	…	…	…	…	…	…
12-17 years	229.6	43.2	6.5	173.3	30.4	17.8	…	4.1	4.9
18-20 years	567.9	211.5	65.5	348.3	67.0	31.5	…	8.5	13.6
21-24 years	618.7	279.9	100.8	273.2	96.9	24.8	…	3.6	30.1
25-29 years	597.0	301.3	125.4	200.9	96.5	9.1	0.6	…	26.6
30-34 years	548.0	345.0	120.4	147.1	76.3	5.7	0.9	…	13.8
35-44 years	610.7	420.1	132.0	114.5	60.4	1.0	…	…	7.1
45-54 years	400.7	277.8	97.1	60.0	22.9	…	…	…	5.2
55-64 years	121.5	70.8	33.7	21.2	8.2	…	…	…	…
65 years and older	15.7	9.2	3.8	2.8	…	…	…	…	…

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[3] Three dots (…) indicate that an estimate with an RSE greater than 50% or an estimate less than 30 has been suppressed.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Figure 2
Illicit drugs, ED visit rates by age and gender: 2006
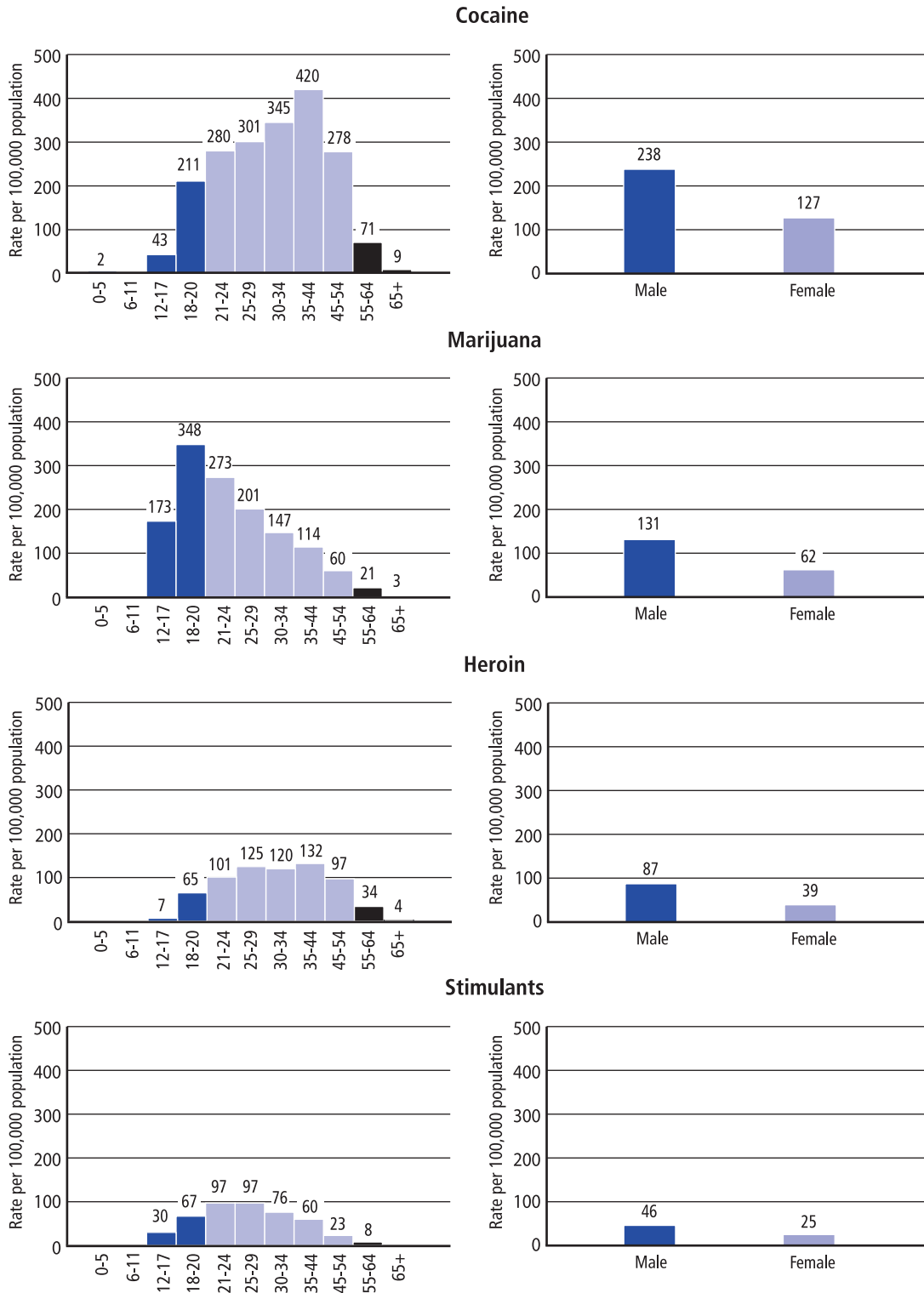
Cocaine

Marijuana

Heroin

Stimulants

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

ALCOHOL IN ED VISITS

Among all the drugs collected by DAWN, alcohol is unique. An ED visit related to alcohol use qualifies as a DAWN case under only two conditions: (1) the alcohol is found in combination with other drugs, regardless of patient age; or (2) the alcohol is found alone (i.e., not in combination with other drugs) in a patient under the age of 21. ED visits associated with alcohol use, particularly among underage patients, represent a significant public health and policy concern and are examined in detail in this section.

For 2006, DAWN estimates that 577,521 (CI: 501,994 to 653,048) ED visits involved either alcohol in combination with another drug (all ages) or alcohol alone for patients under the age of 21. This is about one third (33%) of all drug misuse/abuse ED visits (Table 4). Of all these ED visits involving alcohol, about one fifth (22%) involved patients under the age of 21 who used alcohol alone, that is, with no other drug.

Table 4
Alcohol in drug-related ED visits: 2006

Drug category and selected drugs[1]	Estimated visits[2,3]	Relative standard error (RSE)	95% Confidence interval		
			Lower bound	-	Upper bound
Total drug misuse/abuse ED visits	**1,742,887**	**8.5**	**1,451,086**	**-**	**2,034,688**
ED visits, alcohol	577,521	6.7	501,994	-	653,048
Alcohol in combination	450,817	7.6	383,818	-	517,816
Alcohol alone	126,704	12.5	95,766	-	157,642

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[3] Estimates are all expressed in visits.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Alcohol in combination with other drugs (Tables 5-6, Figure 3)

DAWN estimates 450,817 (CI: 383,818 to 517,816) ED visits related to use of alcohol in combination with another drug(s) in 2006. Alcohol in combination with other drugs is reported to DAWN regardless of the patient's age. These are the only alcohol reports received for patients aged 21 and older. It is these adult patients who account for nearly 9 out of 10 ED visits (87%) implicating alcohol with another drug (Table 5).

Males accounted for 63% of visits involving alcohol in combination with other drugs (Table 5). Taking population size and the margin of error into account, males had higher rates of such visits than females (Figure 3). There was little variation in rates across the age groups from ages 18 to 54. ED visit rates were lower for older and younger patients.

In terms of race/ethnicity, 57% of the visits with alcohol in combination involved patients who were white. Evaluating the relative frequencies across the race/ethnicity groups is impeded by missing data; in 10% of visits race/ethnicity was unknown.

Table 5
Alcohol in combination, by patient and visit characteristics: 2006

| Patient characteristics	Estimated visits[1,2]	Visit characteristics	Estimated visits[1,2]
ED visits, alcohol in combination	450,817		
Gender		Number of drugs involved	
Male	284,425	Single drug	
Female	166,278	Multiple drugs	450,817
Unknown	...	Alcohol involved	450,817
Age		Disposition	
0-5 years	...	Treated and released	234,061
6-11 years	...	Discharged home	192,114
12-17 years	24,418	Released to police/jail	15,664
18-20 years	31,702	Referred to detox/treatment	26,283
21-24 years	44,914	Admitted to this hospital	155,708
25-29 years	53,936	ICU/critical care	35,474
30-34 years	44,304	Surgery	429
35-44 years	133,489	Chemical dependency/detox	12,935
45-54 years	88,078	Psychiatric unit	49,858
55-64 years	21,915	Other inpatient unit	57,011
65 years and older	7,453	Other disposition	61,048
Unknown	175	Transferred	40,915
Race/ethnicity		Left against medical advice	8,977
White	256,104	Died	...
Black	95,003	Other	...
Hispanic	51,076	Not documented	2,791
Race/ethnicity not tabulated above (NTA)	4,240		
Unknown	44,394		

[1] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[2] Three dots (...) indicate that an estimate with an RSE greater than 50% or an estimate less than 30 has been suppressed.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Figure 3
Alcohol with other drugs, ED visit rates by age and gender: 2006
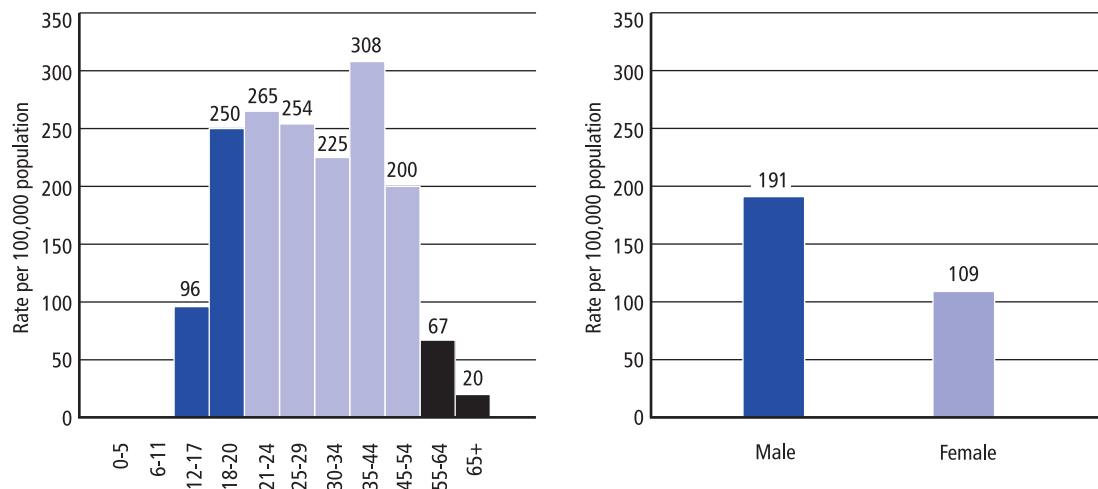
SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Alcohol was most frequently combined with (Table 6):

■ Cocaine alone (101,588 visits),
■ Marijuana alone (41,653 visits),
■ Cocaine and marijuana (21,241 visits), and
■ Heroin alone (14,958 visits)

Table 6
Drugs most frequently reported with alcohol: 2006

Drugs reported with alcohol[1]	Estimated visits[2]
No other drug	126,704
Cocaine only	101,588
Marijuana only	41,653
Cocaine and marijuana only	21,241
Heroin only	14,958
Stimulants only	7,895
Alprazolam only	8,007
Cocaine and heroin only	10,628

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Alcohol-related ED visits in patients under the age of 21 (Table 7)

For individuals under age 21, alcohol is an illegal drug, and ED visits related to both alcohol alone and alcohol in combination are reported to DAWN for this age group. Considering alcohol alone and alcohol in combination with other drugs, DAWN estimates:

- 76,760 (CI: 60,318 to 93,202) alcohol-related ED visits for patients aged 12 to 17, and
- 105,675 (CI: 82,757 to 128,593) alcohol-related ED visits for patients aged 18 to 20.

Nearly 7 in 10 (69%) of the alcohol-related ED visits for minors involved alcohol alone, a finding that is similar for patients aged 12 to 17 and patients aged 18 to 20 (Table 7).

Table 7
Alcohol in drug-related ED visits in patients under age 21: 2006

Drug category and selected drugs[1]	Estimated visits[2]	Relative standard error (RSE)	95% Confidence interval		
			Lower bound	-	Upper bound
Patients aged 12-17					
ED visits, alcohol	76,760	10.9	60,318	-	93,202
Alcohol in combination	24,418	9.0	20,134	-	28,703
Alcohol alone	52,342	14.6	37,323	-	67,360
Patients aged 18-20					
ED visits, alcohol	105,675	11.1	82,757	-	128,593
Alcohol in combination	31,702	8.9	26,193	-	37,211
Alcohol alone	73,973	14.1	53,502	-	94,444

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

ED visits for underage alcohol use (Tables 4, 8, Figure 4)

For 2006, DAWN estimates 126,704 (CI: 95,766 to 157,642) ED visits related to use of alcohol alone (i.e., not in combination with another drug) by patients who were younger than age 21 (Table 4). Nearly all (99%, or 125,888 visits) of those visits represent underage drinking that was not related to either a suicide attempt or a request for admission to detox or substance abuse treatment program (Table 8).

Taking population size into account, the rate of these alcohol-only ED visits for patients aged 18 to 20 (581 visits per 100,000 population) was 2.8 times that for patients aged 12 to 17 (204 per 100,000). Males and females had similar rates (Figure 4).

In terms of race/ethnicity, 58% of these alcohol-only visits involved patients who were white. Evaluating the relative frequencies of the race/ethnicity groups is impeded by missing data; in 16% of visits, race/ethnicity was unknown (Table 8).

Most (90%) of the alcohol-only ED visits resulted in patients' being treated and released, usually to home; another 6% were admitted to inpatient units (Table 8).

Table 8
Alcohol only (age < 21), by patient and visit characteristics: 2006

Patient characteristics	Estimated visits[1,2]	Visit characteristics	Estimated visits[1,2]
ED visits, alcohol only (age < 21)[3]	125,888		
Gender		**Number of drugs involved**	
Male	71,306	Single drug	125,888
Female	54,574	Multiple drugs	
Unknown	...	Alcohol involved	125,888
Age		**Disposition**	
0-5 years	...	Treated and released	112,671
6-11 years	...	Discharged home	102,839
12-17 years	51,901	Released to police/jail	7,870
18-20 years	73,598	Referred to detox/treatment	1,962
21-24 years		Admitted to this hospital	7,479
25-29 years		ICU/critical care	1,123
30-34 years		Surgery	90
35-44 years		Chemical dependency/detox	...
45-54 years		Psychiatric unit	943
55-64 years		Other inpatient unit	5,197
65 years and older		Other disposition	5,738
Unknown		Transferred	3,506
Race/ethnicity		Left against medical advice	688
White	73,624	Died	...
Black	7,427	Other	1,032
Hispanic	23,602	Not documented	501
Race/ethnicity not tabulated above (NTA)	1,709		
Unknown	19,526		

[1] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[2] Three dots (…) indicate that an estimate with an RSE greater than 50% or an estimate less than 30 has been suppressed.

[3] This table is limited to ED visits classified as "alcohol only (age < 21)" and excludes visits classified as either "suicide attempt" or "seeking detox." Therefore, the estimate of total visits is slightly lower than reported in Table 4.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Figure 4
Alcohol only (age < 21), ED visit rates by age and gender: 2006
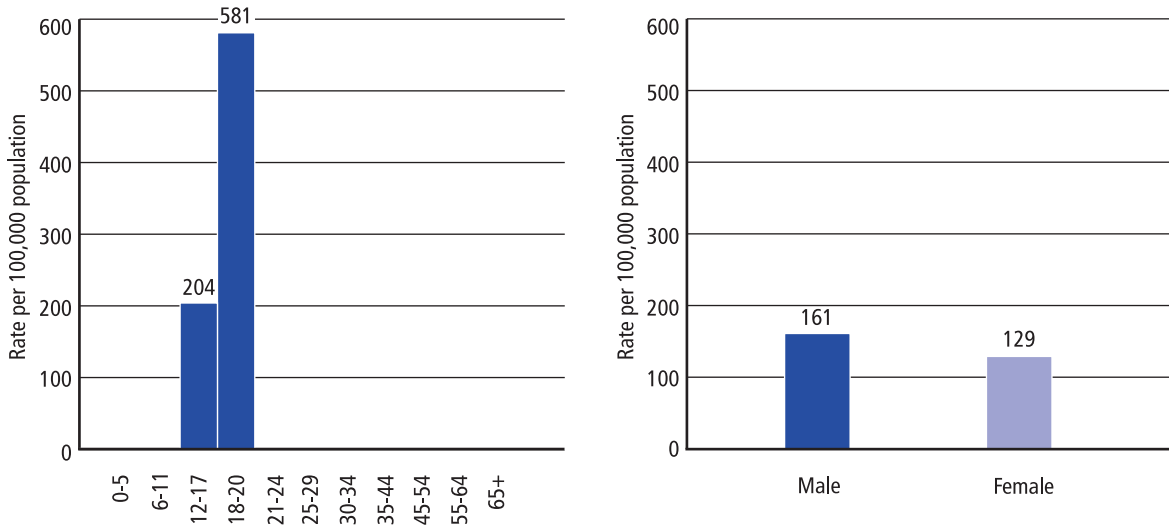
SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

NONMEDICAL USE OF PHARMACEUTICALS

U se of illicit drugs is, by definition, substance abuse. For pharmaceuticals, however, distinguishing medical from nonmedical use is more complicated.[13] In DAWN, "medical use" means taking a prescription or over-the-counter (OTC) pharmaceutical as prescribed or recommended, and "nonmedical use" is use that does not meet the definition of medical use.[14] Thus, nonmedical use of pharmaceuticals includes taking more than the prescribed dose of a prescription pharmaceutical or more than the recommended dose of an OTC 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 or OTC pharmaceutical or dietary supplement. Nonmedical use of pharmaceuticals may involve pharmaceuticals alone or pharmaceuticals in combination with illicit drugs or alcohol.

A cautionary note: DAWN tries to capture only drugs that are related to the ED visit and actively discourages reporting of current medications that are unrelated to the visit. It is important to understand, however, that it is not possible, given the limitations of medical record documentation, to eliminate completely the reporting of current medications, and this should be considered when one interprets these findings. Also, it is not possible to know, based on the documentation available in ED medical records, the extent to which pharmaceuticals came from legitimate prescriptions versus other sources.

Nonmedical use of pharmaceuticals (Tables 9-10, Figure 5)

For 2006, DAWN estimates that 741,425 (CI: 674,198 to 808,652) ED visits involved nonmedical use of prescription or OTC pharmaceuticals or dietary supplements (Table 9). The majority of these visits (54%) involved multiple drugs (Table 10):

- Approximately one fifth (19%) of all nonmedical-use ED visits involved alcohol,
- One fifth (21%) involved pharmaceuticals in combination with an illicit drug, and
- About 6% involved pharmaceuticals in combination with both alcohol and an illicit drug.

Central nervous system (CNS) agents (50% of nonmedical-use visits) and psychotherapeutic agents (44%) were the most frequent drugs reported in the nonmedical-use category of ED visits (Table 9). Respiratory agents (4%), cardiovascular agents (5%), and all other types of pharmaceuticals were much less frequent.

Among the CNS agents, the most frequent drugs were opiate/opioid analgesics (33% of nonmedical-use visits), including single-ingredient formulations (e.g., oxycodone) and combination forms (e.g., hydrocodone with acetaminophen). Methadone, together with single-ingredient and combination forms of oxycodone and hydrocodone, were the most frequent opioids. Once the margin of error is taken into account, these three opioids appeared in similar numbers of visits:

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[13] DAWN cases are identified through a retrospective review of medical charts. Given the limitations of medical record documentation, we have concluded that distinguishing misuse from abuse reliably is not feasible.

[14] Taking less than the prescribed or recommended dose is not considered "nonmedical use."

- Hydrocodone/combinations in 57,550 ED visits (CI: 43,701 to 71,398),
- Oxycodone/combinations in 64,888 ED visits (CI: 49,746 to 80,030), and
- Methadone in 45,130 ED visits (CI: 35,870 to 54,389).

Table 9
Nonmedical use of pharmaceuticals: 2006

Selected drug categories and selected drugs[1]	Estimated visits[2,3,4]	Relative standard error (RSE)	95% Confidence interval		
			Lower bound	-	Upper bound
ED visits, nonmedical use	741,425	4.6	674,198	-	808,652
PSYCHOTHERAPEUTIC AGENTS	323,999	4.2	297,495	-	350,504
Antidepressants	79,682	8.7	66,026	-	93,338
MAO inhibitors	...	...	...	-	...
SSRI antidepressants	35,370	14.6	25,248	-	45,491
Tricyclic antidepressants	16,564	17.6	10,844	-	22,285
Miscellaneous antidepressants	7,561	28.5	3,344	-	11,778
Antipsychotics	44,733	8.7	37,080	-	52,387
Anxiolytics, sedatives, and hypnotics	233,875	5.8	207,294	-	260,457
Barbiturates	10,991	18.2	7,068	-	14,913
Benzodiazepines	195,625	7.3	167,789	-	223,461
Alprazolam	65,236	11.2	50,911	-	79,561
Clonazepam	33,557	12.1	25,580	-	41,534
Diazepam	19,936	9.8	16,108	-	23,764
Lorazepam	23,720	10.0	19,079	-	28,361
Benzodiazepines NOS	58,348	21.7	33,575	-	83,120
Misc. anxiolytics, sedatives, and hypnotics	40,626	10.5	32,304	-	48,947
Diphenhydramine	12,291	11.0	9,643	-	14,939
Hydroxyzine	2,678	17.7	1,749	-	3,606
Zolpidem	17,257	16.6	11,633	-	22,882
Anxiolytics, sedatives, and hypnotics NOS	3,629	14.5	2,601	-	4,657
CNS stimulants	13,892	16.5	9,401	-	18,383
Amphetamine-dextroamphetamine	5,027	26.9	2,377	-	7,677
Caffeine	4,407	22.0	2,509	-	6,305
Dextroamphetamine	...	...	...	-	...
Methylphenidate	2,192	28.2	980	-	3,404

Table 9 (continued)
Nonmedical use of pharmaceuticals: 2006

Selected drug categories and selected drugs[1]	Estimated visits[2,3,4]	Relative standard error (RSE)	95% Confidence interval		
			Lower bound	-	Upper bound
CENTRAL NERVOUS SYSTEM AGENTS	373,138	5.4	333,720	-	412,556
Analgesics	323,579	5.5	288,441	-	358,717
Antimigraine agents	1,191	29.2	509	-	1,873
Cox-2 inhibitors	...	68.9	...	-	...
Opiates/opioids	247,669	6.9	214,160	-	281,177
Opiates/opioids, unspecified	50,978	12.6	38,416	-	63,540
Narcotic analgesics	201,280	8.2	168,954	-	233,606
Buprenorphine/combinations	4,440	41.6	823	-	8,057
Codeine/combinations	6,928	18.4	4,433	-	9,424
Fentanyl/combinations	16,012	27.3	7,441	-	24,583
Hydrocodone/combinations	57,550	12.3	43,701	-	71,398
Hydromorphone/combinations	6,780	23.6	3,649	-	9,911
Meperidine/combinations	1,440	38.7	349	-	2,532
Methadone	45,130	10.5	35,870	-	54,389
Morphine/combinations	20,416	14.2	14,750	-	26,082
Oxycodone/combinations	64,888	11.9	49,746	-	80,030
Propoxyphene/combinations	6,220	18.6	3,955	-	8,485
Nonsteroidal anti-inflammatory agents	27,662	8.9	22,846	-	32,479
Ibuprofen	20,541	8.6	17,071	-	24,011
Naproxen	6,651	17.9	4,314	-	8,987
Salicylates/combinations	10,399	14.5	7,444	-	13,354
Miscellaneous analgesics/combinations	54,313	7.9	45,938	-	62,687
Acetaminophen/combinations	44,314	9.0	36,482	-	52,146
Tramadol/combinations	6,048	16.2	4,128	-	7,969
Tramadol	5,961	16.4	4,050	-	7,873
Acetaminophen-tramadol	...	...	...	-	...
Analgesic combinations not tabulated above (NTA)	898	30.8	355	-	1,441
Anorexiants	1,168	28.2	522	-	1,815
Anticonvulsants	31,169	13.2	23,099	-	39,238
Antiemetic/antivertigo agents	1,360	32.6	491	-	2,230
Anti-Parkinson agents	3,816	31.5	1,457	-	6,174
General anesthetics	...	...	...	-	...

Table 9 (continued)
Nonmedical use of pharmaceuticals: 2006

Selected drug categories and selected drugs[1]	Estimated visits[2,3,4]	Relative standard error (RSE)	95% Confidence interval		
			Lower bound	-	Upper bound
Muscle relaxants	38,918	16.5	26,325	-	51,510
Carisoprodol	24,505	23.2	13,352	-	35,658
Cyclobenzaprine	7,142	13.1	5,308	-	8,976
Miscellaneous CNS agents	999	31.9	374	-	1,623
RESPIRATORY AGENTS	28,867	10.3	23,053	-	34,681
Antihistamines	4,130	20.8	2,450	-	5,809
Bronchodilators	2,920	21.1	1,713	-	4,128
Decongestants	1,511	31.0	593	-	2,428
Expectorants	2,125	29.7	887	-	3,363
Upper respiratory combinations	15,115	12.0	11,550	-	18,680
Respiratory agents NTA	4,296	18.5	2,740	-	5,852
CARDIOVASCULAR AGENTS	36,343	9.8	29,391	-	43,294
Antiadrenergic agents, centrally acting	4,810	14.4	3,455	-	6,166
Beta-adrenergic blocking agents	11,729	21.5	6,788	-	16,671
Calcium channel blocking agents	5,227	16.4	3,546	-	6,907
Diuretics	5,102	20.4	3,060	-	7,145
Cardiovascular agents NTA	17,338	10.7	13,699	-	20,977

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[3] ED visits often involve multiple drugs. Such visits will appear multiple times in this table (e.g., a visit involving oxycodone and hydrocodone will appear twice in this table). Summing ED visits as reported will produce incorrect and inflated counts of ED visits.

[4] Three dots (…) indicate that an estimate with an RSE greater than 50% or an estimate less than 30 has been suppressed.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Table 10
Nonmedical use of pharmaceuticals, by patient and visit characteristics: 2006

Patient characteristics	Estimated visits[1,2]	Visit characteristics	Estimated visits[1,2]
ED visits, nonmedical use	741,425		
Gender		**Number of drugs involved**	
Male	353,066	Single drug	341,796
Female	388,084	Multiple drugs	399,629
Unknown	...		
Age		**Disposition**	
0-5 years	6,360	Treated and released	430,260
6-11 years	4,366	Discharged home	392,512
12-17 years	65,268	Released to police/jail	17,646
18-20 years	51,972	Referred to detox/treatment	20,102
21-24 years	71,351	Admitted to this hospital	223,622
25-29 years	73,753	ICU/critical care	64,777
30-34 years	66,650	Surgery	876
35-44 years	157,450	Chemical dependency/detox	...
45-54 years	131,797	Psychiatric unit	49,413
55-64 years	50,933	Other inpatient unit	104,633
65 years and older	61,346	Other disposition	87,543
Unknown	181	Transferred	49,514
Race/ethnicity		Left against medical advice	16,097
White	508,708	Died	1,574
Black	77,553	Other	...
Hispanic	59,847	Not documented	5,459
Race/ethnicity not tabulated above (NTA)	8,433		
Unknown	86,884		

[1] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[2] Three dots (...) indicate that an estimate with an RSE greater than 50% or an estimate less than 30 has been suppressed.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Note that ED records frequently do not distinguish methadone used for treatment of opiate addiction from the methadone in pill form that is prescribed for pain. In fact, methadone may be one of the most ambiguous drugs to categorize in DAWN. When a patient on opioid replacement therapy presents to an ED, methadone may be routinely documented in the medical record, but without sufficient information to distinguish whether the methadone was related to the ED visit.

The opioids were followed in frequency by the nonopioid analgesics containing acetaminophen (6% of nonmedical-use visits), muscle relaxants (5%), anticonvulsants (4%), and nonsteroidal anti-inflammatory agents (NSAIDs, 4%). DAWN estimates 44,314 (CI: 36,482 to 52,146) nonmedical-use visits involving nonopioid acetaminophen products. The most frequent muscle relaxant in nonmedical-use visits was carisoprodol, which was involved in 24,505 (CI: 13,352 to 35,658), or 3%, of nonmedical-use ED visits in 2006.

Among the psychotherapeutic agents, the anxiolytics (anti-anxiety agents), sedatives, and hypnotics were the most frequent, occurring in 233,875 (CI: 207,294 to 260,457) or about a third (32%) of visits associated with nonmedical use of pharmaceuticals. This category of pharmaceuticals includes barbiturates and benzodiazepines. ED visits involving benzodiazepines clearly outnumber those involving any of the other types of psychotherapeutic agents. DAWN estimates that 195,625 (CI: 167,789 to 223,461) ED visits associated with nonmedical use of pharmaceuticals involved benzodiazepines in 2006.

According to DAWN, the most frequently named benzodiazepines were alprazolam in 65,236 (CI: 50,911 to 79,561) ED visits and clonazepam in 33,557 (CI: 25,580 to 41,534) ED visits. Benzodiazepines without a specific ingredient named appeared in similar numbers: 58,348 (CI: 33,575 to 83,120) ED visits. Benzodiazepines occurring less frequently but still in substantial numbers included lorazepam in 23,720 (CI: 19,079 to 28,361) ED visits and diazepam in 19,936 (CI: 16,108 to 23,764) ED visits.

Among the other anxiolytics, sedatives, and hypnotics, the following drugs appeared in similar numbers of nonmedical-use ED visits:

- Zolpidem in 17,257 ED visits (CI: 11,633 to 22,882),
- Barbiturates, which are primarily unnamed, in 10,991 ED visits (CI: 7,068 to 14,913), and
- Diphenhydramine[15] in 12,291 ED visits (CI: 9,643 to 14,939).

For the ED visits associated with nonmedical use of pharmaceuticals, other psychotherapeutic agents of interest include antidepressants and antipsychotics. DAWN estimates:

- Antidepressants in 79,682 ED visits (CI: 66,026 to 93,338), and
- Antipsychotics, such as quetiapine, in 44,733 ED visits (CI: 37,080 to 52,387).

Methylphenidate, a CNS stimulant that has captured much attention, occurs much less frequently. DAWN estimates that 2,192 (CI: 980 to 3,404) nonmedical-use ED visits involved methylphenidate.

Taking population size and the margin of error into account, visits for nonmedical use of pharmaceuticals did not differ between females (253 visits per 100,000 population) and males (237 visits per 100,000 population) (Figure 5). In terms of age, visit rates were highest for patients aged 18 to 44 and were lowest for patients aged 11 and younger.

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[15] This includes only single-ingredient formulations. Many multi-ingredient pharmaceuticals containing diphenhydramine are classified elsewhere, e.g., as respiratory agents.

In terms of race and ethnicity, 69% of visits related to nonmedical use of pharmaceuticals involved patients who were white (Table 10). Evaluating the relative frequencies of the race/ethnicity groups is impeded by missing data; in 12% of visits, race/ethnicity was unknown.

Patients were treated and released in about half (58%) of ED visits associated with nonmedical use of pharmaceuticals, with most discharged home (91%) and only 5% referred to detox or substance abuse treatment. In one third (30%) of all nonmedical-use visits, patients were admitted to inpatient hospital units (Table 10). Of those admitted to the hospital, about one third (29%) were sent to a critical care unit, about 22% to a psychiatric unit, and about half (47%) to other inpatient units. About 7% of ED visits for nonmedical use of pharmaceuticals resulted in transfers to another health care facility.

Figure 5
Nonmedical use of pharmaceuticals, ED visit rates by age and gender: 2006
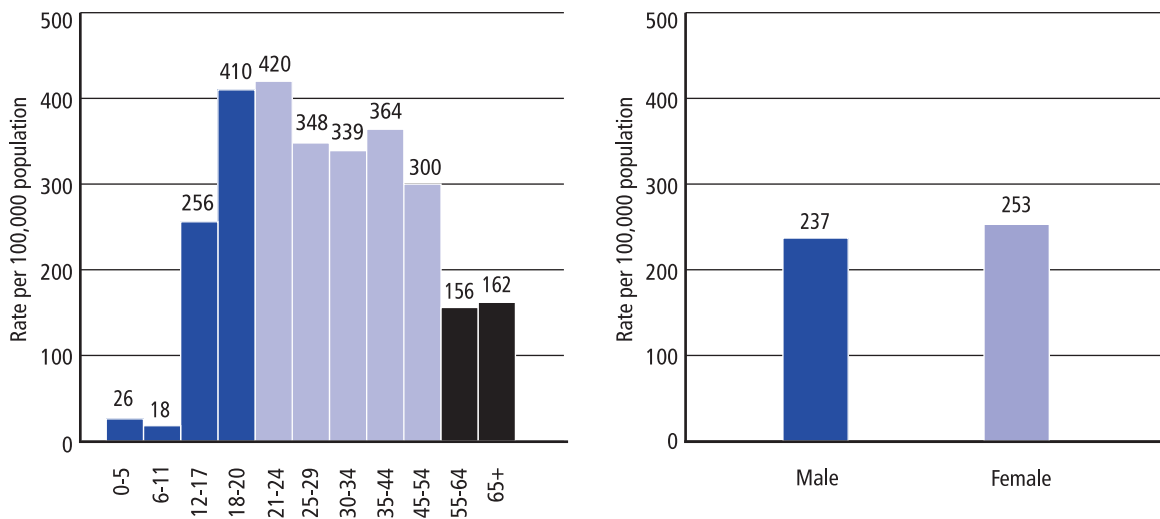
SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

COMPARISONS OF ED VISITS: 2004, 2005, AND 2006

This chapter presents the comparison of the estimates of ED visits for 2006 to prior years. Differences between years are presented in terms of the percent increase or decrease in visits in 2006 compared to the estimates for 2004 or 2005. Only statistically significant changes are discussed and are shown as changes in the tables. However, with only three years' estimates to compare, caution is urged in interpreting these significant differences as trends.

Drug misuse and abuse in ED visits (Table 11)

In 2006, hospitals in the United States delivered a total of 113 million ED visits, an increase of 3.9% over 2004. The population of the United States increased 2.9%, from 294 million to 302 million, over the same period.

According to DAWN, the number of ED visits attributable to drug misuse and abuse was stable from 2004 to 2006 (Table 11).[16] That is, the apparent difference is within the margin of error. Across the different types of drug involvement, changes were detected for visits involving:

- pharmaceuticals alone (i.e., with no other type of drug), which increased 44% from 2004 to 2006;
- pharmaceuticals used in combination with illicit drug(s), which increased 36% from 2004 to 2006; and
- pharmaceuticals used in combination with alcohol, which increased 22% from 2005 to 2006.

Regarding the significant increases detected, it is worthwhile to consider that the number of pharmaceuticals dispensed for legitimate therapeutic uses may be increasing over time, and DAWN estimates are not adjusted to take this into account. Nor do DAWN estimates take into account the increases in the population or in ED use between 2004 and 2006.

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[16] In this publication, drugs are classified using the Drug Reference Vocabulary that was current as of May 2007.

Table 11
Drug misuse and abuse in ED visits in the U.S., by type of drug involvement: 2004, 2005, and 2006

Drug involvement[1]	Estimated visits[2]			Percent change[3]	
	2004	2005	2006	2004, 2006	2005, 2006
All types of drug misuse/abuse	1,619,054	1,616,311	1,742,887		
Illicit drugs only	502,136	517,558	536,554		
Alcohol only (age < 21)	150,988	110,599	126,704		
Pharmaceuticals only	336,987	444,309	486,276	44%	
Combinations					
Illicit drugs with alcohol	338,638	221,823	219,521		
Illicit drugs with pharmaceuticals	105,017	127,245	142,535	36%	
Alcohol with pharmaceuticals	139,716	140,275	171,743		22%
Illicit drugs with alcohol and pharmaceuticals	45,571	54,500	59,553		

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

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

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Illicit drugs in ED visits (Table 12)

No changes from 2004 to 2006, nor from 2005 to 2006, were detected for ED visits involving major illicit drugs: cocaine, marijuana, heroin, and stimulants (Table 12).

Table 12
Illicit drugs in ED visits: 2004, 2005, and 2006

Drug category and selected drugs[1]	Estimated visits[2]			Percent change[3]	
	2004	2005	2006	2004, 2006	2005, 2006
Total drug misuse/abuse ED visits	1,619,054	1,616,311	1,742,887		
ED visits, illicit drugs	991,363	921,127	958,164		
Cocaine	475,425	483,865	548,608		
Heroin	214,432	187,493	189,780		
Marijuana	281,619	279,664	290,563		
Stimulants	162,435	137,650	107,575		
Amphetamines	34,085	34,928	32,240		
Methamphetamine	132,576	109,655	79,924		
MDMA (Ecstasy)	10,220	11,287	16,749	64%	48%
GHB	1,789	1,036	1,084		
Flunitrazepam (Rohypnol)	...	...	...		
Ketamine	...	303	270		
LSD	2,146	2,001	4,002		100%
PCP	31,342	14,825	21,960		
Miscellaneous hallucinogens	3,150	3,194	3,898		
Inhalants	9,523	5,156	5,643	-41%	
Combinations not tabulated above (NTA)	...	3,201	2,055		

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon,* © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

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

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Alcohol in ED visits (Tables 13-14)

No significant changes in alcohol-related ED visits occurred during the period from 2004 to 2006, nor for the period 2005 to 2006 (Tables 13-14). These findings were consistent for all the alcohol-related ED visits: alcohol overall, alcohol in combination with other drugs, and alcohol alone in underage patients.

Table 13
Alcohol in drug-related ED visits: 2004, 2005, and 2006

Drug category and selected drugs[1]	Estimated visits[2]			Percent change[3]	
	2004	2005	2006	2004, 2006	2005, 2006
Total drug misuse/abuse ED visits	1,619,054	1,616,311	1,742,887		
ED visits, alcohol	674,914	527,198	577,521		
Alcohol in combination	523,926	416,599	450,817		
Alcohol alone	150,988	110,599	126,704		

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

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

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Table 14
Alcohol in drug-related ED visits in patients under age 21: 2004, 2005, and 2006

Drug category and selected drugs[1]	Estimated visits[2]			Percent change[3]	
	2004	2005	2006	2004, 2006	2005, 2006
Patients aged 12-17					
ED visits, alcohol	67,589	62,459	76,760		
Alcohol in combination	21,555	19,720	24,418		
Alcohol alone	46,034	42,739	52,342		
Patients aged 18-20					
ED visits, alcohol	135,313	95,166	105,675		
Alcohol in combination	31,926	27,784	31,702		
Alcohol alone	103,387	67,382	73,973		

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

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

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Nonmedical use of pharmaceuticals (Table 15)

ED visits related to nonmedical use of pharmaceuticals increased 38% in the period from 2004 to 2006 (Table 15). Among the drugs most frequently implicated in nonmedical use, the following changes from 2004 to 2006 are notable:

- Psychotherapeutic and CNS agents increased 31% and 32%, respectively.
- Anxiolytics, sedatives, and hypnotics increased 32% overall, with benzodiazepines increasing 36%.
- Opiate/opioid analgesics increased 43%, with hydrocodone/combinations increasing 44%, oxycodone/combinations increasing 56%, and unspecified opiates increasing 60%.

For the period 2005 to 2006, no change was detected in the overall number of ED visits related to nonmedical use of pharmaceuticals nor were changes noted for the substances most frequently implicated in nonmedical-use visits.

Table 15
Nonmedical use of pharmaceuticals ED visits: 2004, 2005, and 2006

Drug category and selected drugs[1]	Estimated visits[2,3]			Percent change[4]	
	2004	2005	2006	2004, 2006	2005, 2006
ED visits, nonmedical use	536,247	669,214	741,425	38%	
PSYCHOTHERAPEUTIC AGENTS	247,324	308,655	323,999	31%	
Antidepressants	66,917	67,051	79,682		
MAO inhibitors	...	...	...		
SSRI antidepressants	32,285	30,374	35,370		
Tricyclic antidepressants	12,412	14,515	16,564		
Miscellaneous antidepressants	9,414	7,452	7,561		
Antipsychotics	35,198	44,393	44,733		
Anxiolytics, sedatives, and hypnotics	177,394	227,486	233,875	32%	
Barbiturates	11,721	14,693	10,991		
Benzodiazepines	143,546	189,704	195,625	36%	
Alprazolam	46,526	57,419	65,236	40%	
Clonazepam	28,178	30,648	33,557		
Diazepam	15,619	18,433	19,936		
Lorazepam	17,674	23,210	23,720		
Benzodiazepines NOS	36,039	61,486	58,347		
Misc. anxiolytics, sedatives, and hypnotics	31,554	35,561	40,626	29%	
Diphenhydramine	10,452	10,294	12,291		
Hydroxyzine	2,363	2,179	2,678		
Zolpidem	12,792	14,730	17,257		
Anxiolytics, sedatives, and hypnotics NOS	2,657	4,421	3,629		

Table 15 (continued)
Nonmedical use of pharmaceuticals ED visits: 2004, 2005, and 2006

Drug category and selected drugs[1]	Estimated visits[2,3]			Percent change[4]	
	2004	2005	2006	2004, 2006	2005, 2006
CNS stimulants	9,801	10,965	13,892	42%	
Amphetamine-dextroamphetamine	2,303	2,669	5,027	118%	
Caffeine	2,736	4,567	4,407		
Dextroamphetamine	...	...	...		
Methylphenidate	2,446	2,519	2,192		
CENTRAL NERVOUS SYSTEM AGENTS	282,296	336,900	373,138	32%	
Analgesics	241,578	294,251	323,579	34%	
Antimigraine agents	868	1,018	1,191		
Cox-2 inhibitors	1,935	765	...		
Opiates/opioids	172,726	217,594	247,669	43%	
Opiates/opioids, unspecified	31,846	52,670	50,978	60%	
Narcotic analgesics	144,644	168,376	201,280	39%	20%
Buprenorphine/combinations	...	...	4,440		
Codeine/combinations	7,171	6,180	6,928		
Fentanyl/combinations	9,823	11,211	16,012		
Hydrocodone/combinations	39,844	47,192	57,550	44%	
Hydromorphone/combinations	3,385	4,714	6,780		
Meperidine/combinations	782	383	1,440		
Methadone	36,806	42,684	45,130		
Morphine/combinations	13,966	15,762	20,416	46%	
Oxycodone/combinations	41,701	52,943	64,888	56%	
Propoxyphene/combinations	6,744	7,648	6,220		
Nonsteroidal anti-inflammatory agents	27,362	28,837	27,662		
Ibuprofen	22,127	22,268	20,541		
Naproxen	4,715	5,190	6,651		
Salicylates/combinations	9,580	12,123	10,399		
Miscellaneous analgesics/combinations	44,857	51,881	54,313		
Acetaminophen/combinations	39,167	43,558	44,314		
Tramadol/combinations	4,849	5,918	6,048		
Tramadol	3,948	5,427	5,961		
Acetaminophen-tramadol	909	...	...		
Analgesic combinations not tabulated above (NTA)	977	653	898		

Table 15 (continued)
Nonmedical use of pharmaceuticals ED visits: 2004, 2005, and 2006

Drug category and selected drugs[1]	Estimated visits[2,3]			Percent change[4]	
	2004	2005	2006	2004, 2006	2005, 2006
Anorexiants	...	1,757	1,168		
Anticonvulsants	28,652	27,641	31,169		
Antiemetic/antivertigo agents	1,678	1,771	1,360		
Anti-Parkinson agents	2,472	1,692	3,816		
General anesthetics	...	...	...		
Muscle relaxants	25,934	33,695	38,918	50%	
Carisoprodol	14,736	20,082	24,505		
Cyclobenzaprine	6,183	7,629	7,142		
Miscellaneous CNS agents	869	900	999		
RESPIRATORY AGENTS	22,286	28,017	28,867		
Antihistamines	5,761	4,429	4,130		
Bronchodilators	2,294	3,043	2,920		
Decongestants	1,864	1,310	1,511		
Expectorants	832	1,960	2,125	155%	
Upper respiratory combinations	10,314	15,837	15,115		
Respiratory agents NTA	2,903	3,692	4,296		
CARDIOVASCULAR AGENTS	27,396	37,095	36,343		
Antiadrenergic agents, centrally acting	3,616	5,125	4,810		
Beta-adrenergic blocking agents	7,094	9,824	11,729		
Calcium channel blocking agents	3,115	5,434	5,227		
Diuretics	3,625	5,332	5,102		
Cardiovascular agents NTA	14,930	18,881	17,338		

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[3] Three dots (...) indicate that an estimate with an RSE greater than 50% or an estimate less than 30 has been suppressed.

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

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

SPECIAL TYPES OF DRUG-RELATED ED VISITS

This chapter profiles two special types of drug-related ED visits captured by DAWN: drug-related suicide attempts and seeking detox cases. These are analyzed by DAWN as separate and distinct classes of drug misuse or abuse.

Suicide attempts (Tables 16-17, Figure 6)

DAWN estimates 182,805 (CI: 154,185 to 211,424) ED visits for drug-related suicide attempts in 2006 (Table 16). Although DAWN includes only suicide attempts that involve drugs, these attempts are not limited to drug overdoses. If there is drug involvement in a suicide attempt by other means (e.g., by gun), the case is included as drug related. However, suicide attempts not involving drugs at all (e.g., by gun alone) are excluded. Also excluded are suicide-related behaviors documented as something other than actual attempts (e.g., suicidal ideation, suicidal gesture, or suicidal thoughts).

Nearly two thirds (65%) of ED visits for drug-related suicide attempts involved multiple drugs (Table 17). Alcohol, either in combination with other drugs or alcohol alone in patients under age 21, was the most frequently implicated drug and was involved in one third (30%) of the ED visits for drug-related suicide attempts. Since DAWN excludes visits for adults when alcohol is the only drug, the role of alcohol in suicide attempts is probably larger. Illicit drugs were involved in just under one quarter (23%) of the ED visits for drug-related suicide attempts. The most frequently reported illicit drugs were cocaine (15% of visits) and marijuana (8% of visits), but the margins of error for the illicit drugs are quite large and the numbers are relatively small when compared with the pharmaceuticals.

Pharmaceuticals were involved in the majority (92%) of ED visits for drug-related suicide attempts, and it is not possible, based on ED medical record documentation, to measure the extent to which these pharmaceuticals may have been prescribed to the patient for a preexisting condition. More than half (58%) of ED visits for drug-related suicide attempts involved psychotherapeutic agents, and 45% involved central nervous system (CNS) agents. The most commonly used psychotherapeutic agents were benzodiazepines (48% of suicide-attempt visits involving psychotherapeutics) and antidepressants (35%). The CNS agents were primarily analgesics (pain relievers) and included both prescription and over-the-counter (OTC) formulations. DAWN estimates that the most commonly used pain relievers were opiates/opioids and acetaminophen/combinations, which were each present in approximately a third (33% and 31%, respectively) of suicide-attempt visits involving CNS agents, followed by nonsteroidal anti-inflammatory agents (NSAIDs, such as ibuprofen and naproxen, 19%) and salicylates/combinations (aspirins, 7%).

About half (55%) of the suicide attempts were admitted for inpatient hospital care. A fifth (21%) were admitted to an ICU/critical care unit; others were admitted to psychiatric units (18%) or other inpatient units (16%). Another 25% were transferred to another health care facility; only 14% were discharged home. Very few died in the ED. However, DAWN does not record deaths for patients who died before arriving at the ED or patients who died after admission to inpatient units of the hospital.

Table 16
Suicide attempts: 2006

Drug category and selected drugs[1]	Estimated visits[2,3,4]	Relative standard error (RSE)	95% Confidence interval		
			Lower bound	-	Upper bound
Total drug-related ED visits, suicide attempts	182,805	8.0	154,185	-	211,424
Major substances of abuse					
Alcohol	54,820	5.4	48,993	-	60,647
Alcohol in combination	54,337	5.4	48,587	-	60,087
Alcohol alone	483	44.4	63	-	903
Non-alcohol illicits	42,148	23.3	22,914	-	61,382
Cocaine	26,510	26.6	12,705	-	40,316
Heroin	4,265	28.3	1,903	-	6,627
Marijuana	15,272	26.4	7,371	-	23,174
Stimulants	4,829	18.8	3,048	-	6,610
Amphetamines	2,228	25.8	1,104	-	3,353
Methamphetamine	2,877	27.5	1,327	-	4,427
MDMA (Ecstasy)	1,239	46.9	101	-	2,377
GHB	...	...	...	-	...
Flunitrazepam (Rohypnol)	...	...	...	-	...
Ketamine	...	...	...	-	...
LSD	...	...	...	-	...
PCP	...	71.8	...	-	...
Miscellaneous hallucinogens	...	...	...	-	...
Inhalants	...	...	...	-	...
Combinations not tabulated above (NTA)	...	...	...	-	...
Other substances					
PSYCHOTHERAPEUTIC AGENTS	106,128	7.6	90,385	-	121,871
Antidepressants	36,677	12.7	27,570	-	45,784
MAO inhibitors	...	...	...	-	...
SSRI antidepressants	16,973	10.9	13,357	-	20,589
Tricyclic antidepressants	4,681	28.1	2,107	-	7,255
Miscellaneous antidepressants	3,806	28.8	1,660	-	5,953
Antipsychotics	22,491	13.4	16,566	-	28,416
Anxiolytics, sedatives, and hypnotics	68,177	7.1	58,632	-	77,723
Barbiturates	2,031	41.8	367	-	3,696
Benzodiazepines	50,431	7.5	43,030	-	57,832
Alprazolam	15,633	14.2	11,291	-	19,974
Clonazepam	14,173	12.4	10,726	-	17,620

Table 16 (continued)
Suicide attempts: 2006

Drug category and selected drugs[1]	Estimated visits[2,3,4]	Relative standard error (RSE)	95% Confidence interval		
			Lower bound	-	Upper bound
Diazepam	5,910	24.4	3,086	-	8,733
Lorazepam	6,682	13.6	4,904	-	8,460
Benzodiazepines NOS	7,080	35.9	2,092	-	12,069
Misc. anxiolytics, sedatives, and hypnotics	21,527	9.7	17,443	-	25,611
Diphenhydramine	7,756	14.6	5,543	-	9,970
Hydroxyzine	1,957	23.6	1,053	-	2,860
Zolpidem	6,674	13.6	4,890	-	8,458
Anxiolytics, sedatives, and hypnotics NOS	1,406	25.7	698	-	2,115
CNS stimulants	1,949	33.1	683	-	3,214
Amphetamine-dextroamphetamine	559	47.5	38	-	1,079
Caffeine	...	...	...	-	...
Dextroamphetamine	...	...	...	-	...
Methylphenidate	633	39.6	141	-	1,124
CENTRAL NERVOUS SYSTEM AGENTS	82,442	7.3	70,683	-	94,201
Analgesics	67,623	7.4	57,880	-	77,366
Antimigraine agents	...	...	...	-	...
Cox-2 inhibitors	...	...	...	-	...
Opiates/opioids	27,185	9.9	21,928	-	32,442
Opiates/opioids, unspecified	3,129	23.5	1,686	-	4,573
Narcotic analgesics	24,470	10.0	19,695	-	29,244
Buprenorphine/combinations	...	...	...	-	...
Codeine/combinations	2,349	22.7	1,306	-	3,392
Fentanyl/combinations	...	...	...	-	...
Hydrocodone/combinations	8,998	11.4	6,981	-	11,016
Hydromorphone/combinations	262	49.5	8	-	516
Meperidine/combinations	...	...	...	-	...
Methadone	1,772	29.3	755	-	2,788
Morphine/combinations	...	50.5	...	-	...
Oxycodone/combinations	7,842	18.9	4,934	-	10,750
Propoxyphene/combinations	2,811	26.9	1,331	-	4,292
Nonsteroidal anti-inflammatory agents	15,956	15.0	11,280	-	20,632
Ibuprofen	12,064	15.0	8,523	-	15,605
Naproxen	3,726	20.9	2,201	-	5,252
Salicylates/combinations	5,400	10.4	4,294	-	6,506

Table 16 (continued)
Suicide attempts: 2006

Drug category and selected drugs[1]	Estimated visits[2,3,4]	Relative standard error (RSE)	95% Confidence interval		
			Lower bound	-	Upper bound
Miscellaneous analgesics/combinations	27,371	9.3	22,367	-	32,376
Acetaminophen/combinations	25,312	9.2	20,757	-	29,867
Tramadol/combinations	1,719	23.6	925	-	2,512
Tramadol	1,372	26.6	656	-	2,088
Acetaminophen-tramadol	...	...	...	-	...
Analgesic combinations NTA	920	44.7	114	-	1,726
Anorexiants	654	31.5	251	-	1,058
Anticonvulsants	12,580	12.3	9,548	-	15,612
Antiemetic/antivertigo agents	...	...	...	-	...
Anti-Parkinson agents	...	51.9	...	-	...
General anesthetics	...	...	...	-	...
Muscle relaxants	7,072	14.4	5,071	-	9,074
Carisoprodol	3,811	23.3	2,068	-	5,554
Cyclobenzaprine	2,096	23.3	1,140	-	3,052
Miscellaneous CNS agents	...	...	...	-	...
RESPIRATORY AGENTS	8,415	13.5	6,182	-	10,647
Antihistamines	1,627	22.0	925	-	2,329
Bronchodilators	...	...	...	-	...
Decongestants	1,347	32.9	479	-	2,215
Expectorants	1,068	33.8	361	-	1,775
Upper respiratory combinations	3,982	16.8	2,670	-	5,294
Respiratory agents NTA	660	32.8	235	-	1,084
CARDIOVASCULAR AGENTS	7,965	16.5	5,389	-	10,542
Antiadrenergic agents, centrally acting	1,930	26.8	917	-	2,942
Beta-adrenergic blocking agents	1,999	20.3	1,202	-	2,795
Calcium channel blocking agents	1,040	28.2	466	-	1,614
Diuretics	...	51.0	...	-	...
Cardiovascular agents NTA	3,298	23.2	1,799	-	4,798

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[3] Three dots (...) indicate that an estimate with an RSE greater than 50% or an estimate less than 30 has been suppressed.

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

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Table 17
Suicide attempts, by patient and visit characteristics: 2006

| Patient characteristics	Estimated visits[1,2]		Visit characteristics	Estimated visits[1,2]
Total drug-related ED visits, suicide attempts	182,805			
Gender			**Number of drugs involved**	
Male	71,657		Single drug	64,143
Female	111,137		Multiple drugs	118,661
Unknown	...			
Age			**Disposition**	
0-5 years	...		Treated and released	31,528
6-11 years	...		Discharged home	25,149
12-17 years	20,506		Released to police/jail	2,080
18-20 years	14,232		Referred to detox/treatment	4,299
21-24 years	18,855		Admitted to this hospital	101,409
25-29 years	21,877		ICU/critical care	37,821
30-34 years	17,095		Surgery	...
35-44 years	44,237		Chemical dependency/detox	...
45-54 years	32,970		Psychiatric unit	32,682
55-64 years	8,462		Other inpatient unit	30,129
65 years and older	4,352		Other disposition	49,867
Unknown	...		Transferred	45,234
Race/ethnicity			Left against medical advice	458
White	114,972		Died	...
Black	28,491		Other	...
Hispanic	18,058		Not documented	1,747
Race/ethnicity not tabulated above (NTA)	2,095			
Unknown	19,188			

[1] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[2] Three dots (...) indicate that an estimate with an RSE greater than 50% or an estimate less than 30 has been suppressed.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

After accounting for population size and the margin of error, the rate of drug-related suicide visits for females (73 visits per 100,000 population) was higher than that for males (48 per 100,000) (Figure 6). In general, the rates for patients aged 18 to 54 exceeded the rates for younger and older age groups. The rate for patients aged 12 to 17 (81 visits per 100,000) exceeded the rates for patients aged 55 and over.

Figure 6
Suicide attempts, ED visit rates by age and gender: 2006
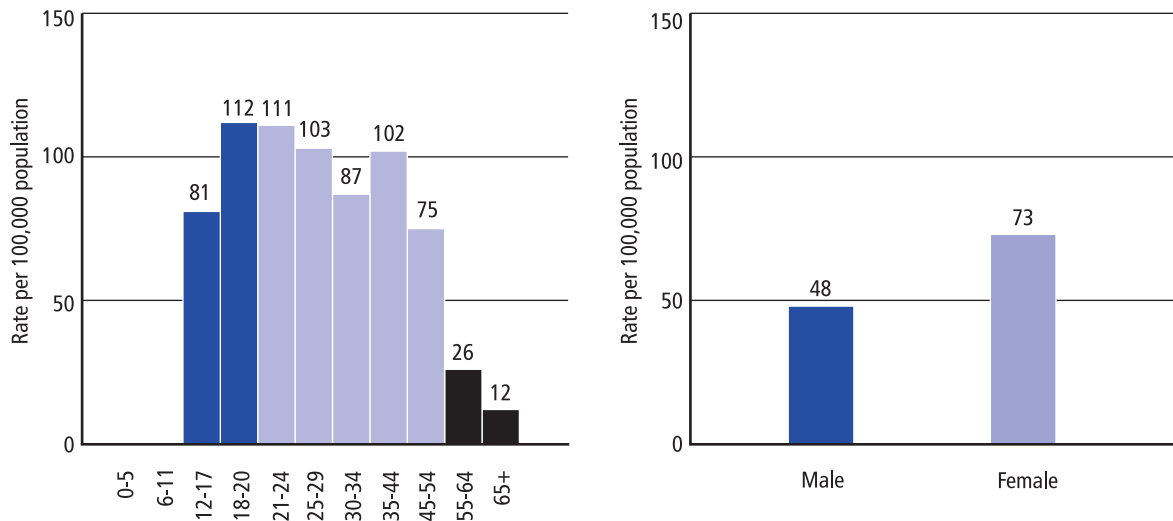
In terms of race/ethnicity, 63% of the suicide attempts involved patients who were white. Evaluating the relative frequencies of the race/ethnicity groups is impeded by missing data; in 10% of visits, race/ethnicity was unknown.

Suicide attempt ED visits: 2004, 2005, and 2006 (Table 18)

Overall, there was no significant change in ED visits for drug-related suicide attempts from 2004 to 2006, but an increase was detected from 2005 to 2006 (Table 18). Increases were evident from 2004 to 2006 for some of the drugs frequently involved in suicide attempts, such as benzodiazepines, which increased 36%, and opiate/opioid analgesics, which increased 44%.

Table 18
Suicide attempts: 2004, 2005, and 2006

Drug category and selected drugs[1]	Estimated visits[2,3]			Percent change[4]	
	2004	2005	2006	2004, 2006	2005, 2006
Total drug-related ED visits, suicide attempts	161,586	151,568	182,805		21%
Major substances of abuse					
Alcohol	48,726	47,891	54,820		
Alcohol in combination	48,080	46,806	54,337		
Alcohol alone	646	1,085	483		
Cocaine	19,520	19,628	26,510		
Heroin	4,579	3,167	4,265		35%
Marijuana	12,074	11,955	15,272		
Stimulants	4,535	5,410	4,829		
Amphetamines	1,560	1,646	2,228		
Methamphetamine	3,136	3,853	2,877		
MDMA (Ecstasy)	...	529	1,239		
GHB	...	...	...		
Flunitrazepam (Rohypnol)	...	...	...		
Ketamine	...	...	...		
LSD	...	...	...		
PCP	...	...	...		
Miscellaneous hallucinogens	...	...	...		
Inhalants	...	794	...		
Combinations not tabulated above (NTA)	...	...	...		
Other substances					
PSYCHOTHERAPEUTIC AGENTS	88,034	82,144	106,128		29%
Antidepressants	33,366	27,086	36,677		
MAO inhibitors	...	...	...		
SSRI antidepressants	18,513	13,377	16,973		
Tricyclic antidepressants	3,555	3,008	4,681		
Miscellaneous antidepressants	3,337	2,681	3,806		
Antipsychotics	17,807	17,129	22,491		
Anxiolytics, sedatives, and hypnotics	52,653	52,022	68,177	29%	31%
Barbiturates	1,949	1,219	2,031		
Benzodiazepines	36,995	35,676	50,431	36%	41%
Alprazolam	11,354	14,530	15,633		
Clonazepam	9,403	9,064	14,173		56%
Diazepam	4,630	3,968	599		

Table 18 (continued)
Suicide attempts: 2004, 2005, and 2006

Drug category and selected drugs[1]	Estimated visits[2,3]			Percent change[4]	
	2004	2005	2006	2004, 2006	2005, 2006
Lorazepam	6,065	5,182	6,682		
Benzodiazepines NOS	4,426	3,343	7,080		
Misc. anxiolytics, sedatives, and hypnotics	16,790	17,522	21,527		
Diphenhydramine	7,458	6,583	7,756		
Hydroxyzine	2,346	1,795	1,956		
Zolpidem	4,355	4,972	6,674		
Anxiolytics, sedatives, and hypnotics NOS	1,859	2,147	1,406		
CNS stimulants	1,654	1,782	1,949		
Amphetamine-dextroamphetamine	...	...	559		
Caffeine	...	450	...		
Dextroamphetamine	...	...	...		
Methylphenidate	...	818	633		
CENTRAL NERVOUS SYSTEM AGENTS	73,949	66,321	82,442		24%
Analgesics	61,095	54,858	67,623		23%
Antimigraine agents	...	...	...		
Cox-2 inhibitors	807	514	...		
Opiates/opioids	18,939	20,359	27,185	44%	34%
Opiates/opioids, unspecified	2,363	2,819	3,129		
Narcotic analgesics	16,928	17,801	24,470	45%	37%
Buprenorphine/combinations	...	...	...		
Codeine/combinations	1,750	2,656	2,349		
Fentanyl/combinations	...	...	...		
Hydrocodone/combinations	7,034	7,035	8,998		
Hydromorphone/combinations	...	...	262		
Meperidine/combinations	...	...	...		
Methadone	1,287	1,596	1,772		
Morphine/combinations	714	1,210	...		
Oxycodone/combinations	5,340	4,229	7,842		85%
Propoxyphene/combinations	1,888	2,129	2,811		
Nonsteroidal anti-inflammatory agents	19,114	14,117	15,956		
Ibuprofen	13,609	10,917	12,064		
Naproxen	4,383	3,224	3,726		
Salicylates/combinations	6,211	4,645	5,400		

Table 18 (continued)
Suicide attempts: 2004, 2005, and 2006

Drug category and selected drugs[1]	Estimated visits[2,3]			Percent change[4]	
	2004	2005	2006	2004, 2006	2005, 2006
Miscellaneous analgesics/combinations	22,864	22,692	27,371		
Acetaminophen/combinations	20,701	21,017	25,312		
Tramadol/combinations	1,742	1,515	1,719		
Tramadol	1,528	1,079	1,372		
Acetaminophen-tramadol	…	…	…		
Analgesic combinations NTA	…	…	920		
Anorexiants	…	…	654		
Anticonvulsants	10,957	9,389	12,580		
Antiemetic/antivertigo agents	…	…	…		
Anti-Parkinson agents	80	543	…		
General anesthetics	…	…	…		
Muscle relaxants	5,921	5,785	7,072		
Carisoprodol	1,864	2,038	3,811		
Cyclobenzaprine	2,966	2,784	2,096		
Miscellaneous CNS agents	…	…	…		
RESPIRATORY AGENTS	8,361	7,662	8,415		
Antihistamines	2,059	1,650	1,627		
Bronchodilators	…	…	…		
Decongestants	…	…	1,347		
Expectorants	…	474	1,068		
Upper respiratory combinations	4,818	4,207	3,982		
Respiratory agents NTA	…	1,244	660		
CARDIOVASCULAR AGENTS	7,667	5,814	7,965		
Antiadrenergic agents, centrally acting	995	912	1,929		
Beta-adrenergic blocking agents	2,105	1,916	1,999		
Calcium channel blocking agents	879	193	1,040		438%
Diuretics	…	539	…		
Cardiovascular agents NTA	3,661	3,024	3,298		

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[3] Three dots (…) indicate that an estimate with an RSE greater than 50% or an estimate less than 30 has been suppressed.

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

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Seeking detox (Tables 19-20, Figure 7)

DAWN estimates 118,355 (CI: 90,171 to 146,540) drug-related ED visits for patients seeking detoxification or substance abuse treatment services during 2006. These "seeking detox" visits tend to be concentrated in hospitals with administrative practices that require medical clearance in the ED for admission to detox or substance abuse treatment units within the hospital. Therefore, this estimate does not encompass the full extent of the demand for these services.

Nearly two thirds (65%) of the seeking detox ED visits involved multiple drugs, and more than one third (40%) of all seeking detox ED visits involved alcohol (Table 19). However, the role of alcohol may be underrepresented here, because for adults aged 21 and older this includes only alcohol in combination with other drugs. Among the illicit drugs, cocaine (49% of visits) and heroin (29% of visits) occurred most frequently, followed by marijuana (19% of visits) and amphetamine or methamphetamine stimulants (7% of visits). Among the pharmaceuticals, psychotherapeutic agents, which were primarily benzodiazepines (13%), and CNS agents, which were primarily opiate/opioid analgesics (26%), were notable. Among the opiates/opioids, hydrocodone/combinations and oxycodone/combinations were most frequent.

Among the seeking detox ED visits, nearly 7 out of 10 (69%) received some type of follow-up care, either inpatient admission, referral elsewhere for detox or substance abuse treatment services, or transfer to another health care facility (Table 20). However, about one quarter (27%) of seeking detox cases may not have received the care they sought because they were discharged to home.

Taking population size and the margin of error into account, the rates of seeking detox visits were similar across all age groups in the 18 to 44 range. The rate of seeking detox visits for males (51 per 100,000 population) was higher than that for females (27 per 100,000 population).

In terms of race/ethnicity, the majority (59%) of seeking detox visits involved patients who were white. Evaluating the relative frequencies of the race/ethnicity groups is impeded by missing data; in 9% of visits race/ethnicity was unknown.

Table 19
Seeking detox: 2006

Drug category and selected drugs[1]	Estimated visits[2,3,4]	Relative standard error (RSE)	95% Confidence interval		
			Lower bound	-	Upper bound
Total drug-related ED visits, seeking detox	118,355	12.1	90,171	-	146,540
Major substance of abuse					
Alcohol	47,102	14.3	33,887	-	60,316
Alcohol in combination	46,769	14.3	33,646	-	59,892
Alcohol alone	...	57.5	...	-	...
Non-alcohol illicits	92,385	12.6	69,548	-	115,223
Cocaine	57,738	14.1	41,815	-	73,661
Heroin	34,462	14.6	24,611	-	44,312
Marijuana	22,104	16.4	14,983	-	29,226
Stimulants	8,128	26.2	3,955	-	12,301
Amphetamines	2,034	26.1	993	-	3,074
Methamphetamine	6,211	31.2	2,407	-	10,014
MDMA (Ecstasy)	483	35.7	145	-	821
GHB	...	...	...	-	...
Flunitrazepam (Rohypnol)	...	...	...	-	...
Ketamine	...	...	...	-	...
LSD	...	54.3	...	-	...
PCP	989	41.5	184	-	1,794
Miscellaneous hallucinogens	...	...	...	-	...
Inhalants	...	...	...	-	...
Combinations not tabulated above (NTA)	...	50.3	...	-	...

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[3] Estimates are all expressed in visits. Visits cannot be summed across drugs because drug-related visits often involve multiple drugs.

[4] Three dots (…) indicate that an estimate with an RSE greater than 50% or an estimate less than 30 has been suppressed.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Table 20
## Seeking detox, by patient and visit characteristics: 2006

Patient characteristics	Estimated visits[1,2]	Visit characteristics	Estimated visits[1,2]
Total drug-related ED visits, seeking detox	118,355		
Gender		**Number of drugs involved**	
Male	76,659	Single drug	40,924
Female	41,528	Multiple drugs	77,432
Unknown	...		
Age		**Disposition**	
0-5 years	...	Treated and released	69,063
6-11 years	...	Discharged home	32,430
12-17 years	3,759	Released to police/jail	791
18-20 years	8,757	Referred to detox/treatment	35,842
21-24 years	11,135	Admitted to this hospital	35,278
25-29 years	17,804	ICU/critical care	897
30-34 years	12,799	Surgery	...
35-44 years	36,665	Chemical dependency/detox	22,540
45-54 years	22,222	Psychiatric unit	6,902
55-64 years	4,521	Other inpatient unit	4,869
65 years and older	681	Other disposition	14,015
Unknown	...	Transferred	10,049
Race/ethnicity		Left against medical advice	1,947
White	69,867	Died	...
Black	25,448	Other	1,447
Hispanic	11,397	Not documented	573
Race/ethnicity not tabulated above (NTA)	737		
Unknown	10,907		

[1] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[2] Three dots (…) indicate that an estimate with an RSE greater than 50% or an estimate less than 30 has been suppressed.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Figure 7
Seeking detox, ED visit rates by age and gender: 2006
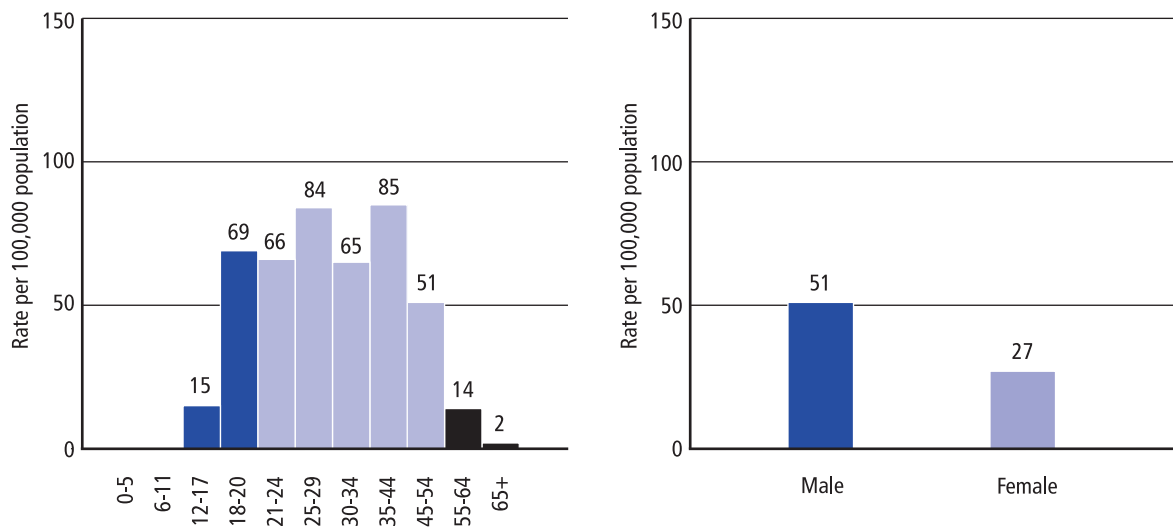
Seeking detox ED visits: 2004, 2005, and 2006 (Table 21)

No significant changes in ED visits from 2004 to 2006, or from 2005 to 2006, were detected for seeking detox ED visits overall, or for alcohol or the illicit drugs involved in these visits (Table 21).

Table 21
Seeking detox: 2004, 2005, and 2006

Drug category and selected drugs[1]	Estimated visits[2,3]			Percent change[4]	
	2004	2005	2006	2004, 2006	2005, 2006
Total drug-related ED visits, seeking detox	**141,867**	**126,226**	**118,355**		
Major substances of abuse					
Alcohol	53,662	47,494	47,102		
Alcohol in combination	51,831	47,154	46,769		
Alcohol alone	...	...	...		
Cocaine	62,989	56,061	57,738		
Heroin	47,035	40,895	34,462		
Marijuana	25,965	22,486	22,104		
Stimulants	11,760	15,402	8,128		
Amphetamines	...	...	2,034		
Methamphetamine	...	...	6,211		
MDMA (Ecstasy)	882	511	483		
GHB	...	...	...		
Flunitrazepam (Rohypnol)	...	...	...		
Ketamine	...	...	...		
LSD	...	...	...		
PCP	827	729	989		
Miscellaneous hallucinogens	...	...	...		
Inhalants	...	...	...		
Combinations not tabulated above (NTA)	...	191	...		

[1] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

[2] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[3] Three dots (…) indicate that an estimate with an RSE greater than 50% or an estimate less than 30 has been suppressed.

[4] This column denotes statistically significant (*p* < 0.05) increases or decreases between estimates for the periods shown.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

Appendices

DAWN, 2006: NATIONAL ED ESTIMATES

APPENDIX A

MULTUM LEXICON
END-USER LICENSE AGREEMENT

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APPENDIX B

GLOSSARY OF TERMS

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 use of a drug, for example, childhood drug poisonings and individuals who take the wrong medication by mistake.

Adverse reaction: This category of drug-related ED visits represents the consequences of using a prescription or over-the-counter (OTC) pharmaceutical for therapeutic purposes and includes visits related to adverse drug reactions, side effects, drug-drug interactions, and drug-alcohol interactions. Adverse reactions that involve a pharmaceutical with an illicit drug are exceptions that are excluded from this category.

Alcohol only (age less than 21): This category of drug-related ED visits includes those in which alcohol was the only drug involved and the patient was aged less than 21. Although alcohol is an illegal drug for minors, combining these cases with other cases involving illicit drugs tends to mask rather than highlight their importance for prevention and treatment efforts. Most instances of alcohol as the only drug in patients under age 21 are classified in the alcohol only (age < 21) case type. However, some are classified as suicide-attempt or seeking detox, case types that precede alcohol only (age < 21) in sequence.

Case description: A description of how the drug(s) was related to the patient's ED visit. The case description, in conjunction with other documentation in the ED medical record, is used to determine if 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 and abuse**.

Confidence interval (CI): An interval estimate, that is, a range of values around a point estimate that takes sampling error into account. Ninety-five percent is an accepted standard of confidence. Technically, a 95% 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% of the time. Practically, a 95% CI summarizes both the estimate and its margin of error in a straightforward way with a reasonable degree of confidence. Calculation of 95% CIs is discussed in Appendix C.

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

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 discharged to the patient's residence. Home is generally used for people 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 forth.
- *Released to police/jail*
- *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:

- *ICU/critical care*
- *Surgery*
- *Chemical dependency/detox*
- *Psychiatric unit*
- *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 chart but does not fit into any of the preceding categories.
- *Not documented*—The discharge status was not documented in the medical chart.

Drug: A substance that was recorded in a DAWN case report. Substances accepted by DAWN include alcohol, illicit drugs, prescription and over-the-counter pharmaceuticals, dietary supplements, and nonpharmaceutical inhalants. Multiple substances ("drugs") can be reported for each DAWN case. Therefore, the total number of drugs exceeds the total number of DAWN cases reported. (See also **single-drug case**.)

Drug category: A generic grouping of related pharmaceuticals or other substances reported to DAWN, based on the classification of Multum Information Services. Multum Information Services is a subsidiary of the Cerner Corporation and a developer of clinical drug information systems and a drug knowledge base. More information is available at http://www.multum.com. In general, the Multum categories follow the therapeutic uses for prescription and over-the-counter pharmaceuticals.

Additional clarification is provided for the following drug categories:

- *Alcohol alone*—DAWN collects data on alcohol when used alone only if the patient is under age 21.
- *Alcohol in combination*—The category for alcohol present with another reportable substance. DAWN does not gather data on alcohol used alone if the patient is aged 21 years or older. For patients 21 and older, alcohol must be used with another substance to be reported to DAWN. Alcohol in combination is reportable for all ages.
- *Amphetamines*—This class of substances has been extracted from the category of central nervous system (CNS) stimulants because of its importance as a major substance of abuse. For purposes of classification,

"amphetamines" (plural) includes a class of compounds derived from or related to the drug amphetamine. Although some "designer" drugs fall into the class of amphetamines, we choose to report some of them individually as major substances of abuse (e.g., methamphetamine). This category does not include other CNS stimulants, such as caffeine or methylphenidate.

- *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).

- *Inhalants*—This category includes anesthetic gases and psychoactive nonpharmaceutical substances for which the documented route of administration was inhaling, sniffing, or snorting. Psychoactive nonpharmaceuticals fall into one of the following three categories: (1) volatile solvents—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, cigar 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, whippets), and gases (butane, propane, helium); (2) nitrites—amyl nitrites ("poppers," "snappers") and butyl nitrites ("rush," "locker room," "bolt," "climax," "video head cleaner"); or (3) chlorofluorohydrocarbons (freons). Anesthetic gases (e.g., nitrous oxide, ether, chloroform) are presumed to have been inhaled.

- *Stimulants*—This category includes amphetamines and methamphetamine. Since some drug screens test for amphetamines only as a class, an amphetamine-positive result could indicate amphetamine or methamphetamine. For this reason, amphetamines and methamphetamine are combined for analysis into the category "stimulants." This category does not include other CNS stimulants, such as caffeine or methylphenidate.

Drug misuse and abuse: A group of ED visits defined broadly to include all visits associated with illicit drugs, alcohol use in combination with illicit drugs or alcohol alone among those younger than 21 years, and nonmedical use of pharmaceuticals. Nonmedical use of pharmaceuticals includes prescription and OTC pharmaceuticals in ED visits that are of the following case types:

- *Overmedication*—This category was designed to capture nonmedical use, overuse, and misuse of prescription and OTC medications that are not documented as drug abuse in the medical chart.

- *Malicious poisoning*—This category was designed to capture cases of 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*—This category includes 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.

Drug-related ED visit: Any ED visit related to recent drug use. This is the definition of a DAWN case effective January 1, 2003. To be a DAWN case, a drug needs only to be implicated in the visit; the drug does not have to have caused the visit. 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.

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 to data from a sample.

Hospital emergency department (ED): Only hospitals that meet eligibility criteria for DAWN are recruited to participate. To be eligible, hospitals must be non-Federal, short-stay, general medical and surgical facilities that operate one or more EDs 24 hours a day, 7 days a week, and be located in the United States. 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's Annual Survey Database. (See also **Universe**.)

Malicious poisoning: See **Drug misuse and abuse**.

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 nucleus. This DAWN publication utilizes areas defined by the Office of Management and Budget (OMB) in June 30, 2003, based on population data from the 2000 decennial Census.

Not otherwise specified (NOS): The catch-all category for substances that are not specifically named. Terms are classified into an NOS category only when assignment to a more specific category is not possible based on information in the source documentation (ED patient charts).

Not tabulated above (NTA): The designation used when categories are not presented in complete detail; smaller units are combined in the NTA category.

Overmedication: See **Drug misuse and abuse**.

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

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% are regarded as too imprecise to be published. ED table cells where such estimates would have appeared contain the symbol "…" (3 dots). (See also **Relative standard error**.)

Race/ethnicity: According to the standard protocol issued by OMB in 1997, the race/ethnicity categories on the DAWN data collection forms are as follows:

- *White*—A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.
- *Black or African American*—A person having origins in any of the black racial groups of Africa.
- *Hispanic or Latino*—A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race.

- *Asian*—A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
- *American Indian or Alaska Native*—A person having origins in any of the original peoples of North and South America (including Central America), and who maintains tribal affiliation or community attachment.
- *Native Hawaiian or Other Pacific Islander*—A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
- *Not documented*—Used when documentation of race is not available from source records.

Despite the detail allowed by these categories, race and ethnicity are often not documented with this level of specificity in patient/decedent records. As a result, categories used to tabulate race and ethnicity data in the publications are:

- *White*—Anyone meeting the definition of white (above). Those who are identified as white and Hispanic are classified as Hispanic.
- *Black*—Anyone meeting the definition of black or African American (above). Those who are identified as black or African American and Hispanic are classified as Hispanic.
- *Hispanic*—Anyone whose ethnicity is Hispanic or Latino (above) is placed in the category Hispanic, regardless of race.
- *Race/ethnicity NTA*—This includes those categories that are too small to report independently, including the following: two or more races, American Indian or Alaska Native, Asian, and Native Hawaiian or Other Pacific Islander.
- *Unknown*—Race/ethnicity is unknown. Those who are identified only as Hispanic are classified as Hispanic.

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 10%. The larger the RSE, the less precise the estimate. Estimates with an RSE of 50% or greater are not published by DAWN. (See also **Precision** and **Standard error**.)

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 in order to make inference to all hospitals; DAWN uses simple random sampling within strata.

Sampling frame: A list of units from which the ED sample is drawn. All members of the sampling frame have a 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.

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 all 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 captures 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: A single-drug case is one in which only one drug was involved. Because multiple substances may be recorded for each DAWN case (see **Drug**), readers should be cautious in interpreting the relationship between a given drug and the number of associated visits or deaths. For example, if the source record for a patient/decedent documented marijuana use, this does not mean that marijuana was the only drug involved in the visit/death or that the marijuana caused the visit/death. One should always consider whether and how many other drugs were used in combination. Even then, attributing a causal relationship between the visit/death and a particular drug may not be possible. DAWN captures single-drug visits/deaths involving alcohol only if the patient /decedent was younger than age 21.

Standard error (SE): A measure of the sampling variability or precision of an estimate. The SE of an estimate is expressed in the same units as the estimate itself. For example, an estimate of 10,000 visits with an SE of 500 indicates that the SE is 500 visits.

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 annual ED visits), creating 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, and then by state, 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 category of drug-related ED visits captures suicide attempts (e.g., "attempted suicide," "tried to kill self") documented in the medical record in which a drug was involved. Suicidal gestures, thoughts, or ideation, including attempts to "harm" self, are assigned to another case type.

Type of case: A classification used to group similar DAWN cases from the diverse set of all drug-related ED visits. Each case is coded into one and only one category, the first that applies from the following hierarchy: suicide attempt,

seeking detox, alcohol only (age < 21), adverse reaction, overmedication, malicious poisoning, accidental ingestion, and other. The rules for assignment of DAWN cases to types of cases are defined in the DAWN ED decision tree in Appendix C.

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 Services are excluded. The universe of EDs is identified from the American Hospital Association's Annual Survey Database.

APPENDIX C

DAWN DATA COLLECTION AND STATISTICAL METHODS

Introduction

The Drug Abuse Warning Network (DAWN) is a public health surveillance system that has monitored drug-related emergency department (ED) visits to hospitals since the early 1970s. DAWN was initially established by the Drug Enforcement Administration. Then DAWN was transferred to the U.S. Department of Health and Human Services (USDHHS), where the National Institute on Drug Abuse (NIDA) conducted DAWN from 1980 to 1992. Since 1992, the Office of Applied Studies (OAS) of the Substance Abuse and Mental Health Services Administration (SAMHSA), USDHHS, has been responsible for DAWN operations and reporting.

Since its inception, DAWN has relied on data collected from a sample of hospitals. However, over the years, the exact survey methodology has been adjusted to improve the quality, reliability, and generalizability of the information produced by DAWN. When NIDA assumed responsibility for DAWN in 1980, implementation of a sample of hospitals to produce representative estimates for the Nation and for selected metropolitan areas became a priority. This sample, refreshed with annual maintenance, continued to support DAWN estimates for the coterminous United States and 21 metropolitan areas until 2002. By that time, major population shifts and changes in the hospital industry over the preceding two decades made apparent the need for a redesign of the sample of hospitals, which was undertaken as part of a wholesale redesign of most major features of DAWN.

Currently, the DAWN survey relies on a longitudinal probability sample of hospitals located throughout the United States, including Alaska and Hawaii. Hospitals eligible for selection into the DAWN sample must be non-Federal, short-stay, general surgical and medical hospitals located in the United States, with at least one 24-hour 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 visits for the Nation as a whole, as well as for specific metropolitan areas. To calculate these estimates and measure their precision, the DAWN survey requires the application of sampling and weighting methodologies.

This appendix documents the data collection methods and the sampling, weighting, and variance estimation methodologies used to develop estimates for the DAWN data collected for 2004, 2005, and 2006.

Target population

The target population is drug-related ED visits in non-Federal, short-stay, general surgical and medical hospitals in the United States with at least one 24-hour ED.

Hospital sample frame

DAWN uses the American Hospital Association (AHA) Annual Survey Database as the basis for its sampling frame. The AHA maintains an updated national registry of U.S. hospitals that is estimated to have a coverage rate of

99%.[1] A health care organization must meet several criteria to be classified as a hospital by the AHA. These include the provision of patient services, diagnostic or therapeutic, for general or specific medical conditions; licensed medical staff; and accreditation by organizations such as the Joint Commission on Accreditation of Health Care Organizations. A hospital is considered to be eligible for inclusion in the DAWN sampling frame if it is a non-Federal, short-stay, general surgical and medical hospital in the United States, with at least one 24-hour ED. Many DAWN hospitals operate multiple EDs.

Determination of DAWN eligibility

A hospital is considered ineligible if any one of the key criteria that define eligibility (non-Federal, short-stay, general surgical and medical hospitals located in the United States, with at least one 24-hour ED) is not met. Only those hospitals that meet all the criteria are considered eligible. For hospitals where critical eligibility data are missing from the AHA database, any one of the nonmissing criteria can render it ineligible. Otherwise, the hospital is considered to have unknown eligibility. For any hospital with unknown eligibility, other variables in the AHA Annual Survey Database are used to determine eligibility. If the hospital's eligibility remains unknown, additional data sources are consulted to determine eligibility.

DAWN data collection

DAWN ED data are collected through a retrospective review of ED medical records for patients treated in the ED. Patients or families are never interviewed. The review of source records is performed by a trained DAWN Reporter in each member facility. Depending on the needs of the facility, the DAWN Reporter may be an employee of the hospital or an employee of the DAWN operations contractor.

For each facility that participates in DAWN, the designated DAWN Reporter reviews all medical records to find ED visits related to drug use. The DAWN Reporter submits an electronic case report to the DAWN system for each ED visit that meets the specific case selection criteria. DAWN Reporters also track, on a copy of the ED registration log, their progress in reviewing the universe of ED visits.

Data items collected by DAWN

The case report form showing all the collected DAWN data items is provided in Figure C1.

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[1] AHA Annual Survey Database, Fiscal year 2001 Health Forum LLC, Copyright 2003, One North Franklin Street, Chicago, IL 60606.

DAWN
DRUG ABUSE
WARNING NETWORK

OMB No. 0930-0078   Expires 12/31/2008

Emergency Department Case Report

U.S. Department of Health and Human Services • Substance Abuse and Mental Health Services Administration

1. Facility

2. Date of Visit
MONTH   DAY   YEAR
2 0

3. Time of Visit
HOUR   MINUTE
☐ a.m.
☐ p.m.
☐ military

4. Age
☐ Less than 1 year
☐ Not documented

5. Patient's home ZIP Code

Otherwise, select one response:
☐ No fixed address (e.g. homeless)
☐ Institution (e.g. shelter/jail/hospital)
☐ Outside U.S.
☐ Not documented

6. Sex
☐ Male
☐ Female
☐ Not documented

7. Race/Ethnicity
Select one or more:
☐ White
☐ Black or African American
☐ Hispanic or Latino
☐ Asian
☐ American Indian or Alaska Native
☐ Native Hawaiian or Other Pacific Islander
☐ Not documented

8. Diagnosis   *List up to 4 diagnoses noted in the patient's chart. Do not list ICD codes.*
1.   3.
2.   4.

9. Case Description   *Beginning with the presenting complaint, describe how the drug(s) was related to the ED visit.*
Copy verbatim from the patient's chart when possible.

10. Substance(s) Involved   *Using available documentation, list all substances that caused or contributed to the ED visit. Record substances as specifically as possible (i.e., brand [trade] name preferred over generic name preferred over chemical name, etc.). Do not record the same substance by two different names. Do not record current medications unrelated to the visit.*

Route of Administration
Select One

Mark if confirmed by toxicology test

	Oral	Injected	Inhaled, sniffed, snorted	Smoked	Other	Not documented
Alcohol involved? ☐ Yes ☐ No/Not documented ☐						
1 ☐						
2 ☐						
3 ☐						
4 ☐						
5 ☐						
6 ☐						

11. Type of Case

Using the Decision Tree,
select the first category that applies:
☐ Suicide attempt
☐ Seeking detox
☐ Alcohol only (age <21)
☐ Adverse reaction
☐ Overmedication
☐ Malicious poisoning
☐ Accidental ingestion
☐ Other

12. Disposition   *Select one:*

Treated and released:
☐ Discharged home
☐ Released to police/jail
☐ Referred to detox/ treatment

*Admitted to **this** hospital:*
☐ ICU/Critical care
☐ Surgery
☐ Chemical dependency/detox
☐ Psychiatric unit
☐ Other inpatient unit

Other disposition:
☐ Transferred
☐ Left against medical advice
☐ Died
☐ Other
☐ Not documented

13. Comments   *Enter here any questions or issues you have about this case.*
Do not include information that could identify the patient.

SMA 100-1 REV. 12/2005

DAWN features that enhance data quality and reliability

Several methods are used to improve the quality and reliability of DAWN data, including the following:

- Retrospective review of ED medical records for every patient treated in participating EDs,
- Electronic reporting with automated prompts and data validation,
- Inclusion of data items on the health effects of drug use and additional detail on patient disposition,
- Elimination of incidental drug reporting,
- Accurate, specific, and nonredundant drug reporting,
- Inclusion of data items to identify drugs confirmed by laboratory testing,
- Rigorous training and certification of DAWN Reporters, and
- In-house review and cleaning of DAWN case reports (see later section, Reduction of Bias, for more details).

ED visits eligible for DAWN

A DAWN case is any ED visit related to recent drug use. DAWN includes ED visits associated with substance abuse and misuse, both intentional and accidental. DAWN also includes ED visits related to the use of drugs for legitimate therapeutic purposes. To be a DAWN case, the relation between the ED visit and the drug need not be causal; the drug needs only to be implicated in the visit.

The case criteria are intended to be broad and inclusive, and to have few exceptions. Broad criteria take into account the fact that documentation in medical records varies in clarity and comprehensiveness across hospitals and among clinicians within hospitals. Broad criteria minimize the potential for judgments that could cause data to vary systematically and unexpectedly across reporters and hospitals. In addition, broad criteria are designed to capture a very diverse set of drug-related visits that can be aggregated or disaggregated to serve a variety of analytical purposes and the interests of multiple audiences. In DAWN, only recent drug use is included,[2] the reason a patient used a drug is irrelevant, and the criteria are broad enough to encompass all types of drug-related events, including, but not limited to, explicit drug abuse.

There are a few clearly delineated exceptions to the DAWN eligibility criteria. An ED visit is not a DAWN visit if:

- There is no evidence of recent drug use.
- The patient left the ED without being treated.
- The patient consumed a nonpharmaceutical substance but did not inhale it.
- The patient has a history of drug use but no recent use.
- Alcohol is the only substance involved and the patient is an adult (aged 21 or over).
- The only documentation of a drug is in toxicology test results.
- The only drugs listed (e.g., current medications) are not related to the visit.
- The patient is being treated as a consequence of undermedication (i.e., taking too little of a drug).

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[2] That is, patients with a history of drug use (and no recent use) are excluded.

Types of cases in DAWN

By design, DAWN's broad case criteria yield a diverse set of visits. To bring order to this heterogeneous mix of ED visits, each visit is assigned to one of eight types, which may be analyzed separately or in purposeful combinations. The eight types of visits are:

- Suicide attempt,
- Seeking detoxification,
- Alcohol only in patients under age 21,
- Adverse reaction,
- Overmedication,
- Malicious poisoning (including drug-facilitated sexual assault or product tampering),
- Accidental ingestion, and
- Other.

DAWN Reporters assign each DAWN case to one, and only one, of the eight case types, based on a series of questions and decision rules. The questions and rules are organized as a decision tree (Figure C2). Starting at the top, each case is assigned to the first case type that applies, even if the case might also meet the rules for a subsequent category. The eight case types were ordered with this in mind.

The final category in the decision tree is called *Other* and it is reserved for DAWN visits that do not meet any of the rules for classification into one of the first seven types. By design, most cases of drug abuse are classified as case type *Other*. This approach, which never directly identifies drug abuse, comes from the recognition that medical records frequently lack explicit documentation of substance abuse. This lack of documentation may occur for several reasons. First, the distinctions among use, misuse, and abuse are often subjective. Second, if there is a low index of suspicion for drug abuse in some types of patients, ED physicians may be unlikely to label those types of patients as drug abusers. Third, in many States, insurers may legally deny payment for ED visits related to substance abuse. Thus, financial incentives may be a powerful factor to influence documentation practices.

Drugs included in DAWN

DAWN includes all types of drugs:[3]

- Illegal drugs, such as heroin, cocaine, marijuana, and Ecstasy,
- Prescription drugs, such as Prozac®, Vicodin®, OxyContin®, alprazolam, and methylphenidate,
- Over-the-counter (OTC) medications, including aspirin, acetaminophen, ibuprofen, and multi-ingredient cough and cold remedies,
- Dietary supplements, including vitamins, herbal remedies, and nutritional products,
- Psychoactive, nonpharmaceutical inhalants,
- Alcohol in combination with other drugs, and
- Alcohol alone, in patients aged less than 21 years.

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[3] The classification of drugs used in DAWN is derived from the Multum *Lexicon*, © 2007, Multum Information Services, Inc. The classification was modified to meet DAWN's unique requirements (2007). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix A and can be found on the Internet at http://www.multum.com.

DAWN Decision Tree

Is this a DAWN Case? Based on documentation in the chart, was the ED visit for a condition induced by or related to drug use? — NO → **STOP** *Not a DAWN Case*

YES ↓

This is a DAWN Case.
Answer the following questions in order. Assign Type of Case to first Yes.

1. Does the chart indicate that the patient attempted suicide with a drug involved? — YES →
01 SUICIDE ATTEMPT
- "Suicide attempt"
- Completed suicide
- Attempted to kill self

NO
- "Suicide ideation"
- No documentation of suicide attempt
- Psych evaluation
- Tried to harm self

2. Does the chart indicate that the patient was seeking detox or entry into a drug treatment program? — YES →
02 SEEKING DETOX
- Seeking detoxification
- Medical clearance for drug treatment admission
- Request for drug rehabilitation

NO
- Withdrawal, but not seeking detox

3. Is the patient under age 21 and alcohol is the only drug mentioned in the chart? — YES →
03 ALCOHOL ONLY (AGE < 21)
- Patient under age 21 and alcohol is the only drug

NO
- Other drug(s) and alcohol are involved
- Patient is age 21 or over

4. Does the chart indicate that the patient had an "adverse reaction" to a prescription drug, over-the-counter medication, or dietary supplement taken as prescribed or recommended? — YES →
04 ADVERSE REACTION
- Allergic reactions
- Drug interactions
- "Side effect" of drug

NO
- Unexpected reaction to illicit drugs
- Toxicity without documentation of "adverse reaction"
- Too little medication; took less than prescribed dose
- Took someone else's drug or medication

5. Did the patient exceed the prescribed dose of a prescription drug or the recommended dose of an over-the-counter medication or dietary supplement? — YES →
05 OVERMEDICATION
- Tried to make up a missed dose
- Forgot they had taken a dose
- Treated symptoms that did not subside with recommended dose

NO
- Illicit drugs
- Malicious poisoning
- Took someone else's drug or medication
- Accidentally took the wrong drug or medication

6. Does the chart indicate that the patient was deliberately poisoned or drugged by another person? — YES →
06 MALICIOUS POISONING
- Drug-facilitated assault
- Drug-facilitated rape
- Homicide with drug as the weapon
- Product tampering

NO

7. Does the chart indicate that the drug was used accidentally or unknowingly? — YES →
07 ACCIDENTAL INGESTION
- Accidental child poisoning
- Took wrong drug or medication

NO

08 OTHER
- Any DAWN Case not assigned above
- Most illicit drug use
- Toxicity due to drugs
- Withdrawal
- Psych evaluation with drugs detected
- Took someone else's drug or medication

Rev. 12/12/2005

To be reportable, a nonpharmaceutical substance must be consumed by inhalation, sniffing, or snorting, and it must have a psychoactive effect when inhaled. An ED visit involving inhalation of a nonpharmaceutical, psychoactive substance and no other drug qualifies as a DAWN case. Carbon monoxide is excluded from the inhalants. Beginning in 2004, cases involving accidental exposures (e.g., exposure to paint fumes while one is painting a closet) are excluded as well.

Hospital participation

For 2006, 205 hospitals submitted data on 269,339 drug-related ED visits that were used for estimation (Tables C1 and C2). The overall weighted response rate was 26.1%. For the 12 oversampled metropolitan areas and divisions, individual response rates ranged from 30.8% in the Houston-Baytown-Sugar Land, TX Metropolitan Statistical Area to 71.2% in the Detroit-Warren-Livonia, MI Metropolitan Statistical Area.

For 2005, 224 hospitals submitted data on 268,128 drug-related ED visits that were used for estimation. The overall weighted response rate in 2005 was 28.9%. There were 13 oversampled areas in 2005 with response rates ranging from 31.1% to 77.3%.

For 2004, 220 hospitals submitted data on 168,841 drug-related ED visits that were used for estimation. The overall weighted response rate in 2004 was 23.9%. There were 13 oversampled areas in 2004 with response rates ranging from 35.3% to 70.8%.

Charts reviewed for drug-related ED visits

DAWN cases are found through a retrospective review of medical records in participating hospitals. Across all participating hospitals in 2006, 9,837,481 charts were reviewed to find the drug-related ED visits that met the DAWN case criteria. Based on the review of charts, 346,946 drug-related visits[4] were found and submitted to the DAWN database, a case rate of 3.5%. On average, a DAWN member hospital submitted 1,077 DAWN cases. However, the number of submitted cases varied widely across hospitals, from 7 cases to 6,782 cases (median 820) in a single hospital during 2006.

Across all participating hospitals in 2005, 11,472,887 charts were reviewed to find the drug-related ED visits that met the DAWN case criteria. Based on the review of charts, 374,276 drug-related visits were found and submitted, a case rate of 3.3%. On average, a DAWN member hospital submitted 843 DAWN cases. The number of DAWN cases varied widely, from 1 case to 9,021 (median 525) for a single hospital.

Across all participating hospitals in 2004, 13,299,739 charts were reviewed to find the drug-related ED visits that met the DAWN case criteria. Based on the review of charts, 307,094 drug-related visits were found and submitted, a case rate of 2.3%. On average, a DAWN member hospital submitted 609 DAWN cases. The number of DAWN cases varied widely, from 1 case to 7,485 (median 377) for a single hospital.

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[4] For 2004-2006, more hospitals participated in DAWN than were used in estimation. Therefore, the number of drug-related ED visits from all participating hospitals exceeded the number used for estimation.

Table C1
Data collection year 2006

Geographic area	Total eligible hospitals[1]	Eligible hospitals in sample	Responding hospitals in sample	Percent		
				Response rate for sampled hospitals	Design weight response rate	Visits weighted response rate
Total U.S.[2]	4,568	544	205	37.7	24.9	26.1
Metropolitan Statistical Areas (MSAs)[3]						
Boston-Cambridge-Quincy, MA-NH MSA	40	29	17	58.6	58.5	57.3
Chicago-Naperville-Joliet, IL-IN-WI MSA	90	74	27	36.5	37.7	36.2
Denver-Aurora, CO MSA	15	15	9	60.0	60.0	68.1
Detroit-Warren-Livonia, MI MSA	37	24	16	66.7	69.7	71.2
Houston-Baytown-Sugar Land, TX MSA	47	42	12	28.6	28.3	30.8
Minneapolis-St. Paul-Bloomington, MN-WI MSA	27	27	10	37.0	37.0	44.0
Phoenix-Mesa-Scottsdale, AZ MSA	28	26	14	53.8	53.8	58.1
San Diego-Carlsbad-San Marcos, CA MSA	16	16	8	50.0	50.0	55.7
Seattle-Tacoma-Bellevue, WA MSA	24	22	10	45.5	45.5	55.2
Metropolitan Divisions and Subareas[3]						
Miami-Miami Beach-Kendall, FL Metropolitan Division of Miami-Fort Lauderdale-Miami Beach, FL MSA	22	16	8	50.0	46.7	50.1
Bronx, Kings, New York, Queens, Richmond Counties of New York-Newark-Edison, NY-NJ-PA MSA	50	39	21	53.8	46.1	55.0
San Francisco-San Mateo-Redwood City, CA Metropolitan Division of San Francisco-Oakland-Fremont, CA MSA	18	18	8	44.4	44.4	54.2

[1] Short-term, general, non-Federal hospitals with 24-hour emergency departments, based on the American Hospital Association (AHA) Annual Survey, are eligible for DAWN.

[2] Total eligible hospitals in the U.S. include eligible hospitals from metropolitan areas shown and the remainder of the U.S. Therefore, components shown do not sum to the total.

[3] Metropolitan Statistical Areas (MSAs) and Metropolitan Divisions follow the standard definitions issued by the Office of Management and Budget in June 2003 (available at http://www.whitehouse.gov/omb/bulletins/b03-04.html), with one exception: for New York, geographic coverage is limited to the subarea comprising the five Boroughs of New York City.

Table C2
Drug-related ED visits, by type of case: 2006

	Unweighted sample data	Weighted estimates[1]	Relative standard error (RSE)	95% Confidence interval		
				Lower bound		Upper bound
Drug-related ED visits						
Suicide attempt	11,840	182,805	8.0	154,185	-	211,424
Seeking detox	18,789	118,355	12.1	90,171	-	146,540
Alcohol only (age < 21)	9,940	125,888	12.5	95,087	-	156,690
Adverse reaction	93,507	1,526,010	9.3	1,247,859	-	1,804,161
Overmedication	20,643	285,828	6.2	250,991	-	320,664
Malicious poisoning	750	8,817	13.1	6,546	-	11,088
Accidental ingestion	4,117	79,011	9.1	64,855	-	93,166
Other	109,753	1,115,141	13.0	832,069	-	1,398,213
Total drug-related ED visits	**269,339**	**3,441,855**	**6.1**	**3,033,110**	**-**	**3,850,600**
Total drug misuse/abuse visits	164,334	1,742,887	8.5	1,451,086	-	2,034,688
Total ED visits (all reasons)	8,930,694	113,110,132	0.0		-	
Drugs[2]						
Suicide attempt	25,096	402,907	9.1	331,056	-	474,758
Seeking detox	38,909	243,297	13.3	180,091	-	306,502
Alcohol only (age < 21)	9,940	125,888	12.5	95,087	-	156,690
Adverse reaction	120,016	2,055,783	11.1	1,608,379	-	2,503,188
Overmedication	35,340	506,476	6.6	441,034	-	571,919
Malicious poisoning	1,295	15,293	12.7	11,482	-	19,105
Accidental ingestion	5,200	98,613	9.1	81,048	-	116,178
Other	183,642	1,936,561	10.7	1,531,598	-	2,341,524
Drugs in all drug-related ED visits	**419,438**	**5,384,819**	**6.3**	**4,716,771**	**-**	**6,052,867**
Drugs in all misuse/abuse ED visits	**282,938**	**3,086,984**	**7.2**	**2,649,699**	**-**	**3,524,268**

[1] These are estimates based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[2] These are estimates of drugs. A single **ED** visit may involve multiple drugs.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).

DAWN data in this publication

For analysis, three categories of ED visits related to drug misuse and abuse were defined. These categories, designed to parallel the approach of the National Survey on Drug Use and Health, are based on:

- Use of illicit drugs,
- Use of alcohol, in combination with other drugs, and alcohol alone in patients under the age of 21, and
- Nonmedical use of pharmaceuticals (e.g., prescription or OTC drugs).

These three categories are defined by drug and case type as shown in Table C3. Because multiple drugs may be involved in a single visit, these categories are not mutually exclusive. A drug-related ED visit involved 1.6 drugs, on average, in 2004, 2005, and 2006.

Table C3
ED visits related to drug misuse and abuse in DAWN

Type of drug involvement	Drugs included	Case types included
Use of illicit drugs	– Cocaine – Heroin – Marijuana – Stimulants (amphetamines and methamphetamine) – MDMA – GHB – Flunitrazepam (Rohypnol) – Ketamine – LSD – PCP – Other hallucinogens – Nonpharmaceutical inhalants – Combinations of illicit drugs	All case types
Use of alcohol	– Alcohol in combination with other drug(s) – Alcohol only in patients under the age of 21	All case types, regardless of age Cases with alcohol as the sole drug appear only in the following case types for patients under age 21 – Suicide attempts – Seeking detox – Alcohol only (age < 21)
Nonmedical use of pharmaceuticals	– Prescription and OTC pharmaceuticals – Dietary supplements	Combination of three case types – Overmedication (cases of nonmedical use, overuse, misuse lacking explicit documentation of drug abuse) – Malicious poisoning (cases in which the patient was administered a drug by another for a malicious purpose) – Case type Other (cases that could not be assigned to another case type; includes documented drug abuse)

NOTE: In this publication the case types of suicide attempt and seeking detox are analyzed separately, but for other purposes they might be considered as nonmedical use. Nonmedical use, though, should never include adverse reaction or accidental ingestion cases.

Sampling and estimation

DAWN sample design

The redesign of the DAWN system introduced in 2003 altered most of the major features of the DAWN data collection and included a new sample of hospitals that constituted the DAWN. The new sampling plan, fully implemented for the first time for the 2004 estimates, formed a nationally representative panel of hospitals to be followed longitudinally for the indefinite future. Briefly, this new design is a probability-based, stratified, one-stage sample. A complete and accurate list of all hospitals in the United States was drawn and, from that, all hospitals meeting the criteria for the target sample frame were identified. Samples were drawn to provide the capability to make estimates for the Nation as well as select Metropolitan Statistical Areas (MSAs) and divisions (Table C4). Each year the sample frame is updated to account for new hospitals.

The stratified design called for drawing oversamples of hospitals in 48 MSAs; in four of those 48 MSAs, additional oversamples were drawn for a total of nine divisions.[5] In effect, there are 53 nonoverlapping geographic areas (44 whole MSAs and nine divisions). (See Table C4 for list of MSAs and divisions[6] where oversamples were drawn.) These areas are collectively referred to as oversample areas, or OS areas.

Metropolitan Statistical Areas and subdivisions

In order to accommodate a planned expansion of the metropolitan areas covered by DAWN, a maximum set of metropolitan areas, based on the definitions issued by the Office of Management and Budget (OMB) in June 2003, was selected. Which metropolitan areas to include was a topic of the DAWN redesign.[7] Retention of the existing 21 metropolitan areas was important because there was significant demand for estimates for those areas, and addition of the five most populous metropolitan areas in each of the nine Census divisions was deemed important to improve DAWN's geographic and population coverage. This yielded a total of 48 metropolitan areas. For many of the 48 metropolitan areas, the June 2003 definitions resulted in larger metropolitan areas. In some cases, these larger areas represented a merger of previously separate metropolitan areas. However, there continued to be strong interest among users of DAWN statistics in the areas covered by the original 21 metropolitan areas. In order to address the needs of these users, four of the merged areas were subdivided.[8] For each of these areas, there was a sample for the metropolitan area, as well as a sample for each subdivision. This would enable DAWN to produce estimates for the metropolitan areas and for the subdivisions. As a result of this process, the final metropolitan-area sample included a total of 53 geographic units: 48 metropolitan areas, 2 subdivisions each for 3 of these metropolitan areas, and 3 subdivisions for one of these metropolitan areas.

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[5] The four MSAs where samples were drawn for divisions are Los Angeles, Miami, New York, and San Francisco. The division definitions used by DAWN follow Census Bureau definitions of Metropolitan Divisions, except in New York where the three submetropolitan areas were defined uniquely based on local input.

[6] MSAs and Metropolitan Divisions follow the standard definitions issued by the Office of Management and Budget in June 2003 (available at http://www.whitehouse.gov/omb/bulletins/b03-04.html and http://www.census.gov/population/www/estimates/metrodef.html).

[7] Substance Abuse and Mental Health Services Administration, Office of Applied Studies. *Drug Abuse Warning Network: Development of a New Design (Methodology Report)*. DAWN Series M-4, DHHS Publication No. (SMA) 02-3754, Rockville, MD, 2002.

[8] When metropolitan areas were redefined in June 2003 based on data from the 2000 decennial Census, several legacy MSAs were merged with other MSAs to form new, much larger MSAs. However, a strong constituency of DAWN data users still needed estimates for the pre-merger areas. Because of this, four of the 48 metropolitan areas—Los Angeles, Miami, New York, and San Francisco— were subdivided into a total of nine divisions, corresponding to the constituents' areas of interest.

Table C4
Oversample (OS) areas in DAWN sample design

Atlanta-Sandy Springs-Marietta, GA*

Austin-Round Rock, TX

Baltimore-Towson, MD*

Birmingham-Hoover, AL

Boston-Cambridge-Quincy, MA-NH*

Bridgeport-Stamford-Norwalk, CT

Buffalo-Cheektowaga-Tonawanda, NY*

Chicago-Naperville-Joliet, IL-IN-WI*

Cincinnati-Middletown, OH-KY-IN

Cleveland-Elyria-Mentor, OH

Columbus, OH

Dallas-Fort Worth-Arlington, TX*

Denver-Aurora, CO*

Detroit-Warren-Livonia, MI*

Hartford-West Hartford-East Hartford, CT

Honolulu, HI

Houston-Baytown-Sugar Land, TX

Indianapolis, IN

Kansas City, MO-KS

Los Angeles-Long Beach-Santa Ana, CA*

   Los Angeles-Long Beach-Santa Ana, CA – Los Angeles division (contains Los Angeles-Long Beach-Glendale, CA Metropolitan Division)

   Los Angeles-Long Beach-Santa Ana, CA – Orange County division (contains Santa Ana-Anaheim-Irvine, CA Metropolitan Division)

Las Vegas-Paradise, NV

Louisville, KY-IN

Memphis, TN-MS-AR

Miami-Fort Lauderdale-Miami Beach, FL*

   Miami-Fort Lauderdale-Miami Beach, FL – Fort Lauderdale division (contains Fort Lauderdale-Pompano Beach-Deerfield Beach, FL, and West Palm Beach-Boca Raton-Boynton Beach, FL, Metropolitan Divisions)

   Miami-Fort Lauderdale-Miami Beach, FL – Miami-Dade County division (contains Miami-Miami Beach-Kendall, FL Metropolitan Division)

Minneapolis-St. Paul-Bloomington, MN-WI*

Nashville-Davidson—Murfreesboro, TN

New Haven-Milford, CT

New Orleans-Metairie-Kenner, LA*

New York-Newark-Edison, NY-NJ-PA*

   New York-Newark-Edison, NY-NJ-PA – New Jersey division (contains Middlesex, Monmouth, Ocean, Somerset, Essex, Hunterdon, Morris, Sussex, Union, Bergen, Hudson, Passaic Counties, NJ, and Pike County, PA)

   New York-Newark-Edison, NY-NJ-PA – New York Suburban division (contains Nassau, Putnam, Rockland, Suffolk, Westchester Counties, NY)

   New York-Newark-Edison, NY-NJ-PA – New York City, 5 Boroughs division (contains Bronx, Kings, New York, Queens, Richmond Counties, NY)

Omaha-Council Bluffs, NE-IA

Philadelphia-Camden-Wilmington, PA-NJ-DE-MD*

Phoenix-Mesa-Scottsdale, AZ*

Pittsburgh, PA

Portland-Vancouver-Beaverton, OR-WA

Providence-New Bedford-Fall River, RI-MA

Riverside-San Bernardino-Ontario, CA

Rochester, NY

Sacramento-Arden-Arcade-Roseville, CA

Salt Lake City, UT

San Antonio, TX

San Diego-Carlsbad-San Marcos, CA*

San Francisco-Oakland-Fremont, CA*

   San Francisco-Oakland-Fremont, CA – Oakland division (contains Oakland-Fremont-Hayward, CA Metropolitan Division)

   San Francisco-Oakland-Fremont, CA – San Francisco division (contains San Francisco-San Mateo-Redwood City, CA Metropolitan Division)

Seattle-Tacoma-Bellevue, WA*

St. Louis, MO-IL*

Tampa-St. Petersburg-Clearwater, FL

Tucson, AZ

Washington-Arlington-Alexandria, DC-VA-MD-WV*

Wichita, KS

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* Denotes a legacy area. Two separate legacy areas (New York and Newark) are contained in the New York-Newark-Edison, NY-NJ-PA Metropolitan Statistical Area.

Sampled hospitals in each of the OS areas were stratified by hospital size (up to four categories based on volume of ED visits) and ownership type (public and private). (Size categories were determined independently for each OS area.) The stratification plan included an additional geographic construct for the remainder of the United States outside the OS areas. Hospitals in the remainder area were stratified into 24 remainder strata based on four regions (Northeast, South, Midwest, West), hospital size (three size categories based on volume of ED visits), and ownership type (public and private).

To begin, a cross classification was created by categories of ownership type and geographic unit. Within each combination of geographic area and ownership type, the number of hospitals determined the number of unique size categories. If there were three or fewer hospitals, only one size category was defined. If there were four, five, six, or seven hospitals, two size categories were defined. If there were eight or more hospitals, four size categories were defined. In the remainder sample, within each combination of Census region and ownership, there were three size categories. This produced 24 unique strata from which to draw the hospitals for the remainder sample.[9]

The DAWN national estimates are the sum of the estimates for OS areas and the remainder area. Using a formula, the national estimate is depicted as:

$$\left(\sum_{i=1}^{53} a_i \right) + b$$

where a_i is the estimate for OS area i, 53 is the number of OS areas, and b is the remainder area estimate.

It was never expected that DAWN would be able to expand data collection into all 53 OS areas. Instead, the expectation was that DAWN would build up gradually to the number of OS areas its budget could support. The DAWN sample design was conceived to provide the flexibility to change gradually over time in terms of the number of OS areas where data were collected, while providing the statistical infrastructure to enable the production of reliable and representative estimates for the Nation and select OS areas, regardless of their number.

To accomplish this, the DAWN design incorporates an approach whereby a subset of the hospitals within the OS areas was identified *a priori* as having a dual-purpose in estimation. Referred to as "dual-purpose hospitals," these designated hospitals can contribute to an estimate for the OS area in which they are located or they can contribute to the estimate for the remainder area. Dual-purpose hospitals carry two probabilities of selection (POS) and two stratum identifiers. One POS/stratum is associated with membership in an OS-area sample and the other is associated with membership in the remainder-area sample.[10]

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[9] Four Census regions times two ownership categories times three size categories equals 24 strata.

[10] In addition, a portion of hospitals in the nine oversampled divisions were identified *a priori* to serve in their MSA-level oversample and were assigned an OS area level POS/stratum for that third purpose. Therefore, hospitals in the four MSAs with division-level oversampling can have up to three nonzero POS/strata: (1) a POS/stratum for membership in the MSA; (2) a POS/stratum for membership in the division; and (3) a POS/stratum for membership in the remainder area.

Figure C3 depicts the initial sample as it was drawn to provide:

- individual samples from a series of OS areas,
- dual-purpose hospitals within those areas, and
- a remainder sample to represent the rest of the country.

Figure C3
Original DAWN sample design
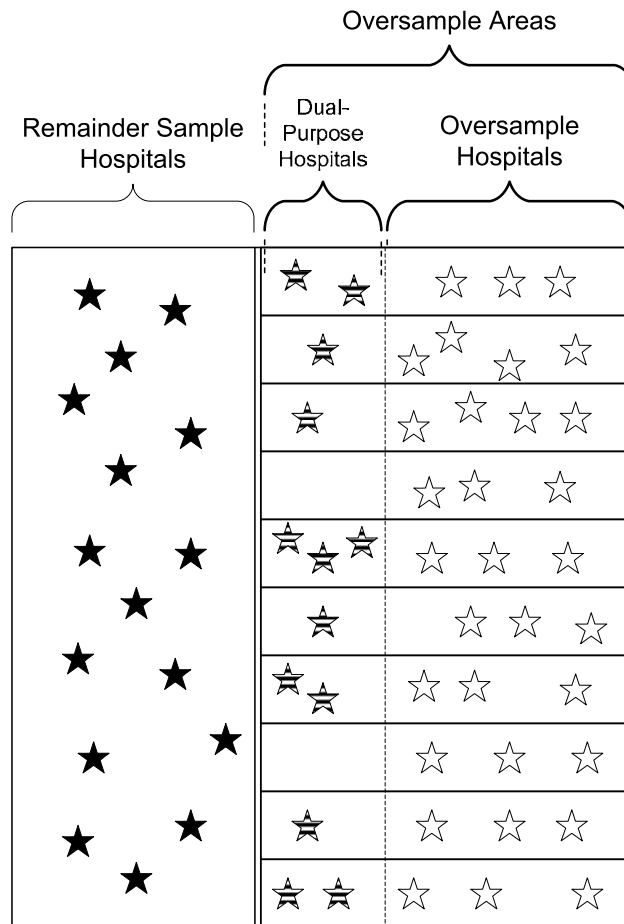
For estimation for each data year, the first step is to determine which role each sampled hospital will play in that year's estimates. To do this, the response rates and nonresponse patterns for each OS area are reviewed to determine data quality. Those OS areas with acceptable data quality are allowed to stand on their own as the basis for separate estimates. These are referred to as "stand-alone OS areas." All hospitals in stand-alone OS areas, including those originally designated as being in the dual-purpose subsample, are considered to be "oversample hospitals" in the OS areas, and they contribute to the OS-area estimate using their OS-area POS/stratum.

If it is determined based on response rates and bias analyses that an OS area cannot stand alone, the design provides that the OS area is eliminated as a separate area but becomes part of the remainder area. In this instance:

- only those dual-purpose hospitals that are designated *a priori* to contribute to the remainder-area estimate are retained in the remainder-area subset,
- these hospitals contribute to the remainder-area estimate using their remainder-area POS/stratum, and
- data from any other hospitals in the OS area are excluded from the national estimates.

Figure C4 depicts the assignment of dual-purpose hospitals to either an OS area or the remainder area and the exclusion of OS hospitals outside of stand-alone OS areas that are not designated as dual purpose.

Figure C4
DAWN design in practice
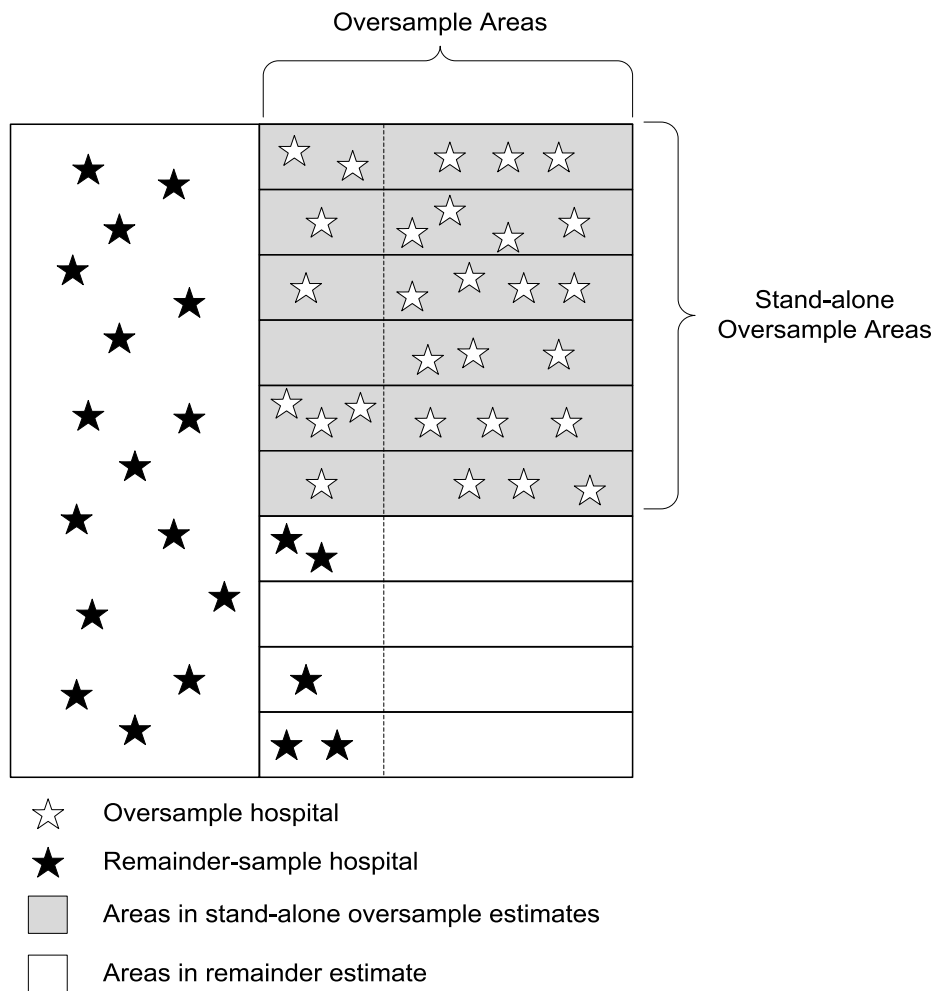
After it is determined which OS areas will be stand alone, the DAWN national estimates as reported in this publication are the sum of the estimates for stand-alone OS areas plus the remainder area. Using a formula, the national estimate is depicted as:

$$\left(\sum_{i=1}^{53} a_i \right) + b$$

where a_i is the estimate for stand-alone OS area i, 53 is the number of stand-alone OS areas, and b is the remainder area estimate inclusive of dual-purpose hospitals in OS areas that are not stand alone.

It is important to note that the definition of the remainder area and the remainder sample of hospitals is designed to be fluid; hospital membership in the remainder sample changes from year to year depending on the response rates and data quality within the OS areas.

Sample maintenance

Because DAWN is a longitudinal survey that will be used to analyze trends in drug-related ED visits over time, annual updates to the sample are performed to ensure that the sample remains representative of the target population. The initial sample was selected in 2003 from a sampling frame created from the 2001 AHA Annual Survey Database. In every subsequent year, the sampling frame is updated to reflect new, closed, merged, and demerged hospitals, based on updates to the AHA files. These updates include newly eligible hospitals, which are those new hospitals or previously ineligible hospitals that are now eligible. Each year, the newly eligible hospitals are provided the opportunity to be selected into the sample, based on the sampling fraction of the stratum in which the newly eligible hospital is located.

Reduction of bias

Survey error is the extent to which findings from the survey sample differ from those of the population of interest. The statistical methodologies described above are designed to minimize error. There are additional sources of error, often referred to as "bias," that also contribute to overall error. Measuring bias is difficult because it requires accurate knowledge about corresponding population values. The DAWN survey methodology includes proven techniques, practices, and protocols that reduce the potential for introducing bias. For example, clearly defined criteria are used to construct the initial hospital sampling frame. Coverage bias is minimized, because the sampling frame has virtually 100% coverage of the target population. To minimize measurement bias, the individuals who collect data for DAWN are provided with specialized and intensive training; automated methods for data entry are used; and the data are subject to quality reviews at several points in the data collection process. Additional detail on the survey methodologies used to enhance DAWN data quality and reduce bias is provided in an earlier DAWN publication.[11]

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[11] See Appendix B, Technical Notes: Changes to Improve the Quality of DAWN Data in: Substance Abuse and Mental Health Services Administration, Office of Applied Studies. *Drug Abuse Warning Network 2003: Interim National Estimates of Drug-Related Emergency Department Visits.* DAWN Series D-26, DHHS Publication No. (SMA) 04-3972, Rockville, MD, 2004.

Sample size and sample allocation

DAWN defines precision in terms of the relative standard error (RSE) of an estimate. The RSE is the standard error of the estimate divided by the actual point estimate. DAWN is designed to have RSEs less than or equal to 10% for metropolitan-area estimates, and RSEs less than or equal to 15% for national estimates pertaining to total drug-related visits, cocaine visits, heroin visits, and marijuana visits. As discussed below, these desired precision levels are important drivers for setting sample size targets.

Sample sizes for each geographic area were determined by the area's targeted precision level in combination with the theory of optimal allocation for stratified samples. According to this approach, the variance of the sample estimates will be minimized when the sample size, n_h, in each sampling stratum is made proportional to the quantity $W_h S_h / C_h$, where W_h is the proportion of sampling units, S_h is the population standard deviation for the parameter being measured, and C_h represents the square root of the cost of sampling in stratum h.

Using these optimum allocation conditions, the minimum required sample sizes necessary to achieve the targeted levels of precision in each DAWN area were calculated using the following general considerations:

- Geographic units for which estimates are desired (national and metropolitan areas described under Stratification),
- Precision level desired (see Target levels of precision),
- Specific types of estimates for which minimum precision is desired (e.g., estimates of total, cocaine, heroin, and marijuana ED visits), and
- Cost.

In addition to these considerations, sampling rates (i.e., the number of sampled hospitals divided by the number of eligible hospitals) were also subject to the following constraints:

- First, if fewer than four hospitals existed in the stratum population, then all hospitals in the stratum were selected into the sample.
- Second, if the sampling rate for a particular stratum was greater than 90%, then all units in the stratum were selected into the sample.
- Finally, if any calculations produced a sample size smaller than two hospitals, then the sample size was set to two hospitals.

Response rate calculations

In 2006, the initial DAWN sample included 1,286 hospitals divided among 53 OS areas (48 MSAs and nine divisions) and one remainder area. Response rates and nonresponse bias analyses were assessed to determine which of these 53 OS areas could stand alone (Figure C3). Once this determination was made, hospitals that were neither dual-purpose nor located in a stand-alone OS area were treated as if they were not sampled. For 2006, this has the effect of reducing the sample from 1,286 hospitals to 544 hospitals, which is the number used for purposes of computing the unweighted response rates (Table C1).

Of the 53 original oversample areas, a total of 12 areas (nine metropolitan areas and three submetropolitan areas) were determined to be able to stand alone in 2006. A total of 13 areas were determined to be able to stand

alone in 2004 and 2005. The 13th OS area was New Orleans-Metairie-Kenner, LA. These determinations yielded a sample size of 556 hospitals in 2004 and 562 hospitals in 2005.

Sampling weights

The DAWN hospitals are selected using stratified simple random sampling with oversampling in selected metropolitan areas. The stratum sample sizes were determined through an optimum allocation process. Sampling weights are first calculated as the inverse of the probability of selection and then adjusted for variable nonresponse and by a procedure known as "poststratification," or benchmark adjustment.

Within-hospital weighting adjustment

Within-hospital nonresponse occurs when a hospital provides incomplete data. To minimize the impact of within-hospital nonresponse, the DAWN weighting plan includes nonresponse adjustment factors that were developed and applied for each month of data collection within each facility. The within-hospital nonresponse adjustment factor is calculated as the total number of ED visits within a month within a facility divided by the total number of reviewed charts for that same facility-month.

The within-hospital weights are applied to the case data by month and by facility. That is, the visit counts for a given facility-month are first summed for each drug and then multiplied by the corresponding within-hospital adjustment factor for that facility-month. The weighted totals are then summed over all facilities and months to give a total weighted visit count for each drug for each hospital.

Weighting adjustment for hospital nonresponse

Hospital-level nonresponse occurs when hospitals fail to provide any data. To minimize the impact of hospital nonresponse, the DAWN weighting plan includes nonresponse adjustment factors that were developed and applied within each weighting class. Weighting classes were formed based on the aforementioned sampling stratification schemes. Within each weighting class, the nonresponse adjustment factor is calculated as the sum of the sampled hospital weights divided by the sum of the weights of the responding hospitals. The hospital nonresponse adjustment factors are checked to make sure the adjustments are within reasonable bounds. If a nonresponse adjustment factor is out of bounds (either too small or too large), adjacent weighting classes are collapsed and new nonresponse adjustment factors are calculated.

When the hospital-level nonresponse adjustment factors are considered final, a nonresponse-adjusted sampling weight was then calculated as the product of the nonresponse adjustment factor and the sampling weight. For each weighting class, a verification check was conducted to ensure that the sum of the nonresponse-adjusted sampling weights was equal to the sum of the sampled hospital weights.

Weighting adjustment for population benchmarks (poststratification)

The DAWN weighting plan also includes a poststratification adjustment factor that reconciles the weighted number of total visits for responding hospitals with the number of total visits from the most recent AHA Annual Survey Database. DAWN used a ratio adjustment within strata to implement this adjustment.

Poststratification strata were formed based on the aforementioned sampling stratification schemes. Within each stratum, the adjustment factor was calculated as the ratio of the AHA count of total visits to the weighted sum of total

visits for responding hospitals. The factors were verified to ensure they were within reasonable bounds. If they were out of bounds (either too small or too large), adjacent poststratification strata were collapsed and new poststratification adjustment factors were calculated.

When the poststratification adjustment factors were considered final, a poststratified weight was then calculated. The final weight was calculated as the product of the poststratification adjustment factor and the nonresponse-adjusted sampling weight. For each poststratification stratum, a validity check was conducted to ensure that the sum of the poststratified weighted total visits was equal to the corresponding AHA count of total visits from each stratum.

Special consideration was given to New Orleans because Hurricane Katrina (on August 29, 2005) and its aftermath caused serious disruptions to the operations of hospitals and, consequently, the DAWN data collection process for the remaining four months of the year. Weight adjustments were implemented by referring to the AHA total counts in combination with a case-by-case study of each hospital in the New Orleans metropolitan area.[12] Based on these studies, estimates were made of the proportion of the year that each hospital was open and serving the public. These were used to adjust the AHA totals, which in turn serve as input for population benchmark counts for New Orleans.

Total drug-related ED visits

Estimates for the entire universe of DAWN-eligible hospitals in the United States are produced by applying poststratified weights to the data received from the sampled hospitals. Thus, for 2006, 269,339 submitted cases were extrapolated to an estimate of 3,441,855 drug-related ED visits. Considering the margin of error, this estimate may range from 3,033,110 to 3,850,600 drug-related ED visits out of more than 113 million total ED visits estimated for the United States (Table C2).

Calculation of estimates

All estimates produced for this publication were calculated using data that had been weighted according to the plan described above. Estimates for any variable of interest were determined by first summing the case totals within facility-month, applying the within-hospital weight, summing to the hospital level, applying the final hospital weight, and summing over all hospitals.

Variance estimation

Each hospital in the DAWN sample was selected through a random process, which theoretically could have been repeated many times, resulting in many hypothetical samples. "Sampling variance," or the margin of error, refers to the extent to which these samples vary. Two measures of this variability are the standard error (SE) and the relative standard error (RSE), which is defined as the SE of the estimate divided by the estimate itself. The precision of an estimate is inversely related to the sampling variance, as measured by the RSE. The greater the RSE value, the lower the precision.

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[12] Information provided by the Louisiana Hospital Association, the Louisiana Public Health Institute, the City of New Orleans Health Department, and available at numerous websites maintained by individual hospitals, news organizations, and State and Federal agencies was invaluable in conducting this assessment. We are grateful for their assistance.

For example, if there are 10,000 estimated visits involving a given drug, and this estimate has an SE of 500 visits, then the RSE value is 5%:

$$RSE = SE/Estimate$$
$$RSE = 500/10,000$$
$$RSE = 0.05, or\ 5\%.$$

In this publication, "confidence intervals" (CIs) are included in many of the tables and are often cited in the text along with the estimates. The 95% CI is calculated as:

$$CI = Estimate \pm (1.96\ x\ RSE\ x\ Estimate)$$

where 1.96 comes from the table of normal distribution z-values. Ninety-five percent of the normal distribution lies within 1.96 standard deviations of the mean.

Applying the formula to the example above, the 95% CI would be:

$$10,000 \pm (1.96\ x\ 0.05\ x\ 10,000) = 10,000 \pm 980.0$$
Lower limit: 10,000 - 980 = 9,020
Upper limit: 10,000 + 980 = 10,980
95% CI: 9,020 to 10,980.

If repeated samples were drawn from the same population of hospitals, using the same sampling and data collection procedures, the true population values would fall within the confidence interval 95% of the time.

Both between- and within-hospital variance components were accounted for. Within-hospital variance was estimated using a replication strategy by which two random replicates were created within each hospital and the variance between the two replicates represented the within-hospital contribution. Typically, this component was considerably smaller than the between-hospital variance that was calculated as the variance between weighted hospital totals within each stratum.

Variance estimates reported in this publication were determined using Taylor Series Linearization. Variance estimates were calculated using SUDAAN® software.

Standardized rates

Standardized measures are needed to make valid comparisons of estimates across age and gender categories. For age in particular, the size of the underlying population differs considerably across age groups; for example, the number of individuals aged 18 to 20 in the United States is much lower than the number of individuals aged 35 to 44. All other factors being the same, a higher estimate of ED visits would be expected to occur naturally for the group that is larger in the population.

To take the size of the underlying population into account, rates of ED visits per 100,000 population were calculated using population data from the U.S. Bureau of the Census.[13]

For each age and gender category, the estimate for a category was divided by the population for that category, which was then divided by 100,000. For example, consider an estimate of 1,000 visits for an age group of 1,000,000 persons, and an estimate of 1,000 visits for an age group of 500,000 persons. The rates would be calculated as:

$$1,000 / (1,000,000/100,000) = 1,000/10$$
$$= 100 \text{ visits per } 100,000 \text{ population}$$

$$1,000 / (500,000/100,000) = 1,000/5$$
$$= 200 \text{ visits per } 100,000 \text{ population.}$$

Population estimates used to generate rates for 2006 are provided in Table C5.

Table C5
Population by age and gender: 2006[1]

Gender and age	Total United States	Males	Females
Total	302,225,862	149,002,083	153,223,779
0-5 years	24,640,694	12,601,585	12,039,109
6-11 years	23,807,562	12,174,360	11,633,202
12-17 years	25,447,520	13,037,107	12,410,413
18-20 years	12,674,580	6,507,886	6,166,694
21-24 years	16,977,014	8,780,282	8,196,732
25-29 years	21,221,621	10,871,501	10,350,120
30-34 years	19,655,279	9,974,102	9,681,177
35-44 years	43,297,681	21,691,759	21,605,922
45-54 years	43,932,378	21,623,741	22,308,637
55-65 years	32,737,374	15,786,874	16,950,500
65 years and older	37,834,159	15,952,886	21,881,273

[1] Population estimates for 2006 are, as of 6/9/2008, from the U.S. Bureau of Census Postcensal Resident Population National Population Dataset, National estimates by demographic characteristics – single year of age, sex and race, and Hispanic Origin, Monthly Population Estimates. Link: http://www.census.gov/popest/datasets.html. File: NC-EST2007-ALLDATA-R-File14.csv.

Standardized rates were not calculated for race and ethnicity subgroups, because the race/ethnicity categories available to DAWN are much less detailed and contain considerably more missing data than the race and ethnicity categories in the Census data. Appendix D describes the race and ethnicity data reported for DAWN.

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[13] Population estimates for 2006 are, as of 6/9/2008, from the U.S. Bureau of Census Postcensal Resident Population National Population Dataset, National estimates by demographic characteristics – single year of age, sex and race, and Hispanic Origin, Monthly Population Estimates. Link: http://www.census.gov/popest/datasets.html. File: NC-EST2007-ALLDATA-R-File14.csv.

Determination of significant differences between years

Comparisons in the estimates of ED visits between years are presented in the form of percentage differences. These are calculated as the 2006 estimate minus the 2004 estimate divided by the 2004 estimate. For shorter term comparisons, these are calculated as the 2006 estimate minus the 2005 estimate divided by the 2005 estimate. The result is presented as a percentage, which is shown only if the difference between the two years is statistically significant. Tests for the significance of differences between two years consider the variance of each year's estimate and the covariance between the two. Thus, hospitals that appear in both samples and provide data in both years contribute to the covariance and, thus, decrease the overall sampling variance beyond the combined contribution of the two samples. The variance estimation process used to establish significance takes into account this overlap between the two annual samples.

Publication criteria

DAWN can produce estimates for thousands of drugs, patient characteristics, and visit characteristics, but some of these estimates are too imprecise, too small, or based on too little data to be reliable. In these situations, the estimate was replaced by three dots (...) in the published table. Estimates were suppressed (i.e., not published) according to the following rules:

- The RSE of the estimate was greater than 50%.

When the RSE is greater than 50%, the lower bound of the 95% 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 weighted or unweighted quantity of ED visits was less than 30.

Estimates this small constitute rare events, which are based on a small number of cases and have precision levels that are difficult to quantify. In many instances, such rare events have variances so large that the estimate would be suppressed because of its RSE alone. Rare events that meet RSE criteria for publication are nonetheless based on very little data and are deemed too unreliable for publication.

There are some estimates with an RSE equal to zero. This occurs when the number of ED visits being estimated is small and all the hospitals contributing to that estimate were selected with certainty, that is, their sampling probability is unity. Strictly speaking, there is no sampling error in such situations and the RSE is equal to zero. These results occur almost exclusively in situations with small numbers of ED visits, where the absence of any sampled hospital data is due to nonresponse and the small number of hospitals contributing to the estimates. In these situations, the necessary data are not available to approximate sampling errors.

APPENDIX D

RACE AND ETHNICITY IN DAWN

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.[1] The new protocol permitted separate reporting of race and Hispanic ethnicity, and it incorporated the ability to capture more than one race for an individual, a few modifications in nomenclature (e.g., "black" was changed to "black or African American"), division of certain categories ("Asian or Pacific Islander" was split into two categories, "Asian" and "Native Hawaiian or Other Pacific Islander"), and elimination of the "other" category. For data collections such as DAWN, where self-identification of the individual is not feasible (no patient is interviewed for DAWN), the OMB protocol also permitted a combined format, whereby race and Hispanic ethnicity would be recorded in a single data item, which could still record multiple entries for race and/or Hispanic ethnicity. The single data item for race and ethnicity is shown in the DAWN ED case form that has been used since 2003 (Appendix C, Figure C1).

Despite the increased detail allowed by the new categories and the provision for multiple entries, the actual race/ethnicity data extracted from source records and submitted to DAWN is quite limited. This is because the source documents (i.e., the ED medical records from which DAWN data are abstracted) rarely contain such detailed information on race/ethnicity of patients.

For reference, estimates of drug-related ED visits by race/ethnicity are presented in Table D1. This analysis, which is based on the most detailed coding of race/ethnicity in DAWN case reports, reveals that estimates for the following categories are too small to be meaningful:

- Multiple (i.e., two or more) races/ethnicities (i.e., two or more races/ethnicities were documented in the source record for the same individual),
- Hispanic or Latino ethnicity with any specific race indicated,
- American Indian or Alaska Native,
- Asian, and
- Native Hawaiian or Other Pacific Islander.

Therefore, in the tables of estimates in this and other DAWN publications we have retained a more limited set of categories: white, black, and Hispanic. A fourth category, called "Race/ethnicity not tabulated above (NTA)," is used to tabulate those categories that are too small to report independently.[2] All cases reported to DAWN as Hispanic or Latino ethnicity are tabulated as Hispanic race/ethnicity, regardless of race.

This lack of detailed race and ethnicity data in DAWN case reports also prevents us from generating rates per 100,000 population for race and ethnicity categories. Data from the 2000 decennial Census were collected and are being tabulated according to the revised race and ethnicity protocol and are therefore incompatible with DAWN estimates.

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[1] 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).

[2] One exception is that, if two races are reported and the second is reported as unknown, the episode is coded for the known race.

Drug-related ED visits, by detailed race/ethnicity: 2006

Race/ethnicity	Estimated visits[1,2]
Total drug-related ED visits	**3,441,855**
One race/ethnicity	3,411,056
White	2,132,810
Black/African American	524,420
Hispanic	298,668
Asian	5,765
American Indian/Alaska Native	29,396
Native Hawaiian/Other Pacific Islander	3,875
Race unknown	416,122
Two races/ethnicities	30,798
White + Black/African American	717
White + Hispanic	28,394
White + Asian	110
White + American Indian/Alaska Native	32
Black/African American + Hispanic	699
Black/African American + Asian	…
Black/African American + American Indian/Alaska Native	216
Hispanic + Asian	…
Hispanic + American Indian/Alaska Native	366
Asian + American Indian/Alaska Native	…
Three races/ethnicities	…
White + Black/African American + Hispanic	…
White + Hispanic + Asian	…
White + Asian + Native Hawaiian/Other Pacific Islander	…

[1] These are estimates of ED visits based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the United States.

[2] Three dots (...) indicate that an estimate with an RSE greater than 50% or a quantity less than 30 has been suppressed.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 2006 (03/2008 update).