Emergency Department Trends From the Drug Abuse Warning Network, Final Estimates 1995–2002

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Substance Abuse and Mental Health Services Administration
Office of Applied Studies

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HIGHLIGHTS

This issue of *Emergency Department Trends From DAWN* presents final estimates for 2002, with comparisons to 1995, 2000, and 2001. The revised estimates in the *ED Trends From DAWN* publication series supersede the estimates published previously for 1995 through 2001.

The Drug Abuse Warning Network (DAWN) relies on a sample of hospitals operating 24-hour emergency departments (EDs) to capture data on ED visits induced by, or related to substance abuse. DAWN data do not measure prevalence of drug use in the population, but the probability sample of hospitals is designed to produce representative estimates of ED drug episodes and drug mentions for the coterminous[3] United States and for 21 metropolitan areas. The Substance Abuse and Mental Health Services Administration (SAMHSA), the agency responsible for DAWN, is required under Section 505 of the Public Health Service Act to collect such data.

Drug Episodes vs. Drug Mentions

Drug Episode: **A drug-related ED episode is an ED visit that was induced by or related to the use of an illegal drug(s) or the nonmedical use of a legal drug for patients age 6 to 97 years.**

Drug Mention: **A drug mention refers to a substance that was recorded ("mentioned") during a drug-related ED episode. Because up to 4 drugs (and alcohol) can be reported for each drug abuse episode, there are more mentions than episodes cited in this report.**

Findings reported here are statistically significant unless stated otherwise. These final estimates for 2002 also replace preliminary estimates for the first half of 2002 published previously in *ED Trends From DAWN*. This publication (text and tables), additional tables grouped by metropolitan area, and tables of relative standard errors are available online at http://DAWNinfo.samhsa.gov/.

TOTAL DRUG-RELATED ED EPISODES

- In 2002, there were 670,307 drug abuse-related ED episodes in the coterminous U.S. (Table 2.2.0), a rate of 261 ED episodes per 100,000 population (Table 12.2.0). On average, 1.8 drugs were reported per episode for a total of 1,209,938 drug mentions. ED drug mentions and ED drug episodes did not increase from 2001 to 2002 (Table 2.2.0). Total ED visits (that is, ED visits for any reason) increased 2 percent (from 100.5 million to 102.8 million) during this period.

- Eight out of every 10 ED drug mentions (81%) come from only 7 categories: alcohol-in-combination, cocaine, heroin, marijuana, benzodiazepines, antidepressants, and analgesics. In 2002, alcohol-in-combination was a factor in 31 percent of ED drug episodes (207,395 mentions), cocaine in 30 percent (199,198), marijuana in 18 percent (119,472), and heroin in 14 percent (93,519). Collectively, the benzodiazepines, antidepressants, and analgesics constituted 359,266 ED mentions in 2002, or nearly 30 percent of total ED drug mentions (Table 2.2.0).

[3] The total coterminous U.S. consists of the 48 contiguous states and the District of Columbia. Alaska and Hawaii are excluded.

- From 2001 to 2002, significant increases in ED drug episodes were found in 3 of the 21 metropolitan areas oversampled in DAWN (Table 3.2): New Orleans (22%, from 3,729 to 4,566), Buffalo (15% from 3,356 to 3,844) and Baltimore (11% from 11,625 to 12,904). From 2001 to 2002, significant decreases in drug episodes were found in 2 metropolitan areas: Dallas (-14%, from 6,498 to 5,572) and San Diego (-5%, from 6,962 to 6,597).

- Adjusting for population differences, the highest rates of ED drug episodes in 2002 were apparent in: Philadelphia (612 ED drug episodes per 100,000 population), Baltimore (555), Chicago (551), San Francisco (547), Seattle (509), and Detroit (502). Among the 21 metropolitan areas in DAWN, Dallas had the lowest rate of ED drug episodes (175 per 100,000 population) in 2002 (Table 13.2).

MAJOR SUBSTANCES OF ABUSE

Each ED drug mention in DAWN is tabulated either as a "major substance of abuse" or as an "other substance of abuse" (described below). "Major substances of abuse" include the most common illicit drugs reported to DAWN (e.g., cocaine, heroin, marijuana), alcohol reported in combination with any other substance reported to DAWN ("alcohol-in-combination"), and less frequently mentioned drugs of particular policy interest (e.g., club drugs such as MDMA (Ecstasy) and GHB).

- From 2001 to 2002, mentions of alcohol-in-combination (207,395 in 2002), cocaine (199,198), heroin (93,519), marijuana (119,472), and methamphetamine (17,696) were statistically unchanged (Table 2.2.0). Of the most common illicit drugs, only amphetamines showed a significant increase in ED mentions (17%, from 18,555 to 21,644), but amphetamines and methamphetamine, when considered together, were statistically unchanged from 2001 to 2002.

- Among the less frequently mentioned major substances of abuse, only 2 drugs increased significantly from 2001 to 2002: mentions of inhalants (187%, from 522 to 1,496) and mentions of PCP (25%, from 6,102 to 7,648) (Table 2.2.0). Mentions of LSD decreased significantly (-68%, from 2,821 to 891). MDMA (Ecstasy) (4,026), GHB (3,330), miscellaneous hallucinogens (1,428), and Ketamine (260) were statistically unchanged from 2001 to 2002.

- **Alcohol-in-combination:** Mentions of alcohol-in-combination were statistically unchanged from 2001 to 2002, but have increased 24 percent (from 166,897 to 207,395 mentions) since 1995 (Table 2.2.0). From 2001 to 2002, significant increases in mentions of alcohol-in-combination were found in Seattle (62% from 3,145 to 5,094), Buffalo (37%, from 1,548 to 2,120), New Orleans (21%, from 1,181 to 1,430) and Baltimore (10%, from 2,911 to 3,189). Significant decreases in mentions of alcohol-in-combination were found in Dallas (-17%, from 1,786 to 1,482), Denver (-16%, from 1,875 to 1,575), Phoenix (-15%, from 2,627 to 2,239) and San Francisco (-11%, from 2,155 to 1,926) (Table 3.6).

- **Cocaine:** Cocaine mentions were statistically unchanged from 2001 to 2002 but have increased 47 percent since 1995 (from 135,711 to 199,198) (Tables 2.2.0 and 3.8). Over one-fifth of the cocaine mentions in 2002 (21%, 42,146 mentions) were attributed to "crack" (Table 2.4.0). Comparing estimates for 2001 and 2002, increases in cocaine

mentions were evident for Baltimore (21%, from 4,930 to 5,969) and Buffalo (18%, from 1,220 to 1,441). Only Dallas showed a significant decrease (-17%, from 1,770 to 1,467) (Table 3.8).

- **Heroin:** Nationwide, heroin mentions were statistically unchanged from 2001 to 2002 but have increased 35 percent since 1995 (from 69,556 to 93,519) (Tables 2.2.0 and 3.10). Comparing estimates for 2001 and 2002, increases in heroin mentions were evident for Seattle (44%, from 1,927 to 2,779), Buffalo (29%, from 607 to 785), Denver (11%, from 769 to 855), and Baltimore (5%, from 4,481 to 4,715). Decreases occurred in Dallas (-31%, from 443 to 304), Phoenix (-14%, from 777 to 672), and San Diego (-3%, from 733 to 708) (Table 3.10).

- **Marijuana:** Marijuana mentions were statistically unchanged from 2001 to 2002 but have risen 164 percent (from 45,259 to 119,472) since 1995 and 24 percent (from 96,426) since 2000 (Tables 2.2.0 and 3.12). Comparing estimates for 2001 and 2002, increases in marijuana mentions were evident for Newark (46%, from 647 to 944), Miami (21%, from 1,932 to 2,337), and Baltimore (14%, from 1,786 to 2,044). Decreases occurred in Dallas (-19%, from 1,049 to 851), San Francisco (-14%, from 704 to 607), Seattle (-12%, from 1,596 to 1,403), and Chicago (-12%, from 5,186 to 4,588) (Table 3.12).

- **Amphetamines and Methamphetamine:** From 2001 to 2002, there was a significant increase (17%, from 18,555 to 21,644) in ED mentions of amphetamines nationwide, but no significant increase in methamphetamine (17,696) was evident (Tables 2.2.0 and 3.14). Considered together, amphetamines and methamphetamine mentions were statistically unchanged from 2001 to 2002. ED mentions of amphetamines and methamphetamine continue to be concentrated in metropolitan areas in the western United States: Los Angeles (3,380), Phoenix (1,937), San Diego (1,741), San Francisco (1,427), Seattle (996), and Denver (579) (Tables 3.14 and 3.16). Comparing estimates for 2001 and 2002, increases in mentions of amphetamines and methamphetamine were evident in Phoenix (30%, from 1,492 to 1,936) and San Diego (8%, from 1,615 to 1,741).

- **Club Drugs:** Trends in ED mentions of the club drugs MDMA (Ecstasy) (4,026) and GHB (3,330) appear to have leveled off, with GHB mentions lower in 2002 than in 2000 (from 4,969) (Table 2.2.0). Estimates for flunitrazepam (Rohypnol) continued to be too imprecise for publication, and Ketamine mentions continued low and stable (260) from 2001 to 2002.

  - **MDMA:** Comparing estimates for 2001 and 2002 among metropolitan areas with at least 100 mentions of MDMA (Table 3.18), no significant increases were found. Decreases were evident in Atlanta (-33%, from 175 to 118), Miami (-27%, from 184 to 135), Seattle (-25%, from 115 to 86), and San Francisco (-15%, from 152 to 129).

  - **GHB:** Among the metropolitan areas with at least 100 mentions of GHB in 2001 or 2002, no significant increases were found and only San Francisco showed a significant decrease (-16%, from 158 to 133) (Table 3.30).

- **Hallucinogens:** Two types of hallucinogens showed significant changes from 2001 to 2002. ED mentions of PCP increased (25%, from 6,102 to 7,648), while mentions of LSD decreased (-68%, from 2,821 to 891) (Tables 2.2.0, 3.22, and 3.24). Miscellaneous hallucinogens remained statistically unchanged from 2001 to 2002 (1,428) (Tables 2.2.0 and 3.26).

  - **LSD:** None of the 21 metropolitan areas in DAWN exceeded 50 mentions of LSD in 2002 (Table 3.22).

  - **PCP:** Among the 10 metropolitan areas with at least 100 mentions of PCP in 2001 or 2002, significant increases were evident in Newark (254%, from 35 to 124), Washington, DC (148%, from 525 to 1,302), Baltimore (60%, from 75 to 120), Dallas (47%, from 96 to 141), and Philadelphia (46%, from 785 to 1,144). A significant decrease in PCP mentions was found in Chicago (-48%, from 874 to 459) (Table 3.24).

- **Inhalants:** From 2001 to 2002, mentions of inhalants nationwide increased significantly (187%, from 522 to 1,496) (Tables 2.2.0 and 3.32). Only Denver exceeded 50 mentions in 2002, a significant increase in mentions of inhalants from 2001 (117%, from 35 to 76) (Table 3.32).

OTHER SUBSTANCES OF ABUSE

Not all ED episodes involving prescription or over-the-counter (OTC) drugs are reportable to DAWN. However, DAWN receives reports of ED episodes involving the nonmedical use of legal drugs. These can involve deliberate abuse of prescribed or legally obtained OTC medications or of pharmaceuticals diverted for abuse. Accidental overdoses or ingestions with no intent of abuse and adverse reactions to OTC or prescription drugs taken as directed are not reportable to DAWN unless they were present in combination with an illicit drug.

Only generic drug names are presented in DAWN publications. DAWN estimates should not be attributed to drugs marketed under particular brand (trade) names.

- DAWN estimates that other substances of abuse (527,981 mentions) accounted for 44 percent of total ED drug mentions in 2002 (Table 2.2.0). Although the vast majority of these other substances are marketed legally by prescription or over the counter, it is impossible to know from DAWN data the number of ED visits related to the abuse of prescription drugs by the person for whom the drug was prescribed for a therapeutic purpose.

- In 2002, ED mentions of other substances of abuse were most concentrated in 2 categories—central nervous system (CNS) agents (227,342 mentions) and psychotherapeutic agents (223,481 mentions)—in nearly equal proportions (19% and 18% of total ED mentions, respectively) (Table 2.2.0).

Psychotherapeutic Agents

- The most frequent psychotherapeutic agents mentioned in drug-related ED visits in 2002 were: anxiolytics, sedatives, and hypnotics (11% of total ED mentions, 137,350

mentions)—which include the benzodiazepines (9%, 105,752 mentions)—and antidepressants (5%, 62,635 mentions).

- **Benzodiazepines:** Overall, mentions of benzodiazepines showed no significant increase from 2001 to 2002 but rose 16 percent (from 91,078 to 105,752) from 2000 to 2002 and 38 percent (from 76,548) from 1995 to 2002 (Table 2.2.0). None of the individual benzodiazepines increased from 2001 to 2002. However, from 2000 to 2002 increases were evident for alprazolam (25%, from 22,105 to 27,659) and benzodiazepines not identified by name (55%, from 22,376 to 34,697) (Table 2.6.0). From 1995 to 2002, increases were evident for the most frequently mentioned benzodiazepines, alprazolam (62%, from 17,082 to 27,659), clonazepam (33%, from 12,802 to 17,042), and unnamed benzodiazepines (199%, from 11,587 to 34,697).

CNS Agents—Narcotic Analgesics/Combinations

- Narcotic analgesics/combinations were the most frequently mentioned CNS agents in drug-related ED visits (10% of total ED mentions) in 2002 (Table 2.2.0).

- From 2001 to 2002, ED mentions of narcotic analgesics/combinations rose 20 percent (from 99,317 to 119,185 mentions). From 2000 to 2002, the increase was 45 percent (from 82,373), and over the 8-year period from 1995 to 2002, mentions of narcotic analgesics/combinations rose 163 percent (from 45,254) (Table 2.8.0).

- In 2002, the most frequently mentioned narcotic analgesics were those unspecified as to ingredient (42,211 mentions of narcotic analgesics-NOS), followed by those narcotic analgesics/combinations containing hydrocodone (25,197), oxycodone (22,397), methadone (11,709), codeine (4,961), propoxyphene (4,676), and morphine (2,775) (Table 2.8.0).

- From 2001 to 2002, significant increases in ED mentions of narcotic analgesics/ combinations were found for codeine/combinations (33%, from 3,720 to 4,961, but not significantly different from 2000), hydrocodone/combinations (17%, from 21,567 to 25,197, and 25% from 2000), and narcotic analgesics-NOS (31%, from 32,196 to 42,211, and 63% from 2000) (Table 2.8.0).

- Mentions of methadone, morphine/combinations, oxycodone/combinations, and propoxyphene/combinations were statistically unchanged from 2001 to 2002 (Table 2.8.0). However, from 2000 to 2002, mentions of methadone rose 50 percent (from 7,819 to 11,709), and mentions of oxycodone/combinations rose 107 percent (from 10,825 to 22,397).

- From 1995 to 2002, significant long-term increases in ED mentions of narcotic analgesics/combinations were found for hydrocodone/combinations (160%), methadone (176%), morphine/combinations (116%), oxycodone/combinations (560%), and narcotic analgesics-NOS (341%) (Table 2.8.0). ED mentions of fentanyl/combinations rose substantially (from 22 to 1,506) from 1995 to 2002 but were still relatively infrequent in 2002.

- From 1995 to 2002, the only long-term decrease among the narcotic analgesics was for mentions of codeine/combinations, which declined 43 percent (from 8,732 to 4,961) (Table 2.8.0).

New Drugs

- From 1994 to 2002, 8 new drugs—citalopram, mirtazapine, and nefazodone (antidepressants); olanzapine and quetiapine (antipsychotics); tramadol and Cox-2 inhibitors (analgesics); and gabapentin (an anti-convulsant)—had zero or few ED mentions followed by increasing numbers in the years following their approval by the FDA. Whether any of these represent an emerging drug abuse problem(s) cannot be determined based solely on this information, but future monitoring of these drugs using DAWN and other information sources may be warranted (Tables 2.6.0 and 2.8.0). Among these 8, only citalopram and quetiapine showed any significant changes from 2000 to 2002.

DEMOGRAPHIC CHARACTERISTICS

- Although total drug-related ED episodes remained statistically stable from 2001 to 2002 (Table 4.2.0), increases were evident for patients age 18 to 25 (11%, from 127,110 to 140,475 mentions), patients age 45 to 54 (15%, from 88,540 to 101,541), and patients age 55 and older (19%, from 26,036 to 30,987). Total episodes for other age groups and all the gender and race/ethnicity subgroups were unchanged from 2001 to 2002.

- **Gender:** Adjusting for population, males and females had similar rates of drug-related ED episodes overall in 2002 (285 and 234 episodes per 100,000 population, respectively) (Table 14.2.0). However, the rates for males were approximately double the rates for females for cocaine (103 vs. 53), heroin (49 vs. 24), marijuana (61 vs. 32), and PCP (4 vs. 2). Additionally, the rates for males were higher than for females for amphetamines (10 vs. 7). Rates for males and females were not considerably different for any of the other major substances of abuse (Tables 14.2.0 through 14.34.0). Rates were very low for both genders for LSD, miscellaneous hallucinogens, flunitrazepam (Rohypnol), GHB, and inhalants.

- **Age:** In 2002, nearly half (48%, 318,799 episodes) of total ED drug episodes involved patients age 35 and over, followed in frequency by patients age 26 to 34 (22%, 145,806), patients age 18 to 25 (21%, 140,475), and patients age 12 to 17 (9%, 62,792) (Table 4.2.0). However, when we account for differences in population size across these age groups, we find that patients age 26 to 34 and patients age 18 to 25 had the highest rates of ED episodes. Patients age 35 to 97 had considerably lower rates, similar to the rates for patients age 12 to 17 (Table 14.2.0).

- Across the age groups, the top 3 drugs mentioned (among the major substances of abuse) always came from the same 4 drugs: alcohol-in-combination, cocaine, heroin, and marijuana. Considering these 4 major substances of abuse and adjusting for population differences in 2002 (Tables 14.6.0, 14.8.0, 14.10.0, and 14.12.0):

  - Rates for patients age 26 to 34 were consistently higher than rates for patients age 35 and over.

  - Rates for patients age 12 to 17 were consistently lower than rates for older patients, except for marijuana. Patients age 12 to 17 had higher rates of marijuana mentions than patients age 35 and over (77 vs. 27) and rates more similar to those for patients age 18 to 25 (109) and age 26 to 34 (82).

- Rates for patients age 18 to 25 were lower than rates for patients age 26 to 34 for cocaine (91 vs. 171). These age groups had statistically similar rates of mentions for heroin (52 vs. 72), alcohol-in-combination (113 vs. 155), and marijuana (109 vs. 82).

- Considering the 4 age groups (age 12 to 17, 18 to 25, 26 to 34, and 35+) and adjusting for population differences in 2002 (Tables 14.6.0, 14.8.0, 14.10.0, 14.12.0, and 14.18.0):

  - Rates for alcohol-in-combination, cocaine, and heroin appeared to rise with age and peak in the 26 to 34 age group (with 155, 171, and 72 mentions per 100,000 population, respectively).

  - Rates for marijuana were similar (77, 109, and 82 mentions per 100,000 population) across a broad range of ages (from age 12 to 34), and the rate for marijuana mentions was substantially lower for patients age 35 and over (27 mentions per 100,000 population).

  - Rates for MDMA (Ecstasy) mentions appeared to peak (at 7 mentions per 100,000 population) in the 18 to 25 age group, with lower rates in both the younger and older age groups (3 mentions per 100,000 population for ages 12 to 17, 2 mentions for 26 to 34; less than 1 mention per 100,000 population for patients age 35 and over).

EPISODE CHARACTERISTICS

- The majority (54%, 365,232 episodes in 2002) of drug-related ED episodes involved more than one drug (Table 5.2.0).

- In 2002, nearly half (47%) of episodes involving methamphetamine involved *only* methamphetamine (Table 5.16.0) and nearly half (46%) of episodes involving heroin involved *only* heroin (Table 5.10.0). By contrast, only 31 percent of episodes involving cocaine involved cocaine alone (Table 5.8.0), only 30 percent of episodes involving amphetamines involved amphetamines alone (Table 5.14.0), and only 28 percent of episodes involving marijuana involved marijuana alone (Table 5.12.0). By definition, all DAWN ED episodes involving alcohol also involved another drug (Table 5.6.0).

- In drug-related ED episodes during 2002, *dependence* (36%, 239,653 episodes) and *suicide* (28%, 189,198) were the most frequently cited motives for taking substances, followed by *psychic effects* (20%, 132,711). However, motive was *unknown* in a relatively high number of cases (15%, 99,567) (Table 5.2.0).

- In 2002, 4 of the major substances of abuse—miscellaneous hallucinogens (3%), heroin (6%), LSD (7%), and Ketamine (9%) had relatively low rates of motive *unknown*. Among these, *dependence* was the motive for the majority of episodes involving heroin (82%), and *psychic effects* was the motive for the majority of episodes involving miscellaneous hallucinogens (85%), Ketamine (41%), and LSD (47%) (Tables 5.6.0 through 5.34.0).

- In 2002, almost half of drug-related ED episodes resulted in admission to the hospital (49%, 331,240 episodes) (Table 5.2.0).

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INTRODUCTION

This publication presents estimates of drug-related emergency department (ED) visits from the Drug Abuse Warning Network (DAWN) from 1995 through 2002. DAWN is an ongoing, national data system that collects information on drug-related visits to EDs from a national probability sample of hospitals. 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.

ED Trends From DAWN is published twice each year. Once each year, *ED Trends* publishes a limited set of preliminary estimates developed from the first half-year of data (i.e., January through June). Each year, a second issue of *ED Trends* presents final estimates for the most recent full year and comparisons to previous years.[4]

This publication contains the following estimates of drug-related ED episodes and specific drug mentions:

- Final estimates for the full years 1995 through 2002.
- Final estimates for each half-year period for 1998 through 2002, which are provided for reference. Revised final estimates for January through June 2002 are published here for the first time (see Appendix B).

The revised estimates in the *ED Trends From DAWN* series replace those DAWN estimates published previously for 1994 through 2000.

DAWN relies on a detailed "drug vocabulary" to categorize the thousands of substances that are reported each year. The drug vocabulary is, literally, the language—the codes and terminology—that DAWN uses to record and classify drugs and other substances collected from EDs. In 2001, it was necessary to implement substantial changes to the existing vocabulary to ensure that reported substances are accurately and consistently classified. The overhaul and replacement of the DAWN drug vocabulary as well as the first publication of the revised trends are described in detail in *Emergency Department Trends From the Drug Abuse Warning Network Preliminary Estimates, January–June 2001 with Revised Estimates 1994–2000*.[5] In addition, a separate publication focusing exclusively on the drug vocabulary is forthcoming.

In the next section, we describe the sources and methods used to collect data for DAWN and then highlight certain limitations of the data. Finally, we provide an overview of the layout of this publication, including a detailed description of each table and its proper interpretation.

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[4] The publication series entitled *ED Trends From DAWN* replaced 2 semi-annual publications—*Mid-year Preliminary Emergency Department Data from DAWN* and *Year-end Emergency Department Data from DAWN*. It also replaced the trend tables (chapter 4) from the annual *Detailed ED Tables* prior to 2001, which are published exclusively on the Internet. (Prior to 1998, *Detailed ED Tables* were published under the title *DAWN Annual Emergency Department Data*.)

[5] The classification of drugs currently in use by DAWN is derived from the Multum *Lexicon*, Copyright © 2003, Multum Information Services, Inc. The classification has been modified to meet DAWN's unique requirements (2003). The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix E to this report and can be found on the Internet at http://www.multum.com/.

OTHER DAWN PUBLICATIONS

The DAWN system also collects data on drug-related deaths from a nonrandom set of death investigation jurisdictions. Findings from DAWN mortality data are published annually in a separate publication series entitled *Mortality Data From the Drug Abuse Warning Network*.[6]

A relatively new series called *The DAWN Report* focuses on topics of special interest in a brief publication format.[7] For example, *The DAWN Report* has focused on ED visits associated with club drugs, major drugs of abuse (cocaine, heroin, marijuana, and methamphetamine), and narcotic analgesics. New issues of *The DAWN Report* will be released in the near future.

OAS receives many requests for specific information from potential and actual consumers of information from DAWN. We view these requests as expressions of the need to improve the content of DAWN publications. Topics for *The DAWN Report* and modifications to other DAWN publications are often the result of consumer input.

OVERVIEW OF DAWN ED COMPONENT

The DAWN system provides information on some of the health consequences of drug abuse in the United States as manifested by drug-related visits to hospital EDs. Hospitals eligible for DAWN are non-Federal, short-stay, general medical and surgical hospitals that operate EDs that are open 24 hours a day, 7 days a week. Since 1988, DAWN ED data have been collected from a representative sample of eligible hospitals located throughout the coterminous U.S., with oversampling in 21 metropolitan areas and a National Panel of hospitals sampled from locations outside these areas.

In 2002, the DAWN sample consisted of 549 eligible hospitals. Of these, 437 (80%) participated in DAWN. Response rates in the 21 metropolitan areas ranged from 65 percent to 100 percent, with 7 metropolitan areas having response rates below 75 percent (Table 1.1). The 2002 sample of hospitals submitted data on 189,616 drug abuse episodes with an average of 1.8 drug mentions per episode (Table 1.3).

For this publication, sampling weights have been applied to data from the sample to produce estimates representing all ED drug episodes and drug mentions in the total coterminous U.S. and in the 21 metropolitan areas (see Appendix B). The National Panel represents hospitals outside of the 21 metropolitan areas. Estimates for the 21 metropolitan areas are pooled with estimates from the National Panel to produce the national estimates. To account for differences in population and to facilitate comparisons across metropolitan areas, estimated rates of ED drug episodes and mentions per 100,000 population also are presented (see Appendix B). Population estimates used to derive the estimated rates for 2002 are presented in Table 1.9 for each DAWN metropolitan area.

[6] For mortality data prior to 2000, the publication series was titled *Drug Abuse Warning Network Annual Medical Examiner Data*.

[7] Issues of *The DAWN Report* are available on-line at http://DAWNinfo.samhsa.gov/.

DATA COLLECTION METHODOLOGY

Within each hospital that participates in DAWN, a designated DAWN reporter, who is usually a member of the ED or medical records staff, is responsible for reviewing medical charts to identify ED visits that are eligible for submission to DAWN. DAWN reporters rely on information from medical charts that originates with the hospital staff that treated the patient. Ultimately, the accuracy and completeness of the data submitted to DAWN depend on the careful recording of information by the medical staff and on the accuracy and completeness of the information provided to the medical staff by the patient.

The DAWN reporter submits an episode report to the DAWN system for each patient who visits a DAWN ED and meets certain criteria. To be included in DAWN, the patient presenting to the ED must meet all of the following criteria:

- The patient was age 6 to 97;
- The patient was treated in the hospital's ED;
- The patient's presenting problem(s) (i.e., the reason for the ED visit) was induced by or related to drug use, regardless of when the drug use occurred;
- The episode involved the use of an illegal drug, or the use of a legal drug or other chemical substance for nonmedical purposes; and
- The patient's reason for using the substance(s) was dependence, suicide attempt or gesture, and/or psychic effects.

In addition to drug overdoses, reportable ED episodes may result from the chronic effects of habitual drug use or from unexpected reactions. Unexpected reactions reflect cases where the drug's effect was different than anticipated (e.g., caused hallucinations). DAWN cases do **not** include accidental ingestion or inhalation of a substance with no intent of abuse, or adverse reactions to prescription or OTC medications taken as prescribed.

A single drug abuse episode may have multiple drug mentions. Up to 4 different substances can be recorded for each ED episode. Therefore, not every reported substance is, by itself, necessarily a cause of the medical emergency. On the other hand, substances that contributed to a drug abuse episode may occasionally go unreported or undetected. Even when only one substance is reported for an episode, an allowance should be made for reportable drugs not mentioned, or for other contributory factors.

Alcohol use is reported to DAWN **only** when it is present in combination with a reportable substance.

In addition, each report of a drug-related ED episode includes demographic information about the patient and information about the circumstances of the episode (e.g., the date and time of the ED visit, the reason the patient came to the ED). Only one reason for the ED contact

and one reason for taking substances are recorded, regardless of the number of substances involved.[8]

CONSIDERATIONS WHEN INTERPRETING DAWN DATA

When interpreting findings from this publication, the reader needs to recognize what DAWN can and cannot measure. DAWN does not measure the frequency or prevalence of drug use in the population, but rather the health consequences of drug use that are reflected in visits to hospital EDs. Moreover, estimates of drug episodes and mentions may increase or decrease for reasons unrelated to the size or characteristics of the drug-using population. The reader should consider the following when interpreting estimates from DAWN:

- The number of ED episodes reported to DAWN is not equivalent to the number of individual patients, because one person may make repeated visits to an ED. DAWN data contain no individual identifiers, which would be required to estimate repeat visits. Therefore, the estimates presented in this publication pertain to total ED episodes or drug mentions, not to the number of different patients involved. In this context, rates should be regarded not as prevalence rates for the population using EDs, but as indicators of the number of ED drug abuse episodes or mentions per 100,000 population.

- DAWN data may be affected by data collection procedures and thereby reflect changes in hospital services or operations. A hospital in one city may open a new detoxification unit that diverts drug-related episodes away from the ED. Conversely, in another city, people may go to the ED to seek care for detoxification because they are unable to gain admission to a drug treatment facility or because they need medical certification before entering treatment. These factors may vary over time and place.

- Estimates of drug-related ED episodes or mentions may be affected by reporting patterns. For example, a change to computer-based recordkeeping systems in a hospital ED could increase or decrease the number of ED visits identified as drug related.

- Greater awareness and knowledge of drug-related problems may result in a greater propensity for ED staff to record drug use in the ED record. Alternatively, the sensitivity of drug-related problems may reduce patients' willingness to disclose drug use and providers' willingness to record it in the permanent medical record. External factors, such as the potential denial of insurance coverage, also may inhibit documentation of substance abuse in records.

- Estimates of drug-related ED episodes or mentions can be affected if the weights applied to the data change in an irregular way. We use a set of quality control procedures to identify and investigate unusual weights and data, and our review of the weights and data used in this publication did not reveal any factors that are unduly responsible for the trends reported.

[8] For each drug mentioned, the DAWN reporting form also includes the form in which the drug was acquired (e.g., liquid, pieces), its source (e.g., street buy, patient's own legal prescription), and its route of administration (e.g., oral, injection). However, these data items frequently are unavailable from source records.

- Trends may be affected by unusual changes in the sample composition. See Appendix B for more information regarding sampling.
- Graphs illustrating trends in drug mentions often use different scales for the vertical axes.
- The U.S. Bureau of the Census is the source for all the population data used to produce the estimated rates (see Appendix B). DAWN estimates for 2001 were the first to utilize population data from the 2000 decennial Census. Estimates for periods prior to 2001 used population projections developed annually from the 1990 Census. Inevitably, the accuracy of population estimates deteriorates over time relative to actual census counts. As a result, the population denominator used to calculate rates per 100,000 population for 2001 and 2002 is considerably larger than that for 2000 due to the availability of 2000 decennial Census data. Many large decreases in 2001 and 2002 population-based rates were attributable to the larger denominator. Therefore, it is important to verify reductions in rates against total estimates for the same measures. It is possible, for example, to have an estimate (in mentions or episodes) increase from 2000 to 2002 and to have the corresponding rate decrease because of changes in the population denominator. To assist the reader, the percentage change columns in the rate tables are calculated based on the rates in this issue of *ED Trends*.[9]

INTERPRETATION OF STATISTICAL SIGNIFICANCE

The estimates of episodes and mentions displayed in tables in this publication are accompanied by columns indicating the percent change from one period to another. The percentage change is indicated only for statistically significant differences and only when both estimates in the comparison are greater than zero. Although estimates in the tables are presented rounded to the nearest whole number, the percentage change is calculated based on the actual, non-rounded number. In describing statistically significant differences between DAWN estimates, the traditional level of statistical significance (*p* less than 0.05) is used.

In tables presenting full years, the estimates for the latest year (2002) are compared to the earliest year presented in the trend (1995 in this publication), and then to the 2 previous years (2000 and 2001).

In tables presenting estimates for half years, the second half of 2002 is compared to the first half of 2002, and the second halves of 2002 and 2001 are compared. Comparisons between the second half of one year and the first half of another may be problematic because of the potential for seasonal distortions.

Each table of estimates has a corresponding table containing the relative standard errors (RSEs) for each estimate and all the *p*-values, including those that are 0.05 or greater, for the comparisons described above. The RSE tables are published on the Internet. The RSE values for total estimates and rates per 100,000 population are similar, so a single RSE table is provided for each pair of estimate tables. For example, Table RSE-2.2.0 presents RSEs applicable to the estimates in Table 2.2.0 and to the estimated rates in Table 12.2.0. The statistical tests used to determine the significance levels are t-tests (with infinite degrees of

[9] Previously (in *ED Trends From the Drug Abuse Warning Network, Preliminary Estimates January–June 2001 with Revised Estimates 1994–2000*), the percentage change columns presented in the rate tables reflected the changes for the underlying estimates (mentions or episodes).

freedom). That is, the change score, or the difference between the 2 estimates, is divided by the standard error of the estimate. A value of zero is expected under the null hypothesis.

Although tests for statistical significance are important tools in interpreting results, significance does not always imply that the difference is large or important. Small changes that are statistically significant may occur frequently at the metropolitan area level in DAWN due to the selection of all eligible hospitals (which constitutes a census) in Baltimore, Buffalo, Denver, San Diego, and San Francisco, along with sampling many other metropolitan areas at a high frequency (Table 1.1). The closer the sample is to a census, the higher is the likelihood that a change will be statistically significant, no matter how small it may be. While technically there is no sampling variability in the 5 areas noted, some variability is due to the hospitals' nonresponse, which is treated as sampling error in the variance calculations.

RSEs for the coterminous U.S. and for each metropolitan area (shown in Table 1.6) are summarized in Figure 1. The RSE for total drug-related ED episodes for the coterminous U.S. is 8 percent. Across the 21 metropolitan areas oversampled in DAWN, RSEs range from a low of 2 percent in San Diego to a high of 21 percent in Boston. RSEs for particular drugs are often much higher. For example, for the coterminous U.S., the RSE for marijuana episodes is 15 percent and the RSE for methamphetamine episodes is 21 percent.

Nonsampling errors such as nonresponse and reporting errors may affect the outcome of significance tests. While p less than 0.05 significance level is used to determine statistical significance in DAWN ED tabulations, large differences associated with slightly higher p-values (specifically those between 0.05 and 0.10) may be of interest also. On the other hand, statistically significant differences are not always meaningful, because the size of the difference is small or because the significance may have occurred simply by chance. In a series of 20 independent tests, it is to be expected that one test will indicate a significant difference merely by chance, even if there is no real difference in the populations compared. The text often discusses more than one comparison within a given table (e.g., comparing percentages for different drugs or subgroups). We have made no attempt to adjust the level of significance to account for these multiple comparisons. Therefore, the probability of falsely rejecting the null hypothesis at least once in a family of comparisons is higher than the significance level given for individual comparisons (in this publication, 0.05).

OTHER CONSIDERATIONS WHEN READING DAWN TABLES

Estimates with RSEs of 50 percent or higher are regarded as too imprecise for publication. In the tables, the symbol "…" (3 dots) has been substituted for estimates that did not meet this standard of precision. With an RSE of 50 percent, the 95 percent confidence interval for an estimate ranges from 2 to 198 percent of the estimate's value (see Appendix B).

Similarly, some 2001 and 2002 estimates for certain metropolitan areas are suppressed (indicated by the symbol "---") because they are based on insufficient data (see Appendix C). In 2001, Atlanta was the only metropolitan area so affected. In 2002, Boston, Detroit, Los Angeles, New York, and St. Louis were affected.

Beginning with the 1999 ED data, estimates smaller than 10 were no longer suppressed in DAWN ED publications. Many estimates as small as these are suppressed by virtue of having RSEs greater than 50 percent. For those that are shown in the tables, we note for the reader that small numbers and their associated RSEs should be interpreted with caution.

As described in Appendix B, the DAWN ED data for 1995 through 1997 were reweighted and reprogrammed, and the presentation of findings was improved during 1998. Improvements in the DAWN drug vocabulary resulted in revisions to estimates for 1994 through 2000.[10] The charts, tables, and graphs in this publication present only revised estimates.

HOW TO USE THIS PUBLICATION

This issue of *ED Trends From DAWN* examines the nature of trends in drug-related ED episodes and focuses almost exclusively on the final estimates for 2002 with statistical comparisons to 2001. Semi-annual estimates for the 10 half years from 1998 through 2002 are provided for reference, but are not discussed. In the full-year tables, statistical tests are used to compare final 2002 estimates with those for 2001, 2000, and 1995. For half years, estimates for the latest half-year period are compared with those for the previous 2 half years. Each table displays the percentage change for statistically significant differences. Actual *p*-values are still available in the companion tables of RSEs, which are published on the Internet.

The presentation of ED findings in this publication is divided into the following sections, which mirror the order of the tables in this publication:

- Trends in major substances of abuse, such as cocaine, heroin, and "club drugs;"
- Trends in other substances of abuse, such as prescription and OTC drugs;
- Trends for the 21 metropolitan areas oversampled in DAWN;
- Trends in demographic characteristics of patients treated in drug-related ED episodes;
- Trends in characteristics of the episodes themselves; and
- Discussion of results.

Population-based rates are discussed within these sections by topic, because the rates are best used to supplement the other estimates of episodes and mentions. By considering the estimates of drug mentions and episodes relative to the size of the population at risk, the rates yield standardized measures that can be compared across selected drugs, metropolitan areas, and gender and age groups.

[10] A thorough description of the revisions to the DAWN drug vocabulary and the impact of those revisions on published estimates can be found in Appendixes A and B of the *ED Trends From DAWN, Preliminary Estimates January–June 2001 with Revised Estimates 1994–2000*.

ORGANIZATION OF TABLES

In this section, we explain the organization of the tables in *ED Trends* and explain the classification of drugs in the context of these tables.

The table numbering scheme is described in a separate exhibit on the inside of the front cover of this publication. Table numbers in this publication are identical to those in the last issue of the *ED Trends From DAWN*.

The tables in this publication are designed to array information from the very general to the very specific. This design responds directly to requests we receive for information at these different levels of detail. Figure 2 illustrates the general to specific organization of the tables.

Major Drug Categories

At the most general level (the left half of Figure 2), estimates are reported for major drug categories. Table 2.2.0 illustrates the standard layout of substances by drug categories. This table and others like it are divided into 2 panels with:

- "Major substances of abuse" (e.g., cocaine, heroin, and "club drugs") in the top panel, and
- "Other substances of abuse" in the lower panel.

Specific content for each of these panels is described later in this section.

National estimates are provided for the major drug categories in one table. The same estimates are provided in separate tables for each of the 21 metropolitan areas oversampled by DAWN. For example, Table 2.2.0 contains national estimates, and Tables 2.2.1 through 2.2.21 contain estimates for each of the 21 DAWN metropolitan areas.

The third term in the table number always indicates the geographic area:

- **.0** for national estimates, and
- **.1 - .21** for the 21 metropolitan areas, where **.1** is always Atlanta, **.2** is always Baltimore, and so forth. The complete list of the metropolitan areas and their corresponding numbers is provided on the inside of the front cover.

Component Drugs

At a more specific level (the right half of Figure 2), a second set of tables lists the component drugs classified under the 5 largest categories: major substances of abuse, psychotherapeutic agents, CNS agents, respiratory agents, and cardiovascular agents.

National estimates are provided for each of the component drugs; these are followed by estimates for component drugs for each of the 21 metropolitan areas.

This is more detailed drug information than is available from any other substance abuse data system. In response to requests, both high and low frequency terms are displayed, as follows:

- Table 2.4.0 (estimates) and 12.4.0 (rates): full-year estimates for component drugs of the major substances of abuse. Corresponding half-year estimates are published in Tables 2.3.0 and 12.3.0, respectively.

  These tables include all the terms, including street names, reported to DAWN for the major substances of abuse. For example, users will consult this table to find estimates for "crack," which is subsumed under the major substance "cocaine" in Tables 2.1.0 and 2.2.0, and to see the relative frequency of particular terms.

- Table 2.6.0 (and 12.6.0): full-year estimates for component drugs of psychotherapeutic agents. Corresponding half-year estimates are published in Tables 2.5.0 and 12.5.0, respectively.

- Table 2.8.0 (and 12.8.0): full-year estimates for component drugs of CNS agents. Corresponding half-year estimates are published in Tables 2.7.0 and 12.7.0, respectively.

- Table 2.10.0 (and 12.10.0): full-year estimates for component drugs of respiratory agents. Corresponding half-year estimates are published in Tables 2.9.0 and 12.9.0, respectively.

- Table 2.12.0 (and 12.12.0): full-year estimates for component drugs of cardiovascular agents. Corresponding half-year estimates are published in Tables 2.11.0 and 12.11.0, respectively.

Except for the major substances of abuse, component drugs are always expressed at the generic substance level (e.g., fluoxetine). No published estimates are provided by brand (trade) name. Tabulations of component drugs will include all substances in the category, regardless of the frequency with which they were reported to DAWN. For example, users interested in the trends in ED visits involving particular narcotic analgesics will consult Table 2.8.0.

Major Substances of Abuse

The major substances of abuse include the most common illicit drugs and drug categories reported to DAWN, alcohol reported in combination with any other substance reported to DAWN, and lower frequency drugs of particular policy interest (e.g., club drugs such as MDMA (Ecstasy) and GHB).

The 15 categories in the major substances of abuse are grouped in a panel at the top of summary tables (e.g., Table 2.2.0) for ease of reference. For each of the major substances, component drugs—that is, the specific terms, including street names as they were reported to DAWN—are enumerated in Table 2.4.0 (and Table 2.3.0 for half years). The 15 major substances of abuse are:

Alcohol-in-combination. This is the most frequent drug reported to DAWN, even though it is reported only when present in combination with another reportable drug.

Cocaine. This category includes both powder and crack cocaine. Estimates for these and other specific terms are available in the component drug tables.

Heroin. ED estimates for heroin and morphine are tabulated separately (with ED morphine estimates presented under narcotic analgesics, below).[11]

Marijuana. This category includes both marijuana and hashish.

Amphetamines. This class of substances has been extracted from the category of 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 (e.g., methamphetamine) individually as major substances of abuse. This category does not include other CNS stimulants, such as caffeine or methylphenidate.

Methamphetamine. This category includes methamphetamine and the term "speed."

MDMA (methylenedioxymethamphetamine, Ecstasy). This is the "designer" or "club" drug commonly known as Ecstasy. It is classified separately as a major substance of abuse because of widespread interest.

Ketamine. This is a veterinary anesthetic classified separately as a major substance of abuse because of widespread interest. It is another of the "designer" or "club" drugs.

LSD. LSD is listed separately from other hallucinogens because of widespread interest.

PCP. PCP is listed separately from other hallucinogens because of widespread interest.

Miscellaneous hallucinogens. This category includes hallucinogens other than LSD and PCP.

Flunitrazepam (Rohypnol). Flunitrazepam is a benzodiazepine that is not legal for marketing in the United States. It is reported under major substances because of increased interest in its use as a "designer" or "club" drug. It is excluded from the list of benzodiazepines described below.

Gamma hydroxy butyrate (GHB). This category includes GHB and its precursor gamma butyrolactone (GBL). It is another of the "designer" or "club" drugs.

Inhalants. Inhalants include anesthetic gases and certain nonpharmaceuticals for which the documented route of administration was inhalation.

To be classified as inhalants, anesthetic gases are extracted from the category CNS agents, general anesthetics. These substances have the physical property at room temperature

[11] In contrast, heroin and morphine are combined in tabulations of DAWN mortality data. It is often impossible to distinguish heroin from morphine during death investigations because the toxicology tests used to identify a drug involved in a drug-related death rely on a metabolite common to both drugs. This is the only such difference in drug classification between DAWN ED and mortality data.

of being a gas or are delivered as a gas and therefore are presumed to have been inhaled. The anesthetic gases include nitrous oxide, ether, and chloroform.

To be classified as an inhalant, a nonpharmaceutical substance must have a psychoactive effect when inhaled and falls into one of 3 subcategories: volatile solvents, nitrites, or chlorofluorohydrocarbons (see Appendix D).

Combinations Not Tabulated Above (NTA). This category includes compounds composed of 2 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 (an illicit combination), whereas separate mentions of heroin and cocaine would be classified separately in the categories heroin and cocaine. Compounds 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).

Other Substances of Abuse

Other substances of abuse are summarized by pharmaceutical category (e.g., Table 2.2.0) using the categories and category assignments that are an integral part of the Multum *Lexicon* (the basis for DAWN's drug vocabulary), with a few exceptions noted here. Many of these substances are marketed legally as prescription and OTC medications. Readers should note that the purpose for which these substances are intended may be quite different from the effect for which these substances are abused. Since it is impossible to know patients' actual intentions when abusing a substance, we have chosen to classify these substances by their therapeutic uses. Some drugs may have more than one therapeutic use and could be assigned to multiple categories. To avoid duplication, each drug is assigned to a single therapeutic category and is tabulated only once.

Four of the categories under other substances of abuse are divided into finer subcategories, and the component drugs for these 4 categories are displayed in subsequent tables (e.g., Tables 2.6.0, 2.8.0, 2.10.0, and 2.12.0).

Psychotherapeutic agents are divided into the following categories:

- Antidepressants
  - MAO inhibitors
  - SSRI antidepressants
  - Tricyclic antidepressants
  - Miscellaneous antidepressants
- Antipsychotics
  - Phenothiazine antipsychotics
  - Psychotherapeutic combinations
  - Thioxanthenes
  - Miscellaneous antipsychotic agents
- Anxiolytics, sedatives, and hypnotics
  - Barbiturates
  - Benzodiazepines – This category excludes the benzodiazepine flunitrazepam (Rohypnol), which was assigned to major substances of abuse.
  - Miscellaneous anxiolytics, sedatives, and hypnotics

- CNS stimulants. This category excludes the CNS stimulants that were assigned to major substances of abuse: amphetamines, methamphetamine, and MDMA (Ecstasy).

Central nervous system (CNS) agents are divided into the following categories:

- Analgesics
  - Antimigraine agents
  - Cox-2 inhibitors
  - Narcotic analgesics and narcotic analgesic combinations – This category excludes heroin, which is classified as a major substance of abuse. This category includes drugs reported to DAWN simply as "opiates."
  - Nonsteroidal anti-inflammatory agents
  - Salicylates and salicylate combinations
  - Miscellaneous analgesics and miscellaneous analgesic combinations
  - Analgesic combinations NTA
- Anorexiants
- Anticonvulsants
- Antiemetic/antivertigo agents
- Antiparkinson agents
- General anesthetics – This category excludes the anesthetic gases that were assigned to major substances of abuse as inhalants.
- Muscle relaxants
- Miscellaneous CNS agents

Respiratory agents are divided into the following categories:

- Antihistamines
- Bronchodilators
- Decongestants
- Expectorants
- Upper respiratory combinations
- Respiratory agents not tabulated above (NTA) – This category captures respiratory agents that did not fit into the 5 other categories of respiratory agents.

Cardiovascular agents are divided into the following categories:

- Antiandrenergic agents, centrally acting
- Beta-andrenergic blocking agents
- Calcium channel blocking agents
- Diuretics
- Cardiovascular agents NTA – This category captures cardiovascular agents that did not fit into the 4 other categories of cardiovascular agents.

As noted earlier, the general categories used in Table 2.2.0 are expanded in Tables 2.4.0 through 2.12.0 to enumerate the component drugs for the 4 major categories: psychotherapeutic agents, CNS agents, respiratory agents, and cardiovascular agents and their associated subcategories. For example, Table 2.2.0 presents mentions of narcotic analgesics under CNS agents; mentions of particular narcotic analgesics—morphine, codeine, and others—are displayed in Table 2.8.0.

In the tables enumerating component drugs, only generic names are used. Brand (trade) names are not used because estimates for particular brands are considered to be unreliable.[12] Therefore, for example, mentions of acetaminophen and mentions of Tylenol are both tabulated as "acetaminophen."

Users of DAWN estimates have told us that it is not useful to report only the most frequently occurring substances. Therefore, in Tables 2.4.0 through 2.12.0, substances are enumerated in their relevant category, regardless of the numbers of mentions estimated from DAWN.

The following 6 categories from the Multum *Lexicon* are presented without subdivisions due to the low number of mentions:

- Alternative medicines
- Anti-infectives
- Gastrointestinal agents
- Hormones
- Nutritional products
- Topical agents

Finally, 2 additional categories, "drug unknown" and "all other substances NTA" do not appear in the Multum *Lexicon* but are needed to complete the classification of substances for DAWN.

Drug unknown. This includes 2 types of cases: those in which the drug was reported to DAWN as "unknown" and those in which drugs were reported to DAWN as "polysubstances." For the purposes of DAWN, polysubstance refers to the abuse of more than one substance when the individual substances were not identified by the source record. Because DAWN cases are identified through retrospective medical chart review, there will always be cases in which the drug abuse was known but the particular substance was unknown or unknowable. Since 1995, reporting of unknown substances seems to have stabilized at about 2 to 3 percent of drug mentions.

All other substances NTA. This category contains any substance reported to DAWN that could not be classified in the categories noted above and has too few mentions to warrant its own entry in DAWN tables. This category currently includes: antihyperlipidemic agents, antineoplastics, biologicals, coagulation modifiers, immunologic agents, miscellaneous agents, and plasma expanders. Miscellaneous agents include: antidotes, antigout agents, antipsoriatics, antirheumatics, chelating agents, cholinergic muscle stimulants, genitourinary tract agents, impotence agents, local injectable anesthetics, miscellaneous uncategorized agents, psoralens, radiocontrast agents, and viscosupplementation agents.

This category also includes certain legacy terms that could not be assigned reliably to any category. These include ambiguous, nonspecific terms that could fall into any of several categories (e.g., "AIDS medicine" could be an anti-infective, an anticonvulsant, or any number of other drugs); undocumented, nonspecific terms (e.g., "thought organizer"); and street terms for illicit substances that could not be linked reliably to a particular illicit substance (e.g., "T," "butterflies").

[12] This issue has been discussed in greater detail in previous issues of *ED Trends From DAWN*.

We will monitor the content of this category to avoid its uncontrolled expansion in the future. Should a substance or class of substances begin to show significant growth, we intend to add such information to the published categories rather than allow this "all other" category to degrade over time. In addition, regular updates of the Multum *Lexicon* will introduce new prescription and OTC substances as they are approved for marketing and before they begin to appear in DAWN.

ADDITIONAL CONTENT AVAILABLE ON THE INTERNET

Although this publication includes a large number of tables, even more detail is available through tables that are published only on the Internet. These additional tables can be accessed online at http://DAWNinfo.samhsa.gov/. Tables published exclusively on the Internet are:

- Additional tables of estimates by metropolitan area. For ease of reference, these are listed in the table of contents of *ED Trends* and their location noted.

- Relative standard errors (RSEs) for estimates provided in this publication, in a corresponding tabular format. The RSEs used for population-based rates are the same as those used for other DAWN estimates. Although there may be slight differences in the RSEs calculated for the DAWN estimates and the RSEs that would be appropriate for the population-based rates (due to sampling error in the current population estimates), they are sufficiently close for the purpose of this publication.

- Updated indexes listing generic and brand names for prescription and OTC substances. No published estimates are provided by brand (trade) name. The index is provided as an aid for readers who may be unfamiliar with the generic names used in this publication. The updated index is not printed in each issue of *ED Trends* due to size.[13]

[13] An earlier version of this index was printed as Appendix I in *Emergency Department Trends From the Drug Abuse Warning Network Preliminary Estimates January–June 2001 with Revised Estimates 1994–2000*. The index is updated periodically.

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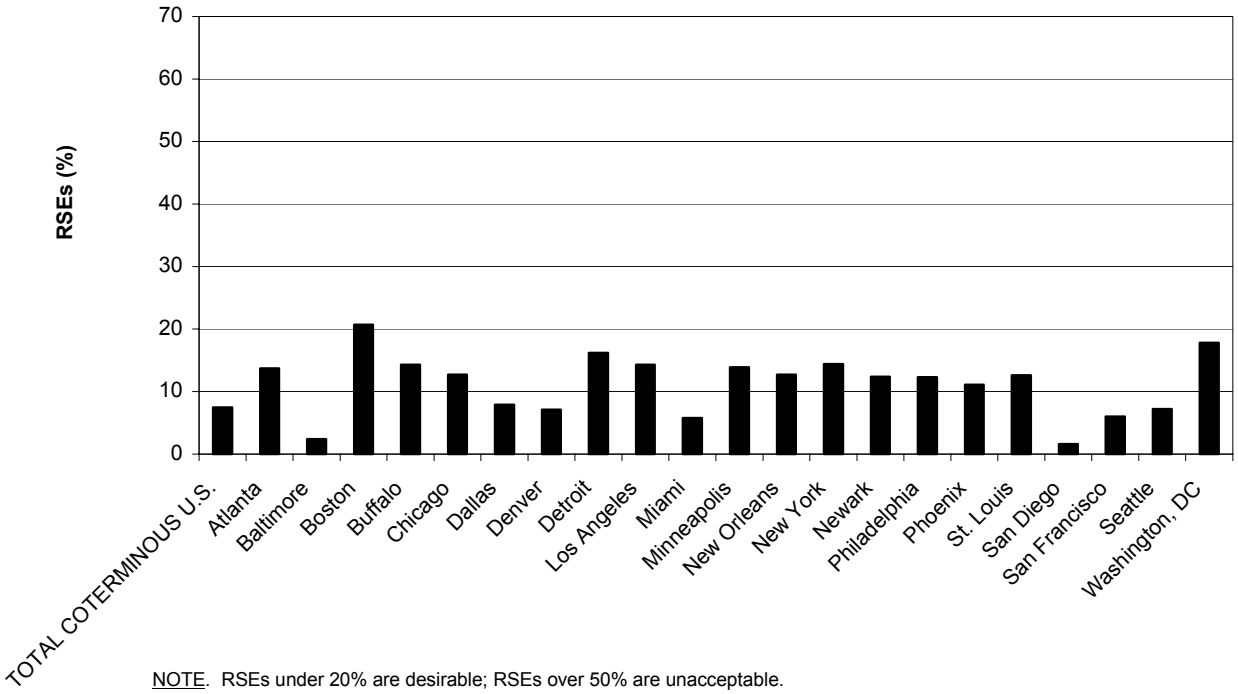
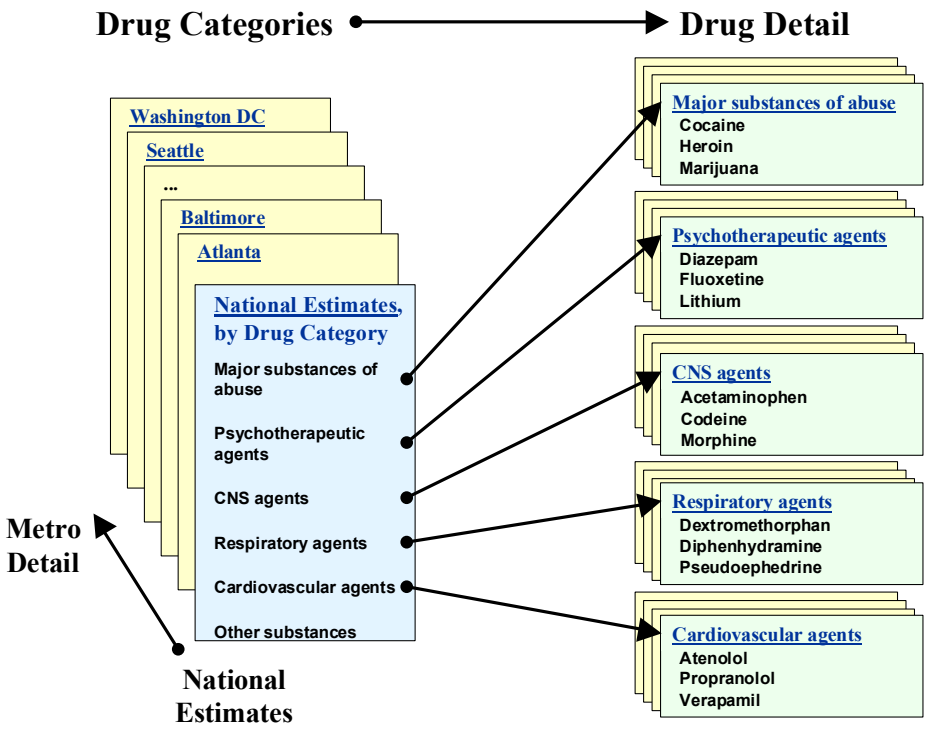
Figure 1
Relative standard errors (RSEs) for drug-related episodes by metropolitan area: 2002



NOTE. RSEs under 20% are desirable; RSEs over 50% are unacceptable.

Figure 2
Tables in *ED Trends From DAWN*



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TRENDS IN MAJOR SUBSTANCES OF ABUSE

This section presents annual estimates from DAWN for total drug-related ED episodes and mentions of major substances of abuse.

"Major substances of abuse" include the most common illicit drugs reported to DAWN, alcohol reported in combination with any other substance reported to DAWN, and lower frequency drugs of particular policy interest (e.g., club drugs such as MDMA (Ecstasy), and GHB). The specific terms (including street names) reported to DAWN for each drug category are listed, with corresponding mentions from 1995 to 2002, in Table 2.4.0 (full-year estimates) and Table 12.4.0 (full-year rates per 100,000 population). Corresponding half-year tables are Tables 2.3.0 and 12.3.0, respectively.

One ED episode can include mentions of one drug alone or mentions of multiple drugs. Major substances of abuse, such as cocaine, heroin, and marijuana, are often reported in combination with other drugs. Alcohol is reportable to DAWN only when present in combination with another reportable drug. Therefore, the total number of drug mentions exceeds the number of episodes. Mentions for individual drugs, which may be recorded only once per episode, are equivalent to episodes. For example, the number of cocaine mentions is equivalent to the number of episodes in which cocaine was mentioned.

The following discussion focuses primarily on comparisons of final estimates for 2002 with 2001. Tables also show statistical tests comparing 2002 estimates with those for 2000 and, for long-term trends, 2002 estimates with those for 1995 (the earliest year shown in the tables). In addition, long-term trends in drug-related ED episodes overall and for those involving the most frequently mentioned illicit drugs and alcohol-in-combination are shown in Figure 3.

DAWN estimates for 2002 are based on data from a nationally representative sample of 437 responding hospitals (Table 1.1).

TOTAL DRUG-RELATED ED EPISODES

- In 2002, there were 670,307 drug abuse-related ED episodes in the coterminous U.S., with 1,209,938 drug mentions (on average, 1.8 drugs per episode) (Table 2.2.0).
- There were no significant increases from 2001 to 2002 in total drug-related ED episodes or in ED drug mentions (Table 2.2.0). Total ED visits (that is, ED visits for any reason) increased 2 percent (from 100.5 million to 102.8 million) during this period.
- In 2002, drug abuse-related ED visits occurred at the rate of 261 ED episodes per 100,000 population in the coterminous U.S. (Table 12.2.0).
- From 2001 to 2002, among the most common major substances of abuse, only amphetamines showed a significant increase (17%, from 18,555 to 21,644). Mentions of alcohol-in-combination (207,395 in 2002), cocaine (199,198), marijuana (119,472), heroin (93,519), and methamphetamine (17,696), were all statistically unchanged. There were no significant decreases among these substances (Table 2.2.0).

- Among the less frequently mentioned major substances of abuse, only 2 had significant increases from 2001 to 2002. Mentions of inhalants rose 187 percent (from 522 to 1,496), returning to the level observed in 2000, and mentions of PCP rose 25 percent (from 6,102 to 7,648). Mentions of LSD decreased (-68%, from 2,821 to 891). MDMA (Ecstasy) (4,026), GHB (3,330), miscellaneous hallucinogens (1,428), and Ketamine (260), were statistically unchanged from 2001 to 2002. Mentions of flunitrazepam (Rohypnol) and illicit combinations NTA were too imprecise for publication (Table 2.2.0).
- Among the major substances of abuse, the highest rates of ED drug mentions in 2002 occurred for the following substances (Table 12.2.0):
  - Alcohol-in-combination (81 mentions per 100,000 population),
  - Cocaine (78),
  - Marijuana (47), and
  - Heroin (36).

ALCOHOL-IN-COMBINATION

- Alcohol-in-combination was mentioned in 31 percent of ED drug episodes in 2002 (207,395 mentions) and remains the most common substance reported in drug-related ED visits (Table 2.2.0 and Figure 3). Alcohol is reported to DAWN only when present in combination with another reportable drug, so the actual number of alcohol-related ED visits is higher than the DAWN estimate for alcohol-in-combination episodes.
- Mentions of alcohol-in-combination were statistically unchanged from 2001 to 2002, but have increased 24 percent (from 166,897 mentions) since 1995 (Table 2.2.0 and Figure 3).

COCAINE, HEROIN, MARIJUANA

- Cocaine continues to be the most frequently mentioned illicit substance, present in 30 percent of ED episodes (199,198 mentions) in 2002. Cocaine was followed in frequency by marijuana (18%, 119,472 mentions), and heroin (14%, 93,519 mentions) (Table 2.2.0 and Figure 3).
- Cocaine, heroin, and marijuana mentions were statistically unchanged from 2001 to 2002 (Table 2.2.0).
- About one-fifth of the cocaine mentions in 2002 (21%, 42,146 mentions) were attributed to “crack.” This number has been stable since 1995. Most cocaine mentions (78%, 155,381) were reported to DAWN simply as “cocaine,” and it is not possible to determine what proportion of these might be crack. Mentions that were reported simply as “cocaine” increased 54 percent from 1995 to 2002 (from 101,043 to 155,381), but did not increase from 2000 to 2002, or 2001 to 2002 (Table 2.4.0).
- Taking changes in population into account, from 1995 to 2002, cocaine mentions increased 33 percent (from 58 to 78 mentions per 100,000 population). Also during

this period, heroin mentions increased 22 percent (from 30 to 36), and marijuana mentions increased 139 percent (from 19 to 47) (Table 12.2.0).

AMPHETAMINES AND METHAMPHETAMINE

- In 2002, amphetamines and methamphetamine were each mentioned in 3 percent of drug abuse-related ED episodes (21,644 mentions of amphetamines; 17,696 mentions of methamphetamine) (Table 2.2.0). Only rarely were they reported together in the same ED visit, and it is not possible to know the accuracy of distinctions between them. Most mentions of amphetamines (93%) are reported simply as "amphetamine," while methamphetamine mentions are most frequently identified as "methamphetamine" (66%) or "speed" (13%) (Table 2.4.0). Together amphetamines and methamphetamine accounted for 39,340 mentions in 2002.
- From 1995 to 2002, mentions of amphetamines increased 126 percent (from 9,581 to 21,644), and the rate of amphetamine mentions increased 105 percent (from 4 to 8 mentions per 100,000 population). From 2001 to 2002, mentions of amphetamines rose 17 percent (from 18,555), and the rate of mentions of amphetamines increased 15 percent (from 7 to 8 mentions) (Table 12.2.0). Methamphetamine mentions were statistically unchanged from 2001, 2000, or 1995. This stability masks a period of great fluctuation in methamphetamine ED mentions during the late 1990s.

CLUB DRUGS

- No significant changes from 2001 to 2002 were evident for the club drugs MDMA (Ecstasy) (4,026 mentions in 2002), GHB (3,330), or Ketamine (260) (Table 2.2.0).
- The percentage changes in MDMA and GHB mentions from 1995 to 2002 are very large because of very small numbers in 1995 (Table 2.2.0). Both drugs remain relatively infrequent in ED visits, with no more than 2 mentions per 100,000 population in 2002 (Table 12.2.0).
- Estimates for flunitrazepam (Rohypnol) have been too imprecise for publication every year from 1995 through 2002 (Table 2.2.0 and Figure 4).

OTHER TRENDS

- Among the less frequently mentioned major substances of abuse (Table 2.2.0):
  - Mentions of inhalants increased 187 percent (from 522 in 2001 to 1,496 in 2002), returning to the level observed in 2000.
  - Mentions of PCP increased 25 percent (from 6,102 to 7,648) from 2001 to 2002.
  - Mentions of LSD continued to decline, with a 68 percent decrease from 2001 to 2002 (from 2,821 to 891).
  - No significant changes were evident for miscellaneous hallucinogens from 2001 to 2002 (from 1,788 to 1,428).

- For the 15 major substances of abuse (displayed in Figure 4), relative standard errors (RSEs) in 2002 range from a low of 10.0 for alcohol-in-combination to a high of 78.9 for combinations NTA. Any DAWN estimate with an RSE exceeding 50 percent is considered too imprecise for publication and is therefore suppressed in the tables. In 2002, estimates for methamphetamine, Ketamine, miscellaneous hallucinogens, flunitrazepam (Rohypnol), GHB, inhalants, and combinations NTA all had RSEs greater than 20 percent. Only the RSE for flunitrazepam (Rohypnol) exceeded 50 percent (66%) (Table RSE-2.4.0).

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Figure 3
ED drug-related episodes and alcohol-in-combination, cocaine, heroin, and marijuana mentions: 1995 through 2002

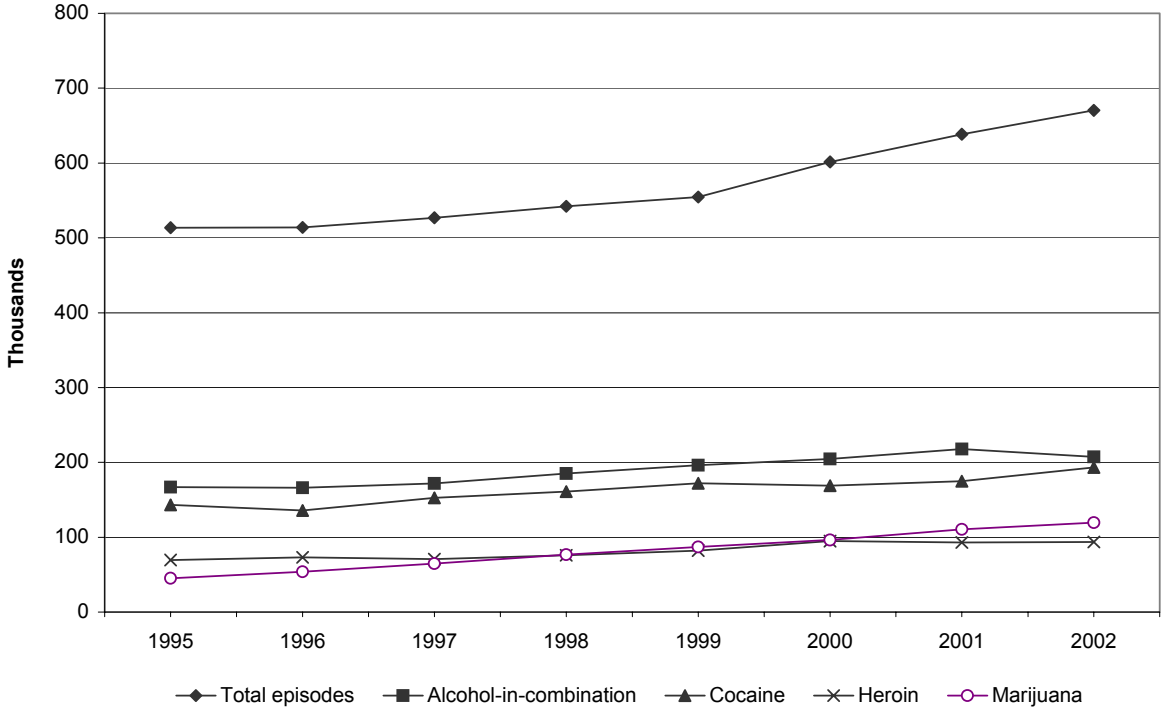
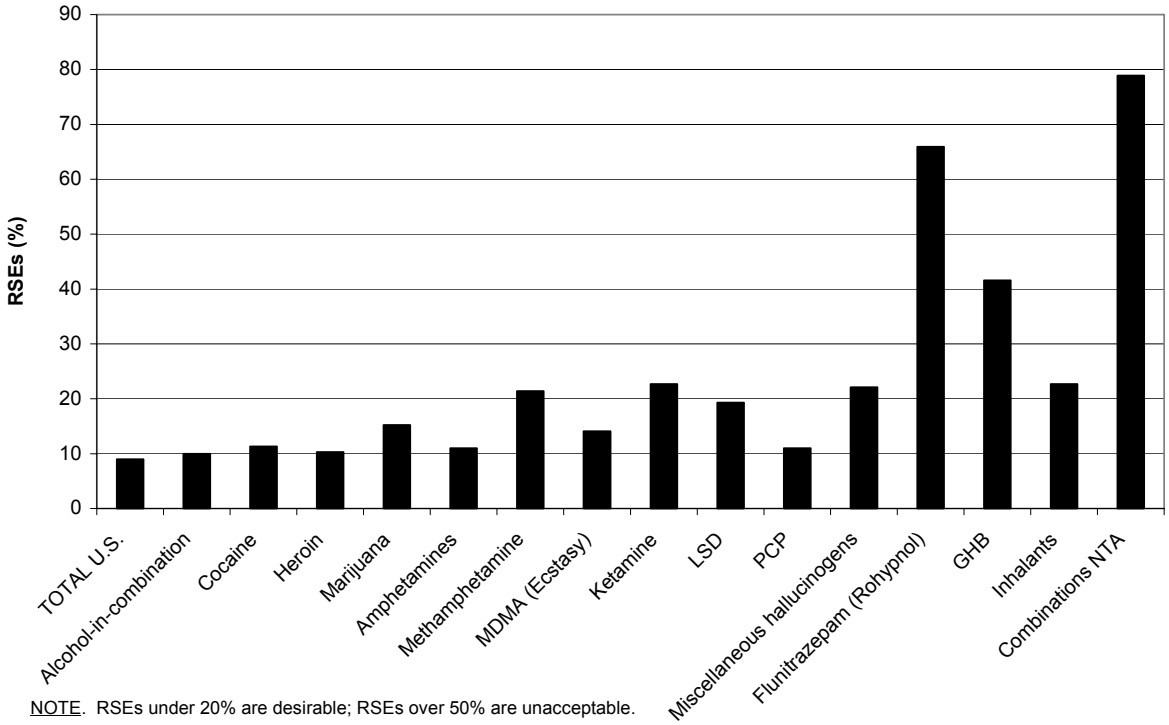


Figure 4
Relative standard errors (RSEs) for major substances of abuse: 2002



NOTE. RSEs under 20% are desirable; RSEs over 50% are unacceptable.

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TRENDS IN OTHER SUBSTANCES OF ABUSE

DAWN also receives reports of ED episodes involving the nonmedical use of legal drugs. These can involve deliberate abuse of prescribed or legally obtained over-the-counter (OTC) medications or of pharmaceuticals diverted for abuse. Accidental overdoses or adverse reactions to OTC or prescription drugs taken as directed are not reportable to DAWN unless they were present in combination with an illicit drug.

These "other substances of abuse" are tabulated first by categories composed of similar substances (Tables 2.2.0 and 12.2.0 for full-year estimates and rates, respectively) and then by generic drug name for the largest categories: psychotherapeutic agents (Tables 2.6.0 and 12.6.0), central nervous system (CNS) agents (Tables 2.8.0 and 12.8.0), respiratory agents (Tables 2.10.0 and 12.10.0), and cardiovascular agents (Tables 2.12.0 and 12.12.0). Corresponding half-year tables (2.5.0, 2.7.0, 2.9.0 and 2.11.0 for estimates and 12.5.0, 12.7.0, 12.9.0 and 12.11.0 for rates) are reported in this publication as well.

By design, all drug mentions in DAWN are tabulated either as major substances of abuse or as other substances of abuse. There is no double counting, and the deliberate assignment of drugs into major substances is the result of specific interest in such substances.

Drugs are presented in DAWN publications by generic names (e.g., acetaminophen, rather than Tylenol), and DAWN estimates should not be attributed to drugs marketed under particular brand (trade) names. DAWN data are extracted from medical records produced in the course of health care delivery (no patient is ever interviewed), so DAWN case reports contain information about particular substances as that information was documented in the ED medical record. Any prescription or OTC drug may be reported to DAWN by its brand (trade) name, generic name, or chemical name, depending on what was documented in the source record. There is no way to discern whether the brand names in the medical record are always accurate or how frequently particular brands might have been recorded by generic name. Therefore, brand names are recoded into generic names, and we do not publish estimates by brand. An index linking brand to generic names is available online at http://DAWNinfo.samhsa.gov/. The index is provided solely as an aid to readers who may be unfamiliar with generic names.

This discussion focuses mainly on comparisons of estimates from 2001 to 2002.

OTHER SUBSTANCES OF ABUSE

- DAWN estimates that other substances of abuse (527,981 mentions) comprised 44 percent of total ED drug mentions in 2002 (Table 2.2.0). Although the vast majority of these other substances are marketed legally by prescription or OTC, it is impossible to know from DAWN the number of ED visits related to the abuse of prescription drugs by patients with a legitimate prescription.

- ED mentions of other substances of abuse in 2002 were most concentrated in 2 categories—CNS agents (227,342 mentions) and psychotherapeutic agents (223,481

mentions)—in nearly equal proportions (19% and 18% of total ED mentions, respectively) (Table 2.2.0).

- The particular drugs involved in ED visits are sometimes unknown or unknowable. In 2002, there were 30,544 such mentions (3% of total mentions) (Table 2.2.0).

PSYCHOTHERAPEUTIC AGENTS

- Overall, mentions of psychotherapeutic agents were statistically unchanged from 2001 to 2002 (Table 2.2.0).
- Mentions of psychotherapeutic agents were up 9 percent since 2000 (from 204,527 to 223,481) and 18 percent since 1995 (from 190,270) (Table 2.2.0).
- Psychotherapeutic agents in DAWN are broken into 4 subcategories: antidepressants; antipsychotics; anxiolytics, sedatives, and hypnotics; and CNS stimulants.

Antidepressants

- Antidepressants (5% of total ED mentions, 62,635 mentions) were the second most frequent psychotherapeutic agents mentioned in drug-related ED visits in 2002, and as a category have remained statistically unchanged in recent years (Table 2.2.0). This category includes:
  - MAO inhibitors (14 mentions),
  - SSRI antidepressants (27,914),
  - Tricyclic antidepressants (11,546), and
  - Miscellaneous antidepressants (23,161).

MAO Inhibitors

- From 1995 to 2002, mentions of MAO inhibitors overall decreased 95 percent (from 303 to 14), but no significant change was evident from 2000 to 2002, or from 2001 to 2002 (Table 2.6.0).

SSRI Antidepressants

- From 1995 to 2002, mentions of SSRI antidepressants overall increased 29 percent (from 21,585 to 27,914), but no significant change was evident from 2000 to 2002 (Table 2.6.0).
- From 2001 to 2002, no significant changes were evident for any of the SSRI antidepressants. In 2002, the most frequently mentioned SSRIs (Table 2.6.0) were:
  - Citalopram (5,313 mentions), which rose 54 percent from 2000 to 2002,
  - Fluoxetine (5,770), down 39 percent from 1995 to 2002, and down 27 percent from 2000 to 2002,

- Paroxetine (9,443), up 67 percent from 1995 to 2002, and
- Sertraline (7,214), which has remained relatively stable in recent years.

Tricyclic Antidepressants

- Overall, mentions of tricyclic antidepressants decreased 41 percent (from 19,429 to 11,546) from 1995 to 2002, but have remained stable in the last 3 years (Table 2.6.0).
- From 2001 to 2002, no significant changes were evident for any of the SSRI antidepressants, and from 2000 to 2002, only amitriptyline mentions changed significantly. In 2002, the most frequently mentioned tricyclic antidepressants (Table 2.6.0) were:
  - Amitriptyline (4,436 mentions), down 50 percent from 1995 and down 31 percent from 2000 to 2002,
  - Doxepin (868), down 68 percent since 1995,
  - Imipramine (242), down 90 percent since 1995,
  - Nortriptyline (424), down 82 percent since 1995, and
  - Tricyclic antidepressants not identified by name (noted as "not otherwise specified" or "-NOS") (5,397), with no change from 1995, 2000 or 2001.

Miscellaneous Antidepressants

- Overall, mentions of miscellaneous antidepressants increased 86 percent (from 12,447 to 23,161) from 1995 to 2002, but remained stable from 2000 to 2002, and from 2001 to 2002 (Table 2.6.0).
- Among the miscellaneous antidepressants, only venlafaxine mentions changed significantly during the 3 years from 2000 to 2002. In 2002, the category of miscellaneous antidepressants (Table 2.6.0) included:
  - Buproprion (4,074 mentions), up 226 percent since 1995,
  - Mirtazapine (2,222),
  - Nefazodone (923), up 294 percent since 1995,
  - Trazadone (9,560),
  - Venlafaxine (5,501), up 345 percent since 1995, up 48 percent since 2000, and up 38 percent since 2001; and
  - Unnamed antidepressants (antidepressants-NOS) (875), up 508 percent from 1995 to 2002.

Antipsychotics

- Mentions of substances classified as antipsychotics were statistically unchanged from 1995, 2000 and 2001. In 2002, this category included 4 subcategories, but more than 90 percent of mentions fell into the single subcategory of miscellaneous antipsychotic agents.

- In 2002, there were 18,492 ED mentions of miscellaneous antipsychotic agents. This estimate was statistically unchanged from 2000 but 67 percent higher than in 1995 (Table 2.6.0). However, the trends for the individual antipsychotic agents in this category varied considerably; they include:

  - Haloperidol (911 mentions), down 67 percent since 1995,

  - Lithium (2,231), down 67 percent since 1995, down 40 percent since 2000, and down 35 percent since 2001,

  - Olanzapine (4,207), unchanged over the periods 1995, 2000 and 2001 to 2002,

  - Quetiapine (6,508), up 116 percent since 2000 and up 50 percent since 2001, and

  - Risperidone (3,566), up 248 percent since 1995.

- Other significant long-term trends in antipsychotics included thioridazine which declined 98 percent (from 2,566 to 48 mentions), fluphenzaine, which declined 95 percent (from 792 to 42), prochlorperazine, which declined 66 percent (from 555 to 191), and chlorpromazine, which declined 64 percent (from 2,202 to 795 mentions) from 1995 to 2002 (Table 2.6.0). Thioridazine also significantly decreased from 2000 to 2002, down 94 percent from 782.

Anxiolytics, Sedatives, and Hypnotics

- Anxiolytics, sedatives, and hypnotics (137,350, or 11% of total ED mentions) were the most frequent psychotherapeutic agents mentioned in drug-related ED visits in 2002 (Table 2.2.0). This category includes 3 subcategories, none of which posted significant changes from 2001 to 2002:

  - Barbiturates (1%, 9,783 mentions), with an increase of 38 percent from 2000 to 2002,

  - Benzodiazepines (9%, 105,752), with a 16 percent increase from 2000 to 2002, and

  - Miscellaneous anxiolytics, sedatives, and hypnotics (2%, 21,816), which were statistically unchanged since 2000.

Barbiturates

- From 2001 to 2002, ED mentions of the barbiturates, individually and as a class, were statistically unchanged (Table 2.2.0).

- From 1995 to 2002, barbiturate mentions rose 44 percent (from 6,793 to 9,783) (Table 2.2.0).

- In 2002, the most frequently mentioned barbiturates were unnamed (barbiturates-NOS, with 7,579 mentions) (Table 2.6.0). Mentions of barbiturates-NOS increased 56 percent from 2000 to 2002, and 110 percent from 1995 to 2002.
- Phenobarbital, the second most frequently mentioned barbiturate in 2002 with 1,217 mentions, decreased 58 percent from 1995 to 2002 (Table 2.6.0).

Benzodiazepines

- In 2002, mentions of benzodiazepines (105,752) accounted for 9 percent of all ED drug mentions. Overall, mentions of benzodiazepines increased 16 percent (from 91,078) from 2000 to 2002 (Table 2.2.0 and Figure 5). Since 1995, mentions of benzodiazepines have risen 38 percent (from 76,548).
- From 2001 to 2002, ED mentions of the benzodiazepines, individually and as a class, were statistically unchanged.
- In 2002, the most frequently mentioned benzodiazepines (Table 2.6.0 and Figure 6) were:
  - Alprazolam (27,659 mentions),
  - Clonazepam (17,042),
  - Diazepam (11,193),
  - Lorazepam (11,042),
  - Temazepam (2,219), and
  - Unnamed benzodiazepines (i.e., benzodiazepines-NOS, 34,697).
- From 1995 to 2002, among the most frequently mentioned benzodiazepines (Table 2.6.0 and Figure 6):
  - Mentions of benzodiazepines-NOS rose 199 percent, alprazolam rose 62 percent, and clonazepam 33 percent, while
  - Mentions of diazepam, lorazepam, and temazepam remained stable.
- From 2000 to 2002, all the benzodiazepines except alprazolam and benzodiazepines-NOS were statistically unchanged (Table 2.6.0).
  - Mentions of alprazolam rose 25 percent (from 22,105 to 27,659),
  - Mentions of benzodiazepines-NOS increased 55 percent (from 22,376 to 34,697).
- Mentions of 2 of the less frequently mentioned benzodiazepines decreased from 1995 to 2002 (Table 2.6.0):
  - Chlordiazepoxide (-74%, from 2,661 to 696), and
  - Triazolam (-77%, from 776 to 175).

Miscellaneous Anxiolytics, Sedatives, and Hypnotics

- In 2002, mentions of miscellaneous anxiolytics, sedatives, and hypnotics (21,816) accounted for 2 percent of all ED drug mentions. Overall, mentions in this category declined 15 percent (from 25,541) from 1995 to 2002 (Table 2.2.0). ED mentions for this subcategory were stable from 2000 to 2001, and again from 2001 to 2002.

- In 2002, the most frequently mentioned substances among the miscellaneous anxiolytics, sedatives, and hypnotics were (Table 2.6.0):

  - Buspirone (1,196 mentions),
  - Diphenhydramine (5,430),
  - Doxylamine (1,721),
  - Hydroxyzine (1,656),
  - Zolpidem (8,793), and
  - Anxiolytics, sedatives, and hypnotics-NOS (2,174).

- Among the miscellaneous anxiolytics, sedatives, and hypnotics listed above, buspirone mentions decreased 48 percent (from 2,299 to 1,196), and diphenhydramine mentions decreased 27 percent (from 7,440 to 5,430) from 2000 to 2002. ED mentions of zolpidem rose 29 percent (6,810 to 8,793) during the same period (Table 2.6.0).

- From 1995 to 2002, zolpidem mentions increased 118 percent (from 4,037). Also during this period, mentions of diphenhydramine dropped 55 percent (from 11,953), and mentions of hydroxyzine dropped 38 percent (from 2,680) (Table 2.6.0).

CNS Stimulants

- In 2002, the CNS stimulants subcategory had the fewest (3,275) mentions among the psychotherapeutic agents (Table 2.6.0). However, several important stimulants—the amphetamines, methamphetamine, and MDMA (Ecstasy)—are tabulated separately as major substances of abuse.

- Mentions of the remaining CNS stimulants decreased 43 percent (from 5,723 to 3,275) from 1995 to 2002, and were unchanged from 2000 and 2001 to 2002 (Table 2.6.0).

CNS AGENTS

- The CNS agents (227,342 mentions) in DAWN are divided into 8 subcategories (Table 2.2.0), with analgesics (pain relievers) accounting for more than 80 percent (190,879) of mentions of CNS agents in 2002. Because of their frequency, analgesics are further subdivided into:

  - Antimigraine agents (572 mentions in 2002),
  - Cox-2 inhibitors (1,637),

- Narcotic analgesics and narcotic analgesic combinations (119,185),
- Nonsteroidal anti-inflammatory agents (21,414),
- Salicylates and salicylate combinations (9,780),
- Miscellaneous analgesics and miscellaneous analgesic combinations (38,288), and
- Analgesic combinations NTA (3).

- Among the CNS agents other than analgesics, 5 subcategories had substantial numbers of mentions in 2002 (Table 2.2.0):
  - Anorexiants (1,408 mentions), down 43 percent from 1995 to 2002,
  - Anticonvulsants (16,681), up 60 percent from 1995 to 2002,
  - Antiemetic/antivertigo agents (1,090), up 107 percent from 2001 to 2002,
  - Antiparkinson agents (869), down 75 percent from 1995 to 2002, and
  - Muscle relaxants (16,328), statistically unchanged from 1995 to 2002.

Narcotic Analgesics and Narcotic Analgesic Combinations

Several of the narcotic analgesics come in single- and multiple-ingredient (compound) forms. To clearly understand the magnitude of narcotic analgesic abuse as it manifests in ED visits, it is important to consider both of these forms.

The narcotic analgesics containing oxycodone provide an example of this. Consider 2 common narcotic analgesics marketed under brand names OxyContin and Percocet. OxyContin contains a single active ingredient, oxycodone hydrochloride. Percocet is a compound containing oxycodone and acetaminophen. But ED medical records (the source of the data submitted to DAWN) vary in the detail with which these drugs are documented. That is, some records will contain brand names, OxyContin or Percocet, whereas others contain only generic names or ingredients, oxycodone, oxycodone hydrochloride, or acetaminophen-oxycodone. To further muddy the waters, a compound may be documented as a single ingredient, and frequently, narcotic analgesics are documented and reported to DAWN simply as “opiates.”

Since we cannot conclude that all mentions of “oxycodone” are OxyContin, nor that all mentions of Percocet are necessarily reported as “acetaminophen-oxycodone,” DAWN performs 2 levels of aggregation for most of the narcotic analgesics:

- First, all brand terms are translated into their generic equivalents. That is, all case reports of “OxyContin” and all case reports of “oxycodone” go into the generic “oxycodone.” All case reports of “Percocet” go into the generic “acetaminophen-oxycodone” with all other mentions of “acetaminophen-oxycodone.”

- Second, single- and multiple-ingredient generics are aggregated into categories. That is, mentions of "oxycodone" and "acetaminophen-oxycodone" are aggregated into a category that is called "oxycodone/combinations" (see Table 2.8.0).

The narrative in this publication focuses primarily on findings at this latter category level, which covers single- and multi-ingredient forms for each of the narcotic analgesics that occur in both forms.[14] In addition, it is important also to consider the category of unnamed narcotic analgesics—labeled "narcotic analgesics-NOS" (not otherwise specified)—because it is not possible to distinguish which specific opiates were involved in these cases.

Table 2.8.0 presents full-year estimates of CNS agents, including narcotic analgesics and narcotic analgesic combinations, for 1995 through 2002. Trends in narcotic analgesics and narcotic analgesic combinations are also represented graphically in Figure 7.

- When considered together, narcotic analgesics/combinations comprise 119,185 mentions or 10 percent of ED mentions estimated for the coterminous U.S. in 2002 (Table 2.8.0).

- From 2001 to 2002, ED mentions of narcotic analgesics/combinations rose 20 percent (from 99,317 to 119,185 mentions). From 2000 to 2002, the increase was 45 percent (from 82,373), and over the 8-year period from 1995 to 2002, mentions of narcotic analgesics/combinations rose 163 percent (from 45,254) (Table 2.8.0 and Figure 7).

- The most frequently mentioned narcotic analgesics/combinations in 2002 (Table 2.8.0) were those reported to DAWN without a specific ingredient identified[15] (i.e., narcotic analgesics-NOS) (42,211 mentions in 2002). These were followed in frequency by:

  - Narcotic analgesics containing hydrocodone (i.e., hydrocodone/combinations) (25,197 mentions in 2002),

  - Narcotic analgesics containing oxycodone (i.e., oxycodone/combinations) (22,397 mentions in 2002),

  - Methadone (11,709 mentions in 2002),

  - Narcotic analgesics containing codeine (i.e., codeine/combinations) (4,961 mentions in 2002),

  - Narcotic analgesics containing propoxyphene (i.e., propoxyphene/combinations) (4,676 mentions in 2002), and

  - Narcotic analgesics containing morphine (i.e., morphine/combinations) (2,775 mentions in 2002).

[14] The issue of single- versus multiple-ingredient compounds arises for a few other classes of pharmaceuticals (e.g., respiratory agents). However, since these occur with much lower frequency, similar categories were not constructed.

[15] This category includes drugs reported to DAWN as "narcotic analgesic," "opiates," "opioid," and "synthetic narcotic."

- From 2001 to 2002, significant increases in ED mentions of narcotic analgesics/ combinations were found (Table 2.8.0) for:
  - Codeine/combinations (33%, from 3,720 to 4,961, but not significantly different from 2000);
  - Hydrocodone/combinations (17%, from 21,567 to 25,197, and 25% from 2000); and
  - Narcotic analgesics-NOS (31%, from 32,196 to 42,211, and 63% from 2000).
- Mentions of methadone, morphine/combinations, oxycodone/combinations, and propoxyphene/combinations were statistically unchanged from 2001 to 2002 (Table 2.8.0). However, from 2000 to 2002, mentions of methadone rose 50 percent (from 7,819 to 11,709), and mentions of oxycodone/combinations rose 107 percent (from 10,825 to 22,397).
- From 1995 to 2002, significant long-term increases in narcotic analgesics/combinations mentions were found (Table 2.8.0) for:
  - Fentanyl/combinations (more than 6,000%), which is still mentioned relatively infrequently with 1,506 mentions in 2002,
  - Hydrocodone/combinations (160%),
  - Methadone (176%),
  - Morphine/combinations (116%),
  - Oxycodone/combinations (560%), and
  - Narcotic analgesics-NOS (341%).
- From 1995 to 2002, the only long-term decrease among the narcotic analgesics was for mentions of codeine/combinations, which declined 43 percent (from 8,732 to 4,961) (Table 2.8.0).

Non-narcotic Analgesics

- In 2002, the most frequently mentioned non-narcotic analgesics (Table 2.2.0) were:
  - Nonsteroidal anti-inflammatory agents (NSAIDs) (21,414 mentions),
  - Salicylates and salicylate combinations (9,780), and
  - Miscellaneous analgesics and miscellaneous analgesic combinations (38,288 mentions).

NSAIDs

- Mentions of the class of drugs known as NSAIDs have dropped 30 percent (from 30,401 to 21,414) from 1995 to 2002, but mentions of NSAIDs were stable from 2000 and 2001 to 2002 (Table 2.2.0).

- The most frequently mentioned NSAIDs in drug-related ED visits in 2002 (Table 2.8.0) were:
  - Ibuprofen (15,867 mentions), unchanged from 2000 to 2002 but down 27 percent (from 21,754) from 1995, and
  - Naproxen (4,576), with no long- or short-term changes evident.

Salicylates and salicylate combinations

- Mentions of salicylates/combinations dropped 29 percent (from 13,784 to 9,780) from 2000 to 2002 and 43 percent (from 17,153) from 1995 (Table 2.8.0).
- In 2002, salicylates were primarily aspirin and aspirin compounds, which accounted for 85 percent of the category (8,302 mentions) (Table 2.8.0). Mentions of aspirin/combinations decreased 46 percent (from 15,443) from 1995 and 35 percent (from 12,710) from 2000 to 2002.

Miscellaneous analgesics and miscellaneous analgesic combinations

- Mentions of miscellaneous analgesics/combinations (38,288 mentions in 2002) fell 9 percent from 2001 (42,044) and 14 percent from 2000 (from 44,667). Acetaminophen/combinations account for 94 percent of this category (36,086 mentions in 2002) (Table 2.8.0).
- Tramadol, which was first approved by the FDA for marketing in 1995, had 1,714 ED mentions in 2002, an increase of 166 percent (from 645) from 1995 to 2002. However, mentions of tramadol were statistically unchanged from 2000 to 2002 and from 2001 to 2002 (Table 2.8.0).

RESPIRATORY AGENTS

- Respiratory agents comprised 1 percent (13,259) of total ED drug mentions in 2002 (Table 2.2.0).
- The respiratory agents mentioned most frequently in ED episodes in 2002 (Table 2.2.0) are:
  - Antihistamines (3,314 mentions), which have been relatively stable since 1995,
  - Bronchodilators (753), down 64 percent since 1995,
  - Decongestants (663), down 67 percent since 1995,
  - Expectorants (688), which have been relatively stable since 1995, and
  - Upper respiratory combinations (7,266), the largest subcategory of respiratory agents, which have been relatively stable since 1995.

- In general, mentions of respiratory agents remained stable between 2001 and 2002. The long-term trend from 1995 to 2002 also has been stable. The few large changes (in percentage terms) tended to be associated with relatively small numbers of mentions, e.g., for loratadine (764 mentions in 2002), acetaminophen-chlorpheniramine (1,572), and albuterol (628) (Table 2.10.0)

CARDIOVASCULAR AGENTS

- Cardiovascular agents comprised 1 percent (12,566) of total ED drug mentions in 2002 (Table 2.2.0).
- Cardiovascular agents are divided into 5 subcategories (Table 2.2.0):
  - Antiadrenergic agents, centrally acting (2,034 mentions in 2002),
  - Beta-adrenergic blocking agents (2,949),
  - Calcium channel blocking agents (1,666),
  - Diuretics (839), and
  - Cardiovascular agents NTA (5,078), up 43 percent from 2001 to 2002.
- Mentions of cardiovascular agents increased significantly from 2001 to 2002 (26%, from 9,984 to 12,566) and from 2000 to 2002 (34%, from 9,348) (Table 2.2.0).
- From 1995 to 2002, mentions of calcium channel blocking agents decreased 46 percent (from 3,095 to 1,666) (Table 2.2.0).
- Of all the cardiovascular agents, there are few specific substances with large enough numbers to warrant discussion (Table 2.12.0). The largest are:
  - A centrally acting antiadrenergic agent, clonidine (1,882 mentions in 2002),
  - Beta blockers, atenolol (1,385), propranolol (667), metoprolol (649),
  - Ephedrine (1,033), and
  - Lisinopril (776).
- ED mentions of beta blocking agents overall rose 51 percent (from 1,956 to 2,949 mentions) from 2000 to 2002.
- From 1995 to 2002, increases were found for mentions of atenolol (252%, from 394 mentions) and lisinopril (189%, from 269). ED mentions of propanolol decreased 59 percent (from 1,639) during the same period (Table 2.12.0).

OTHER SUBSTANCES

- The remaining other substances showed a 21 percent increase from 2001 to 2002 (from 42,611 to 51,333). The majority of mentions (60% or 30,544) in this category come from drug unknown, with the remainder distributed across (Table 2.2.0):
  - Alternative medicines (894 mentions in 2002),
  - Anti-infectives (3,780),
  - Gastrointestinal agents (3,403),
  - Hormones (4,007),
  - Nutritional products (1,647), and
  - Topical agents (3,673).
- Of these, only mentions of topical agents increased significantly from 1995 to 2002 (361%, from 797 to 3,673 mentions) and from 2000 to 2002 (497%, from 615 to 3,673). Significant long-term declines were evident for anti-infectives (-72%, from 13,575 to 3,780), gastrointestinal agents (-37%, from 5,418 to 3,403), and nutritional products (-46%, from 3,032 to 1,647). Mentions of anti-infectives declined 31 percent from 2000 (from 5,441) and 28 percent from 2001 (from 5,282). Long-term trends for the remaining "other substances" were stable (Table 2.2.0).

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Figure 5
ED mentions of benzodiazepines: 1995 through 2002

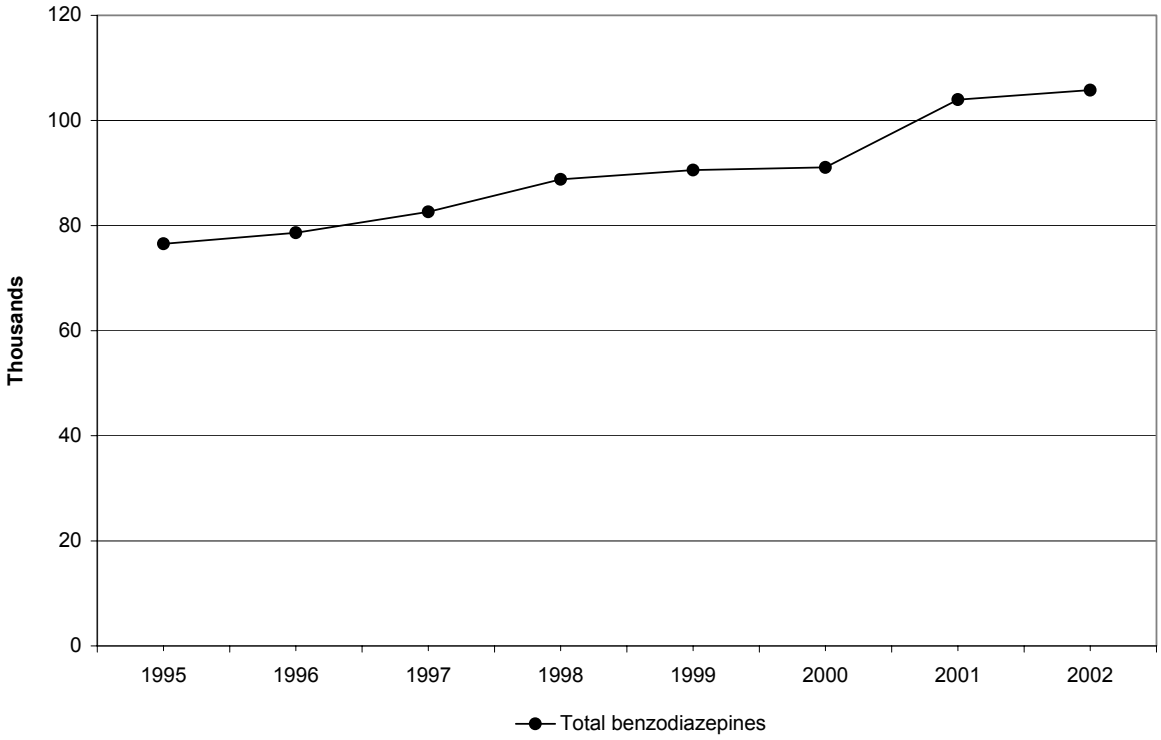

Figure 6
ED mentions of selected benzodiazepines: 1995 through 2002

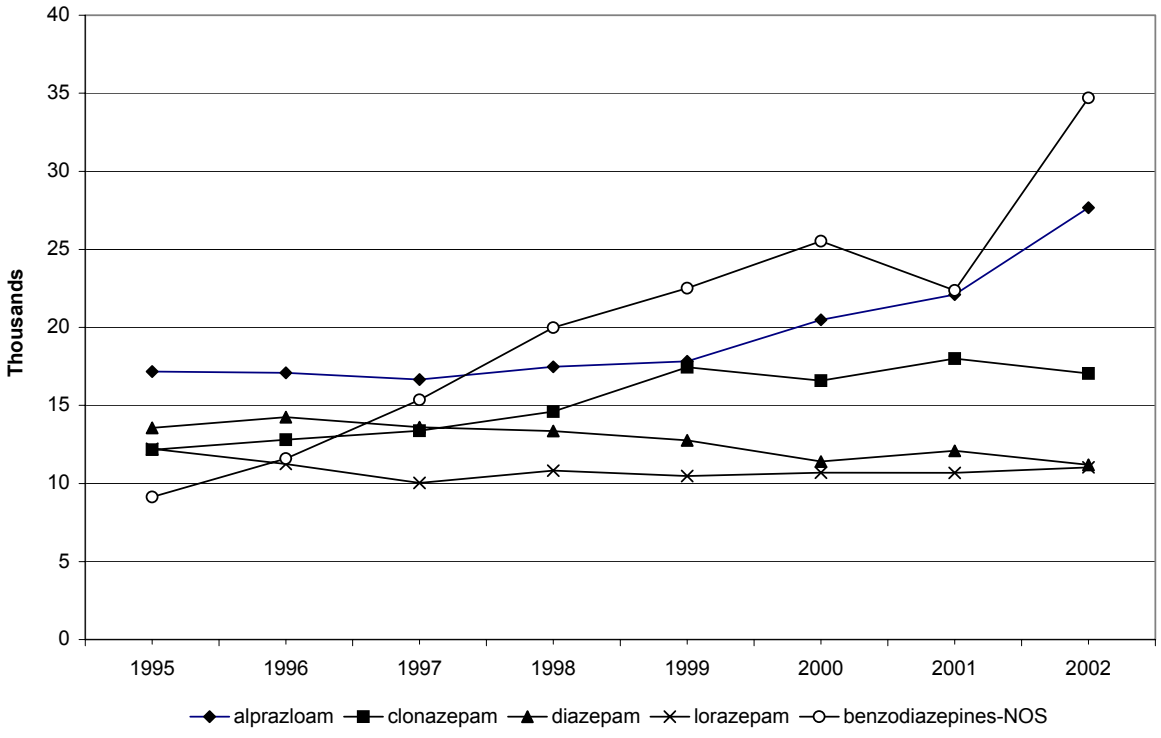

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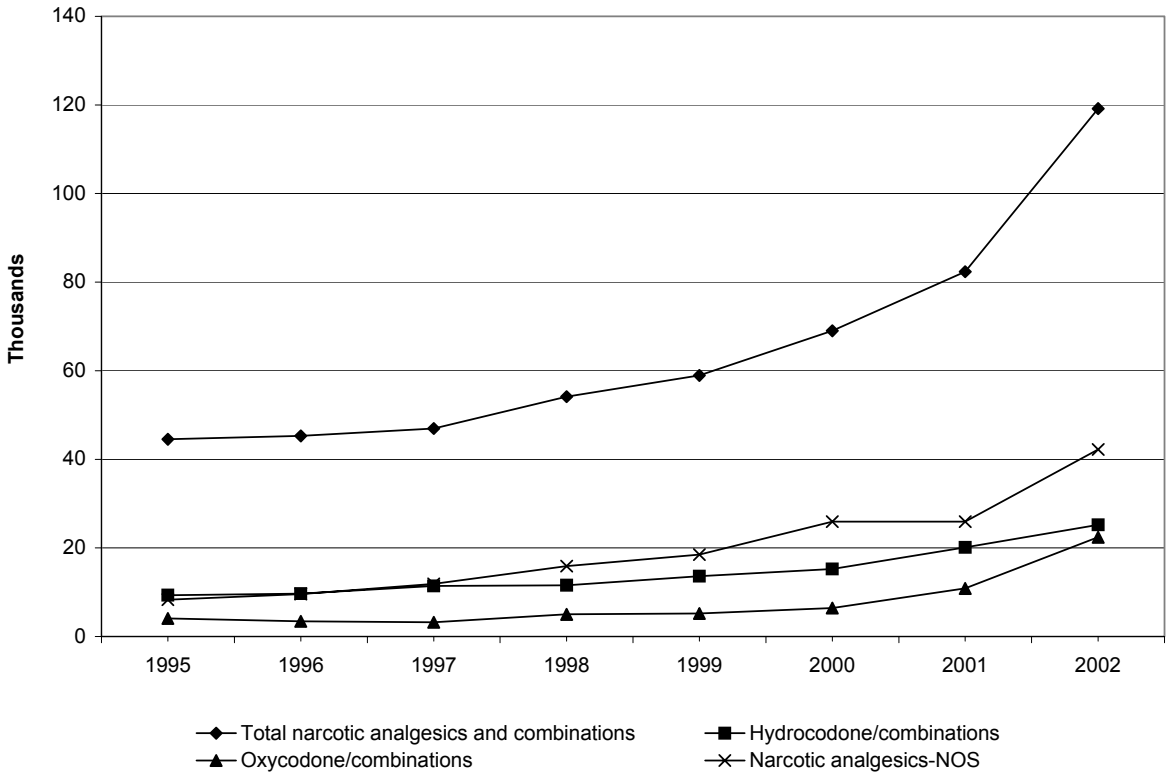
Figure 7
ED mentions of selected narcotic analgesics: 1995 through 2002



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TRENDS IN MAJOR SUBSTANCES OF ABUSE IN 21 METROPOLITAN AREAS

This section presents findings for the major substances of abuse for the 21 DAWN metropolitan areas. As noted previously, "major substances of abuse" include the most common illicit drugs reported to DAWN, alcohol reported in combination with any other substance reported to DAWN, and less frequently mentioned drugs of particular policy interest (e.g., club drugs such as MDMA (Ecstasy) and GHB).

This section of *ED Trends* focuses on Tables 3.1 to 3.34 (ED episodes and mentions) and 13.1 to 13.34 (rates of ED episodes and mentions per 100,000 population). Each of these tables summarizes estimates across the 21 metropolitan areas for: total episodes, total mentions, and mentions of the 15 major substances of abuse.

The same estimates displayed in Tables 3.1 to 3.34 and 13.1 to 13.34 are presented separately for each metropolitan area in Tables 2.2.1 to 2.2.21 (episodes and mentions) and 12.2.1 to 12.2.21 (rates).[16] As noted in the introduction, 3-part table numbers ending in "**.1**" to "**.21**" contain estimates for the 21 metropolitan areas. Some readers will be interested in findings only for a particular area. For these readers, we also provide 21 complete sets of tables, one for each metropolitan area, online at http://DAWNinfo.samhsa.gov/.

Readers should note that very small changes in the estimates for some metropolitan areas may result in statistically significant differences. This occurs when all or nearly all eligible hospitals are included in the sample for those cities. Those interested in making comparisons across metropolitan areas should rely on the rates per 100,000 population because these account for differences in population across the metropolitan areas.

TOTAL DRUG-RELATED EPISODES

- Nationwide, total ED drug episodes and drug mentions remained unchanged from 2001 to 2002 (Tables 3.2 and 3.4).
- From 2001 to 2002, significant increases in drug episodes were found in 3 DAWN metropolitan areas (Table 3.2):
  - New Orleans (22%, from 3,729 to 4,566 episodes),
  - Buffalo (15%, from 3,356 to 3,844), and
  - Baltimore (11%, from 11,625 to 12,904).
- From 2001 to 2002, significant decreases in drug episodes were found in 2 metropolitan areas (Table 3.2):

[16] In addition, demographic characteristics of patients are presented in Tables 4.2.1 to 4.2.21 (episodes and mentions) and 14.2.1 to 14.2.21 (rates). Estimates of episode characteristics are presented in Tables 5.2.1 to 5.2.21 (there are no rates calculated for episode characteristics). Because of the detail involved, this publication focuses little on these estimates by metropolitan area.

- Dallas (-14%, from 6,498 to 5,572 episodes) and
- San Diego (-5%, from 6,962 to 6,597).

- Adjusting for population differences, the highest rates of ED drug episodes in 2002 were apparent in (Table 13.2):
  - Philadelphia (612 ED drug episodes per 100,000 population),
  - Baltimore (555),
  - Chicago (551), and
  - San Francisco (547).
- Among the 21 metropolitan areas in DAWN, Dallas had the lowest rate of ED drug episodes (175 per 100,000 population) in 2002 (Table 13.2).

ALCOHOL-IN-COMBINATION

- Nationwide, there were 207,395 ED mentions of alcohol-in-combination in 2002 (Table 3.6). Mentions of alcohol-in-combination were stable for the coterminous U.S. from 2001 to 2002.
- From 2001 to 2002, significant increases in mentions of alcohol-in-combination were found in 4 DAWN metropolitan areas (Table 3.6):
  - Seattle (62%, from 3,145 to 5,094 mentions),
  - Buffalo (37%, from 1,548 to 2,120),
  - New Orleans (21%, from 1,181 to 1,430), and
  - Baltimore (10%, from 2,911 to 3,189).
- From 2001 to 2002, significant decreases in mentions of alcohol-in-combination were found in 4 DAWN metropolitan areas (Table 3.6):
  - Dallas (-17%, from 1,786 to 1,482 mentions),
  - Denver (-16%, from 1,875 to 1,575),
  - Phoenix (-15%, from 2,627 to 2,239), and
  - San Francisco (-11%, from 2,155 to 1,926).
- Nationwide, there were 81 mentions of alcohol-in-combination per 100,000 population in 2002 (Table 13.6). Adjusting for population differences, the highest rates of ED mentions of alcohol-in-combination in 2002 were apparent in:
  - Buffalo (251 alcohol-in-combination mentions per 100,000 population),

- Seattle (235),
- Philadelphia (219),
- Detroit (216),
- Miami (184), and
- Atlanta (180).

- Among the 21 metropolitan areas in DAWN, the lowest rates of ED mentions of alcohol-in-combination in 2002 (Table 13.6) were found in:
  - Dallas (47 alcohol-in-combination mentions per 100,000 population),
  - San Diego (67), and
  - Phoenix (76).

COCAINE

- Nationwide, there were 199,198 ED mentions of cocaine in 2002 (Table 3.8). Cocaine mentions remained stable in the coterminous U.S. from 2001 to 2002.
- From 2001 to 2002, significant increases in cocaine mentions were found in 2 DAWN metropolitan areas (Table 3.8):
  - Baltimore (21%, from 4,930 to 5,969 mentions), and
  - Buffalo (18%, from 1,220 to 1,441).
- From 2001 to 2002, a significant decrease in cocaine mentions was found only in Dallas (-17%, from 1,770 to 1,467 mentions) (Table 3.8).
- Nationwide, there were 78 mentions of cocaine per 100,000 population in 2002 (Table 13.8). Adjusting for population differences, the highest rates of cocaine ED mentions in 2002 were apparent in:
  - Chicago (275 cocaine mentions per 100,000 population),
  - Philadelphia (274),
  - Baltimore (257),
  - Miami (240), and
  - Atlanta (239).
- Among the 21 metropolitan areas in DAWN, the lowest rates of ED cocaine mentions in 2002 (Table 13.8) were found in:
  - San Diego (32 cocaine mentions per 100,000 population),

- Dallas (46),
- Minneapolis (55), and
- Phoenix (59).

HEROIN

- Nationwide, there were 93,519 ED mentions of heroin in 2002 (Table 3.10). ED mentions of heroin remained stable in the coterminous U.S. from 2001 to 2002.
- From 2001 to 2002, significant increases in heroin mentions were found in 4 DAWN metropolitan areas (Table 3.10):
  - Seattle (44%, from 1,927 to 2,779 mentions),
  - Buffalo (29%, from 607 to 785),
  - Denver (11%, from 769 to 855), and
  - Baltimore (5%, from 4,481 to 4,715).
- From 2001 to 2002, significant decreases in heroin mentions were found in 3 metropolitan areas (Table 3.10):
  - Dallas (-31%, from 443 to 304 mentions),
  - Phoenix (-14%, from 777 to 672), and
  - San Diego (-3%, from 733 to 708).
- Nationwide, there were 36 heroin mentions per 100,000 population in 2002 (Table 13.10). Adjusting for population differences, the highest rates of heroin ED mentions in 2002 were apparent in:
  - Chicago (220 heroin mentions per 100,000 population),
  - Newark (214), and
  - Baltimore (203).
- Among the 21 metropolitan areas in DAWN, the lowest rates of ED heroin mentions in 2002 (Table 13.10) were found in:
  - Dallas (10 heroin mentions per 100,000 population) and
  - Minneapolis (16).

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MARIJUANA

- Nationwide, there were 119,472 ED mentions of marijuana in 2002 (Table 3.12). Mentions of marijuana remained stable from 2001 to 2002.
- From 2001 to 2002, significant increases in marijuana mentions were found in 3 DAWN metropolitan areas (Table 3.12):
  - Newark (46%, from 647 to 944 mentions),
  - Miami (21%, from 1,932 to 2,337), and
  - Baltimore (14%, from 1,786 to 2,044).
- From 2001 to 2002, significant decreases in marijuana mentions were found in 4 metropolitan areas (Table 3.12):
  - Dallas (-19%, from 1,049 to 851 mentions),
  - San Francisco (-14%, from 704 to 607),
  - Chicago (-12%, from 5,186 to 4,588), and
  - Seattle (-12%, from 1,596 to 1,403).
- Nationwide, there were 47 marijuana mentions per 100,000 population in 2002 (Table 13.12). Adjusting for population differences, the highest rates of marijuana ED mentions in 2002 were apparent in:
  - Philadelphia (150 marijuana mentions per 100,000 population),
  - Detroit (146), and
  - St. Louis (124).
- Among the 21 metropolitan areas in DAWN, the lowest rates of ED marijuana mentions in 2002 (Table 13.12) were found in:
  - Dallas (27 marijuana mentions per 100,000 population),
  - Denver (38), and
  - San Francisco (39).

AMPHETAMINES AND METHAMPHETAMINE

Some consumers of DAWN findings have suggested that ED mentions of methamphetamine may be erroneously attributed to amphetamine in DAWN case reports, which are based on documentation in ED medical records. This hypothesis has not been confirmed or ruled out, but it is a possibility, given that a toxicology finding of amphetamine can result in a patient who used methamphetamine. Therefore, since ED mentions of these stimulants can be

combined quite simply and both rarely appear on the same ED case report, the following discussion considers ED mentions of amphetamines and methamphetamine in combined totals.

- Nationwide, there were 21,644 mentions of amphetamines (Tables 3.14) and 17,696 mentions of methamphetamine (Table 3.16) for a combined total of 39,340 mentions in 2002. From 2001 to 2002, mentions of amphetamines increased significantly (17%, from 18,555 to 21,644), while mentions of methamphetamine remained stable. When considered together, ED mentions of amphetamines/methamphetamine were statistically unchanged from 2001 to 2002 and from 2000 to 2002.

- Looking across the 21 DAWN metropolitan areas for 2002, the highest rates of ED mentions of amphetamines and methamphetamine (combined) were found in 6 cities in the western United States, followed by St. Louis, Atlanta, and Minneapolis:

ED mentions of amphetamines and methamphetamine, 2002. Metropolitan areas are ranked by rate per 100,000 population.

Metropolitan area	Combined mentions	Rates per 100,000 population
San Francisco	1,427 /+	91
San Diego	1,741 +/+	68
Phoenix	1,937 +/+	66
Seattle	996 /-	46
Los Angeles	3,380 /+	39
Denver	579	29
St. Louis	555	24
Atlanta	861 /+	23
Minneapolis	523	20

+/+ indicates direction (+ or -) of statistically significant difference for 2001 vs. 2002 / 2000 vs. 2002.

- Among the 9 metropolitan areas with the highest rates of combined amphetamines/methamphetamine ED mentions:

  - Only Phoenix and San Diego had significant increases from 2001 to 2002. In Phoenix, amphetamines/methamphetamine mentions rose 30 percent (from 1,492 to 1,936 mentions). In San Diego, amphetamines/methamphetamine mentions rose 8 percent (from 1,615 to 1,741 mentions) during the same period.

  - Three metropolitan areas had significant increases from 2000 to 2002: Atlanta (105%, from 537 to 861 mentions), San Francisco (48%, from 1,397 to 1,428 mentions), and Los Angeles (38%, from 2,778 to 3,380 mentions).

- Only Seattle had a significant decrease (-16%, from 1,180 to 996) in mentions of amphetamines/methamphetamine from 2000 to 2002.

- The long-term trend in amphetamines/methamphetamine was upward from 1995 to 2002 for the following metropolitan areas: Minneapolis (309%), Atlanta (274%), St. Louis (270%), Seattle (103%), Los Angeles (81%), Phoenix (57%), and San Diego (57%). ED mentions of amphetamines/methamphetamine for 1995 and 2002 were statistically equivalent in Denver and San Francisco.

CLUB DRUGS

- National rates for the club drugs MDMA (Ecstasy), Ketamine, and GHB were low in 2002, with no more than 2 mentions per 100,000 population (Tables 13.18, 13.20, and 13.30). Estimates of flunitrazepam (Rohypnol) were too imprecise for publication (Tables 3.28 and 13.28).
- For the coterminous U.S., trends in ED mentions of the club drugs MDMA (Ecstasy), Ketamine, and GHB appear to have leveled off or even diminished slightly (Tables 3.18, 3.20, and 3.30). From 2001 to 2002, none of these drugs had increases in ED mentions. ED mentions of GHB appeared to peak in 2000, with a 33 percent decrease (from 4,969 to 3,330 mentions) from 2000 to 2002 (Table 3.30).
- Significant long-term increases in club drug mentions were still apparent for MDMA (Ecstasy) (856%, from 421 to 4,026) and GHB (2,197%, from 145 to 3,330) from 1995 to 2002 (Tables 3.18 and 3.30). Estimates for Ketamine in 1995 were too imprecise for publication (Table 3.20).

MDMA (Ecstasy)

- Among the 11 metropolitan areas with at least 100 mentions of MDMA (Ecstasy) in 2001 or 2002, there were no significant increases from 2001 to 2002, but significant decreases were evident in 4 areas (Table 13.18):
  - Atlanta (-33%, from 175 to 118 mentions),
  - Miami (-27%, from 184 to 135),
  - Seattle (-25%, from 115 to 86), and
  - San Francisco (-15%, from 152 to 129).
- Adjusting for population differences, the highest rates of MDMA (Ecstasy) mentions in 2002 were apparent in (Table 13.18):
  - San Francisco (8 mentions per 100,000 population),
  - New Orleans (7),
  - Miami (6),
  - Philadelphia (4), and
  - Seattle (4).

GHB

- Among the 4 metropolitan areas with at least 100 mentions of GHB in 2001 or 2002, there were no significant increases from 2000 to 2002 or from 2001 to 2002. San Francisco showed a significant decrease in GHB mentions from 2001 to 2002 (-16%, from 158 to 133) (Table 3.30).
- Adjusting for population differences, the highest rates of GHB mentions in 2002 were apparent in (Table 13.30):
  - San Francisco (8 mentions per 100,000 population),
  - New Orleans (3), and
  - Dallas (3).

OTHER TRENDS

- Nationwide, ED mentions of inhalants increased 187 percent (from 522 to 1,496) from 2001 to 2002 (Table 3.32). However, estimates for inhalants have tended to fluctuate substantially from year to year, and no significant change is seen when the comparison is made between 1995 or 2000 and 2001.
- Mentions of LSD decreased 68 percent from 2001 to 2002 (from 2,821 to 891), while mentions of PCP increased 25 percent (from 6,102 to 7,648) (Tables 3.22 and 3.24). Of these drugs, only PCP had 100 or more mentions in any metropolitan area in 2002. Mentions of miscellaneous hallucinogens remained stable from 2001 to 2002. Mentions of combinations NTA for 2002 were too imprecise for publication (Tables 3.26 and 3.34).

LSD

- Nationwide, there was a 69 percent decrease in mentions of LSD per 100,000 population from 2001 to 2002; the decline relative to 2000 was 78 percent (Table 13.22). Adjusting for population differences, the highest rates of LSD ED mentions in 2002 (in Miami and Seattle) did not exceed 2 per 100,000 population.

PCP

- Nationwide, there were 7,648 ED mentions of PCP in 2002, a 25 percent increase in 1 year (from 6,102 in 2001) and a 42 percent increase in 2 years (from 5,404 in 2000). From 1995 to 2002, ED mentions of PCP increased 28 percent (from 5,963) (Table 3.24).

- Among the 10 metropolitan areas with at least 100 mentions of PCP in 2001 or 2002, only Chicago had a significant decline (-48%, from 874 to 459 mentions) and significant increases were evident in 5 (Table 3.24):
  - Newark (254%, from 35 to 124 mentions),
  - Washington, DC (148%, from 525 to 1,302),
  - Baltimore (60%, from 75 to 120),
  - Dallas (47%, from 96 to 141), and
  - Philadelphia (46%, from 785 to 1,144).
- Nationwide, there were 3 mentions of PCP per 100,000 population in 2002 (Table 13.24), but much higher rates were apparent in 4 of the metropolitan areas represented in DAWN:
  - Washington, DC (31 PCP mentions per 100,000 population),
  - Philadelphia (25), and
  - Los Angeles (11).

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TRENDS IN OTHER SUBSTANCES OF ABUSE IN 21 METROPOLITAN AREAS

This section presents findings for the 21 DAWN metropolitan areas for an extensive collection of substances, most of which are marketed legally by prescription or over the counter. However, only ED visits involving the nonmedical use of prescription and OTC medications are reportable to DAWN. Since it is impossible to know patients' actual intentions when abusing a substance, these substances are classified based on their therapeutic uses. In this section, we focus only on the largest categories of drugs, leaving exploration of small subcategories and individual substances to readers interested in particular metropolitan areas.

This section of *ED Trends* focuses primarily on Tables 2.2.1 to 2.2.21 (episodes and mentions) and 12.2.1 to 12.2.21 (rates) to present findings for each metropolitan area for the selected drug categories.[17] As noted in the introduction, 3-part table numbers ending in "**.1**" to "**.21**" present estimates for each of the metropolitan areas. Because of the detail involved, metropolitan area summaries are not provided in this publication for each individual drug. For readers interested in findings for a particular metropolitan area, 21 complete sets of tables, one for each metropolitan area, are available online at http://DAWNinfo.samhsa.gov/.

Readers should note that very small changes in the estimates for particular metropolitan areas may produce statistically significant differences. This occurs when all or nearly all eligible hospitals are included in the sample for those cities. Those interested in making comparisons across metropolitan areas should rely on the rates per 100,000 population because these account for differences in population sizes across the metropolitan areas.

Small numbers can also yield huge changes in percentage terms. For ease of reference, the following discussion cites the number of mentions involved for each of the statistically significant changes noted in percentage terms.

PSYCHOTHERAPEUTIC AGENTS

- Nationwide, mentions involving psychotherapeutic agents remained stable from 2001 to 2002 (Table 2.2.0). Nationally, there were 87 mentions of psychotherapeutic agents per 100,000 population in 2002 (Table 12.2.0).
- From 2001 to 2002, a significant increase in mentions of psychotherapeutic agents was found only in Buffalo (43%, from 423 to 605) (Tables 2.2.1 through 2.2.21).
- From 2001 to 2002, significant decreases in ED mentions of psychotherapeutic agents were found in 4 metropolitan areas (Tables 2.2.1 through 2.2.21):
  - Denver (-21%, from 1,492 to 1,172 mentions),

[17] In addition, demographic characteristics of patients are presented in Tables 4.2.1 to 4.2.21 (episodes and mentions) and 14.2.1 to 14.2.21 (rates). Estimates of episode characteristics are presented in Tables 5.2.1 to 5.2.21 (there are no rates calculated for episode characteristics). Because of the detail involved, these estimates are not discussed.

- Dallas (-19%, from 2,866 to 2,324),
- San Diego (-13%, from 2,599 to 2,258), and
- Seattle (-12%, from 2,883 to 2,534).

- Adjusting for population differences, the highest rates of ED mentions of psychotherapeutic agents in 2002 were apparent in (Tables 12.2.1 through 12.2.21):
  - Philadelphia (170 mentions of psychotherapeutic agents per 100,000 population),
  - Boston (165),
  - Detroit (147),
  - St. Louis (143),
  - Phoenix (133),
  - New Orleans (124), and
  - Seattle (117).

Antidepressants

- From 2001 to 2002, mentions of antidepressants were stable for the coterminous U.S. (Table 2.2.0). Mentions of antidepressants increased in 2 metropolitan areas during this time period (Tables 2.2.1 through 2.2.21):
  - Buffalo (139%, from 44 to 105 mentions) and
  - Phoenix (8%, from 1,193 to 1,290).
- From 2001 to 2002, mentions of antidepressants decreased in 5 metropolitan areas (Tables 2.2.1 through 2.2.21):
  - Washington, DC (-28%, from 733 to 528 mentions),
  - Denver (-21%, from 425 to 332),
  - San Diego (-17%, from 695 to 577),
  - Baltimore (-16%, from 350 to 293), and
  - Chicago (-10%, from 879 to 793).

Antipsychotics

- In the coterminous U.S., mentions of antipsychotics (20,221) remained stable from 2001 to 2002 (Table 2.2.0). Mentions of antipsychotics increased in:
  - Detroit (41%, from 343 to 483) and
  - Seattle (24% from 195 to 241).

- From 2001 to 2002, mentions of antipsychotics decreased in 3 metropolitan areas (Tables 2.2.1 through 2.2.21):
  - Newark (-33%, from 119 to 80 mentions),
  - San Diego (-18%, from 212 to 173), and
  - Denver (-17%, from 132 to 109).

Anxiolytics, Sedatives, and Hypnotics

- Overall, anxiolytics, sedatives, and hypnotics, the most frequent category of psychotherapeutic agents mentioned in drug-related ED episodes, remained statistically stable (from 135,949 to 137,350 mentions) from 2001 to 2002 in the coterminous U.S. (Table 2.2.0).
- Anxiolytics, sedatives, and hypnotics increased from 2001 to 2002 in 3 of the 21 DAWN metropolitan areas (Tables 2.2.1 through 2.2.21):
  - Buffalo (26%, from 367 to 462 mentions),
  - Newark (16%, from 1,066 to 1,240), and
  - Baltimore (4%, from 1,765 to 1,840).
- From 2001 to 2002, anxiolytics, sedatives, and hypnotics decreased in 5 of the 21 DAWN metropolitan areas (Tables 2.2.1 through 2.2.21):
  - Dallas (-26%, from 1,780 to 1,319 mentions),
  - Seattle (-22%, from 1,845 to 1,439),
  - Denver (-22%, from 917 to 716),
  - San Francisco (-21%, from 1,096 to 862), and
  - San Diego (-11%, from 1,678 to 1,490).
- Nationally, there were 54 ED mentions of anxiolytics, sedatives, and hypnotics per 100,000 population in 2002 (Table 12.2.0). The highest rates among the 21 DAWN metropolitan areas were found in (Tables 12.2.1 through 12.2.21):
  - Boston (128 mentions per 100,000 population),
  - Philadelphia (114),
  - New Orleans (104),
  - Detroit (95),
  - St. Louis (94),

- Baltimore (79),
- Newark (71), and
- Phoenix (70).

Benzodiazepines

- Benzodiazepines, which accounted for 9 percent (105,752) of total ED drug mentions in the coterminous U.S., remained statistically stable from 2001 to 2002 (Table 2.2.0).
- Mentions of benzodiazepines increased from 2001 to 2002 in 2 of the 21 DAWN metropolitan areas (Tables 2.2.1 through 2.2.21):
  - Newark (17%, from 849 to 991 mentions) and
  - Baltimore (3%, from 1,354 to 1,400).
- Mentions of benzodiazepines decreased significantly in 5 of the DAWN metropolitan areas from 2001 to 2002 (Tables 2.2.1 through 2.2.21):
  - Dallas (-29%, from 1,346 to 963 mentions),
  - Denver (-22%, from 644 to 504),
  - Seattle (-20%, from 1,354 to 1080),
  - San Francisco (-20%, from 825 to 657), and
  - San Diego (-12%, 1,312 to 1,151).
- Nationally, there were 41 ED mentions of benzodiazepines per 100,000 population in 2002 (Table 12.2.0). The highest rates among the 21 DAWN metropolitan areas were found in (Tables 12.2.1 through 12.2.21):
  - Boston (102 mentions per 100,000 population),
  - Philadelphia (95),
  - New Orleans (82),
  - St. Louis (78),
  - Detroit (69),
  - Baltimore (60), and
  - Newark (57).

Miscellaneous Anxiolytics, Sedatives, and Hypnotics

- Substances classified as miscellaneous anxiolytics, sedatives, and hypnotics (137,350) were stable from 2001 to 2002 in the coterminous U.S. (Table 2.2.0).
- From 2001 to 2002, mentions of miscellaneous anxiolytics, sedatives, and hypnotics increased in 2 of the metropolitan areas oversampled in DAWN (Tables 2.2.1 through 2.2.21):
  - Buffalo (63%, from 92 to 150 mentions) and
  - Baltimore (6%, from 105 to 111).
- From 2001 to 2002, mentions of miscellaneous anxiolytics, sedatives, and hypnotics decreased in 7 DAWN metropolitan areas (Tables 2.2.1 through 2.2.21):
  - San Diego (-25%, from 219 to 164 mentions),
  - Miami (-24%, 157 to 120),
  - Seattle (-23%, from 300 to 232),
  - Minneapolis (-22%, from 450 to 350),
  - Denver (-22%, from 201 to 156),
  - Phoenix (-20%, from 432 to 344), and
  - Dallas (-14%, from 323 to 279).

CNS AGENTS

- Nationwide, mentions involving CNS agents increased 8 percent (from 210,685 to 227,342) from 2001 to 2002 (Table 2.2.0).
- From 2001 to 2002, significant increases in mentions of CNS agents were found in 4 DAWN metropolitan areas (Tables 2.2.1 through 2.2.21):
  - New Orleans (40%, from 1,310 to 1,837 mentions),
  - Baltimore (36%, from 3,206 to 4,372),
  - Newark (28%, from 1,228 to 1,572), and
  - St. Louis (22%, from 2,286 to 2,798).
- From 2001 to 2002, there were significant decreases in mentions of CNS agents in 5 of the 21 metropolitan areas (Tables 2.2.1 through 2.2.21):
  - Seattle (-18%, from 3,991 to 3,289 mentions),
  - Atlanta (-18%, from 2,632 to 2,169),

- Denver (-18%, from 1,899 to 1,566),
- San Diego (-14%, from 2,545 to 2,183), and
- Dallas (-13%, from 2,514 to 2,186).

- Nationally, there were 89 ED mentions of CNS agents per 100,000 population in 2002 (Table 12.2.0). Adjusting for population differences, the highest rates of CNS agents in 2002 were apparent in (Tables 12.2.1 through 12.2.21):
  - Baltimore (188 mentions of CNS agents per 100,000 population),
  - New Orleans (159),
  - Seattle (152),
  - Buffalo (147),
  - Detroit (147),
  - Boston (137),
  - Phoenix (136),
  - Philadelphia (133), and
  - St. Louis (121).

Narcotic Analgesics and Narcotic Analgesic Combinations

- Overall, narcotic analgesics/combinations comprised 119,185 mentions or 10 percent of total ED mentions for the coterminous U.S. in 2002 (Table 2.2.0).
- Nationwide, narcotic analgesics/combinations mentions rose 20 percent (from 99,317 to 119,185) from 2001 to 2002 (Table 2.2.0). From 2001 to 2002, significant increases in mentions of narcotic analgesics/combinations were found in 4 of the 21 DAWN metropolitan areas (Tables 2.2.1 through 2.2.21):
  - Newark (51%, from 739 to 1,115 mentions),
  - Baltimore (47%, from 2,624 to 3,848),
  - St. Louis (41%, from 1,108 to 1,560), and
  - Philadelphia (22%, from 3,027 to 3,687).
- From 2001 to 2002, there were significant decreases in mentions of narcotic analgesics/combinations in 2 of the 21 metropolitan areas (Tables 2.2.1 through 2.2.21):
  - Seattle (-20%, from 2,560 to 2,045) and
  - San Diego (-10%, from 1,304 to 1,169).

- Nationally, there were 46 ED mentions of narcotic analgesics/combinations per 100,000 population in 2002 (Table 12.2.0), up 19 percent from 39 in 2001. Adjusting for population differences, the highest rates of narcotic analgesics/combinations in 2002 were found in (Tables 12.2.1 through 12.2.21):
  - Baltimore (165 mentions per 100,000 population),
  - Buffalo (106),
  - New Orleans (98),
  - Boston (97),
  - Detroit (97),
  - Seattle (95),
  - Philadelphia (81),
  - St. Louis (68),
  - Newark (64),
  - Phoenix (62), and
  - Chicago (61).

Most Frequently Mentioned Narcotic Analgesics

- In 2002, the 3 most frequently mentioned narcotic analgesics/combinations in drug abuse-related ED visits in the coterminous U.S. were (Table 2.8.0):
  - Narcotic analgesics not identified by specific ingredient, that is, narcotic analgesics-NOS (42,221 mentions, up 63 percent from 2000 and up 31 percent from 2001),
  - Narcotic analgesics identified as hydrocodone or hydrocodone combinations (25,197 mentions, up 25 percent from 2000 and up 17 percent from 2001), and
  - Narcotic analgesics identified as oxycodone or oxycodone combinations (22,397 mentions, up 107 percent from 2000 but statistically unchanged from 2001).
- From 2001 to 2002, ED mentions of hydrocodone/combinations increased in 2 of the 21 metropolitan areas in DAWN (Tables 2.8.1 through 2.8.21):
  - Buffalo (115%, from 75 to 161 mentions) and
  - Seattle (26%, from 191 to 240).
- From 2001 to 2002, ED mentions of oxycodone/combinations increased in 5 of the 21 metropolitan areas in DAWN (Tables 2.8.1 through 2.8.21):
  - Detroit (249%, from 45 to 157 mentions),

- San Francisco (57%, from 54 to 85),
- Baltimore (47%, from 203 to 299),
- Seattle (44%, from 254 to 366), and
- St. Louis (43%, from 153 to 218).

- From 2001 to 2002, ED mentions of narcotic analgesics-NOS increased in 3 of the 21 metropolitan areas (Tables 2.8.1 through 2.8.21):
  - St. Louis (98%, from 340 to 674),
  - Baltimore (51%, from 2,162 to 3,267), and
  - San Diego (9%, from 627 to 682).
- Nationally for 2002, DAWN estimated the rates of ED mentions of hydrocodone/combinations, oxycodone/combinations, and narcotic analgesics-NOS to be 10, 9, and 16 mentions per 100,000 population, respectively. Among the 21 DAWN metropolitan areas (Tables 2.8.1 through 2.8.21):
  - The highest rates of ED mentions of hydrocodone/combinations were found in: New Orleans (24), Buffalo (19, with rates up 115% from 2001), Detroit (16), San Francisco (14), Phoenix (11), and Seattle (11).
  - The highest rates of oxycodone/combinations were found in: Boston (34), Philadelphia (26), Seattle (17, with rates up 42% from 2001), Phoenix (14), Baltimore (13, with rates up 46% from 2001), and New Orleans (11).
  - The highest rates of narcotic analgesics-NOS were found in: Baltimore (140, with rates up 49% from 2001), Buffalo (69, with rates down 17% from 2001), Detroit (52), New Orleans (45), Boston (45), Chicago (42), Philadelphia (36), Newark (35), and New York (34).
- Narcotic analgesics-NOS accounted for 35 percent of total narcotic analgesic mentions in the coterminous U.S., but the variation across metropolitan areas was substantial (Tables 2.8.0 through 2.8.21). As a share of total narcotic analgesics, reporting of narcotic analgesics-NOS was:
  - Highest (more than 85 percent) in Baltimore,
  - At least 50 percent in Chicago (69%), Buffalo (66%), New York (63%), San Diego (58%), Newark (55%), Detroit (54%), and Atlanta (52%), and
  - Lowest in Minneapolis (23%), San Francisco (31%), Seattle (31%), and Washington, DC (32%).

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RESPIRATORY AGENTS

- Nationwide, ED mentions of respiratory agents remained stable from 2001 to 2002 (Table 2.2.0). Nationally, there were only 5 mentions of respiratory agents per 100,000 population in 2002 (Table 12.2.0).

- Adjusting for population differences, the highest rates of respiratory agents in 2002 were found in (Tables 12.2.1 through 12.2.21):

  - Phoenix (10 mentions of respiratory agents per 100,000 population),
  - Minneapolis (8),
  - Philadelphia (7), and
  - St. Louis (7).

CARDIOVASCULAR AGENTS

- Nationwide, mentions of cardiovascular agents in ED episodes increased 26 percent from 2001 to 2002 (Table 2.2.0). Nationally, there were only 5 mentions of cardiovascular agents per 100,000 population in 2002 (Table 12.2.0).

- Adjusting for population differences, the highest rates of cardiovascular agents in 2002 were found in (Tables 12.2.1 through 12.2.21):

  - Phoenix (10 mentions of cardiovascular agents per 100,000 population),
  - Seattle (6),
  - Minneapolis (6), and
  - Philadelphia (6).

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TRENDS IN ED DRUG EPISODES BY PATIENT DEMOGRAPHICS

This section presents findings for demographic characteristics of patients, by gender, race/ethnicity, and age for drug-related ED episodes overall and for the 15 major substances of abuse. This represents an expansion from the past; for estimates prior to 2001, patient characteristics were tabulated only for cocaine, heroin, marijuana, and methamphetamine.

This section of *ED Trends From DAWN* focuses primarily on trends in episodes and mentions by patient demographic characteristics, as presented in Tables 4.1.0 and 4.2.0 (total episodes) and Tables 4.5.0 through 4.34.0. Tables showing total drug mentions by patient demographics are provided as well (Tables 4.3.0 and 4.4.0), but our discussion focuses on the more meaningful episode-level analysis of patient characteristics. Mentions are equivalent to episodes when a single drug (e.g., LSD) is under consideration; categories of drugs (e.g., miscellaneous hallucinogens) may include more mentions than episodes because multiple drugs in the category (e.g., psilocybin and mescaline) could be reported for the same episode.

This section also compares the rates of ED drug episodes and mentions for the major substances of abuse per 100,000 population for gender and age groups. It is important to use rates when making comparisons across demographic groups because the rates take into account the differing sizes of these groups in the population. For this discussion, we focus on Tables 14.1.0 and 14.2.0 (total episodes) and Tables 14.6.0 through 14.34.0 (the major substances of abuse. Tables showing rates of total drug mentions by gender and age are provided (Tables 14.3.0 and 14.4.0) but not discussed for the reasons noted earlier.

To illustrate the different perspectives revealed from comparisons based on mentions or rates, Figure 8 shows long-term trends in the number of drug-related episodes by age group. Figure 9 shows the same trends for the same age groups expressed in rates per 100,000 population. Figures 8 and 9 paint very different pictures because the sizes of the underlying population groups are so different. Figures 10 through 12 illustrate trends by age group in the rate of mentions of cocaine, heroin, and marijuana, respectively, from 1995 to 2002.

Population-based rates are not available for racial or ethnic subgroups because the race and ethnicity categories in DAWN do not match sufficiently the categories available in population data from the Census. For the same reason, there can be no comparisons of estimates by race/ethnicity across the metropolitan areas in DAWN. For more information regarding DAWN reporting on race/ethnicity, see Appendix A.

All of the trends by patient demographics are available for each of the 21 metropolitan areas oversampled by DAWN, but in the interests of space, these are not discussed. See the table of contents for a complete listing of tables and their locations.

TOTAL DRUG-RELATED EPISODES

- Although total drug-related ED episodes remained statistically stable from 2001 to 2002 (Table 4.2.0), increases were evident for patients age 18 to 25 (11%, from 127,110 to 140,475 mentions), patients age 45-54 (15%, from 88,540 to 101,541), and

patients age 55 and older (19%, from 26,036 to 30,987). Total episodes for other age groups and all the gender and race/ethnicity subgroups were unchanged from 2001 to 2002.

ALCOHOL-IN-COMBINATION

- From 2001 to 2002, mentions of alcohol-in-combination remained stable among all gender and race/ethnicity groups, and all but one age group. Mentions of alcohol-in-combination decreased among patients age 26 to 29 (-20%, from 21,881 to 17,495) during this period (Table 4.6.0).

- From 1995 to 2002, mentions of alcohol-in-combination increased 24 percent, with the largest increases occurring among minors age 18 to 19 (63%) and among patients age 35 and older (45%), particularly those age 45 to 54 (100%) and those age 55 and older (91%) (Table 4.6.0).

COCAINE, HEROIN, MARIJUANA

- From 2001 to 2002, an increase in cocaine mentions occurred for patients age 45 to 54 (23%, from 26,191 to 32,243) (Table 4.8.0). Cocaine mentions for males, females, younger age groups, groups age 55 and older, and all of the race/ethnicity subgroups were unchanged from 2001 to 2002.

- From 1995 to 2002, the largest increases in cocaine mentions (compared with 47% overall) occurred among the youngest and oldest groups, including patients age 12 to 17 (71%), age 18 to 19 (97%), age 20 to 25 (37%), and the groups age 35 and older (95%). For the latter, the increases ranged from 64 percent in the 35 to 44 age group, to 211 percent in the 45 to 54 age group, and 242 percent in the 55 and older age group. Significant increases were found for both genders (females 57% and males 43%) and for white patients (100%) and for patients who race/ethnicity was unknown (44%) (Table 4.8.0).

- From 2001 to 2002, an increase in heroin mentions was noted only for patients age 55 and older (15%). There were no significant changes in heroin mentions for any other age subgroup nor for any gender or race/ethnicity subgroups (Table 4.10.0).

- From 1995 to 2002, heroin mentions increased 35 percent overall, with much larger increases among patients age 18 to 19 (211%), 55 and older (160%), and 45 to 54 (102%) (Table 4.10.0). Considering patients by gender and race/ethnicity, heroin mentions increased for females (55%), males (27%), whites (53%), and patients whose race/ethnicity was unknown (87%).

- From 2001 to 2002, significant increases in marijuana mentions occurred only for patients age 45 to 54 (32%, from 8,840 to 11,667) (Table 4.12.0). Marijuana mentions were statistically unchanged for all other age, gender, and race/ethnicity subgroups between 2001 and 2002.

- From 1995 to 2002, marijuana mentions increased 164 percent overall (Table 4.12.0). The most dramatic increases were seen among patients age 35 and older (288%),

particularly adults age 45 to 54 (603%) and age 55 and older (478%), although the latter had relatively few mentions. During this period, marijuana mentions increased for females (216%) and males (145%) and all race and ethnicity subgroups, Hispanics (261%), whites (216%), blacks (83%), and all other races (55%). Again, there was a large increase in mentions attributed to patients whose race and ethnicity were unknown (152%).

AMPHETAMINES AND METHAMPHETAMINE

- From 2001 to 2002, overall mentions of amphetamines increased 17 percent (from 18,555 to 21,644). Among subgroups, increases were evident among males (26%, from 9,712 to 12,230) and patients age 35 years and older (18%, from 5,819 to 6,848) (Table 4.14.0). No other demographic subgroups experienced a significant change in mentions of amphetamines during this time period.

- From 1995 to 2002, amphetamine mentions increased 126 percent overall, with the largest increases among patients age 55 and older (752%) and 45 to 54 (613%), followed by patients age 12 to 17 (237%), 26 to 29 (138%), and 18 to 19 (123%) (Table 4.14.0). In other words, amphetamine mentions increased for every age group, except those age 30 to 34. Amphetamine mentions increased 127 percent among females and 123 percent among males. By race and ethnicity, amphetamine mentions increased among whites (121%), blacks (114%), and patients whose race and ethnicity was unknown (334%).

- Full-year national estimates for methamphetamine are presented in Table 4.16.0 (mentions) and Table 14.16.0 (rates) and show recent increases in mentions among patients age 35 and older (44%, from 4,170 to 6,003. Since national estimates for methamphetamine tend to be quite volatile, we refer readers to estimates by metropolitan area, with particular attention to the 5 metropolitan areas with the highest rates of methamphetamine mentions: San Francisco, Seattle, San Diego, Los Angeles, and Phoenix. Rates of methamphetamine mentions are summarized for all 21 metropolitan areas in Table 13.16. Demographic characteristics for each metropolitan area are available online in tables with numbers beginning with **4.16** (mentions) and **14.16** (rates).

CLUB DRUGS

In general, the club drugs had few mentions in 1995, but their mentions have increased substantially since then.

- Three-quarters (75%) of MDMA (Ecstasy) mentions in 2002 were attributed to ED patients age 25 and under, nearly 2 in 3 (64%) for patients who were white (Table 4.18.0). There was a significant decrease in mentions for patients age 20 to 25 from 2001 to 2002 (-39%, from 2,285 to 1,392). ED mentions of MDMA decreased for male patients (-34%, from 3,076 to 2,030) during the same period. MDMA mentions were unchanged for other age, gender, and race/ethnicity subgroups from 2000 to 2002 and 2001 to 2002 (Table 4.18.0). The only exception was for patients age 55 and over, but the numbers are very small.

- From 1995 to 2002, significant increases in MDMA mentions were apparent for most gender, race/ethnicity, and age groups; in percentage terms, the increases are quite large, owing to very small numbers in 1995 (Table 4.18.0).

- Total mentions of GHB were statistically unchanged from 2001 to 2002 but decreased (-33%, from 4,969 to 3,330) from 2000 to 2002. Almost half (46%) of GHB mentions in 2002 were attributed to ED patients age 20 to 25, nearly 90 percent were white, and two-thirds were male. However, there were no significant changes in ED mentions of GHB among these young adults from 2000 to 2002 or from 2001 to 2002, and GHB mentions were notably stable from 2000 to 2002 for gender, race/ethnicity, and other age subgroups (Table 4.30.0).

HALLUCINOGENS

- From 2001 to 2002, ED mentions of LSD decreased overall by 68 percent (from 2,821 to 891), and this decrease was fairly evenly distributed across the demographic subgroups (Table 4.22.0). By gender, LSD mentions decreased for both females (-86%, from 820 to 112) and males (-60%, from 1,929 to 776). By race/ethnicity, mentions decreased for Hispanics (-79%, from 382 to 81) and whites (-69%, from 2,186 to 670). For blacks, the decrease from 2000 to 2002 was significant, while the estimates from 2001 to 2002 were unchanged. Among the age subgroups, LSD mentions decreased for patients age 12 to 17 (-83%, from 952 to 167), 20 to 25 (-61%, from 661 to 258), and 26 to 34 (-71%, from 331 to 97).

- Overall mentions of PCP increased from 2001 to 2002 by 25 percent (from 6,102 to 7,648) (Table 4.24.0). Among the demographic subgroups, significant increases were evident among females (63%, from 1,683 to 2,738) and among black patients (28%, from 2,578 to 3,308). None of the age groups had significant changes from 2001 to 2002. However, increases were evident for the age 20 to 25 and age 45 to 54 groups from 2000 to 2002.

POPULATION-ADJUSTED RATES BY GENDER

- Adjusting for population, males and females had similar rates of drug-related ED episodes overall in 2002 (285 and 234 episodes per 100,000 population, respectively) (Table 14.2.0). However, the rates for males were approximately double the rates for females for cocaine (103 vs. 53), heroin (49 vs. 24), marijuana (61 vs. 32), and PCP (4 vs. 2). Additionally, the rates for males were higher than for females for amphetamines (10 vs. 7). Rates for males and females were not considerably different for any of the other major substances of abuse (Tables 14.2.0 through 14.34.0). Rates were very low for both genders for LSD, miscellaneous hallucinogens, flunitrazepam, GHB, and inhalants.

- In 2002, among the 21 metropolitan areas oversampled by DAWN:

  - Rates of drug-related ED episodes involving males were highest in Philadelphia (757 episodes per 100,000 population), Baltimore (696), San Francisco (691), and Chicago (664) (Tables 14.2.1 through 14.2.21). Rates for males were lowest in Dallas (164), Minneapolis (245), San Diego (282), and Washington, DC (287).

- Rates of drug-related ED episodes involving females were highest in Philadelphia (467), Seattle (449), Chicago (442), Detroit (440), and Baltimore (416) (Tables 14.2.1 through 14.2.21). Rates for females were lowest in Dallas (185), Washington, DC (207), Los Angeles (222), and New York (228).

POPULATION-ADJUSTED RATES BY AGE

Trends in ED drug episodes by age group can be shown in terms of numbers of episodes (Figure 8) or in rates of episodes per 100,000 population (Figure 9). Focusing on the number of episodes is useful for determining which age groups are most frequently seen in EDs for drug-related emergencies. This is an estimate of utilization. In the case of total episodes, patients age 35 to 97 are responsible for the greatest number of ED episodes and those age 12 to 17 for the fewest (Figure 8). However, we cannot use these findings to make valid comparisons across age groups because of differences in the size of the population for each age category. For example, episodes for the age 35 to 97 group may be highest simply because this age group is, by far, the largest in terms of population size. The following sections focus specifically on comparisons of rates, adjusted for population size, for the major demographic subgroups.

Overall

- In 2002, nearly half (48%, 318,799 episodes) of total ED drug episodes involved patients age 35 and over, followed in frequency by patients age 26 to 34 (22%, 145,806), patients age 18 to 25 (21%, 140,475), and patients age 12 to 17 (9%, 62,792) (Table 4.2.0 and Figure 8). However, when we account for differences in population size across these age groups (Figure 9), we find that patients age 26 to 34 and patients 18 to 25 had the highest rates of ED episodes. Patients age 35 to 97 had considerably lower rates, similar to the rates for patients age 12 to 17.

- For 2002, DAWN estimates the following rates for ED drug episodes (Table 14.2.0):

  - 256 per 100,000 population for patients age 12 to 17. This rate was statistically unchanged from 2001, 2000, and 1995.

  - 414 for patients age 18 to 25. This rate increased 9 percent from 2001 to 2002 (from 379 to 414) but is 3 percent lower than in 2000 (425). The rate in 2002 is 10 percent above that (375) in 1995.

  - 473 for patients age 26 to 34. This rate was statistically unchanged from 2001, 2000, and 1995.

  - 225 for patients age 35 and over. This rate was statistically unchanged from 2001, but represents a 12 percent increase (from 201) from 2000 and a 39 percent increase (from 162) from 1995.

- In 2002, across the 21 metropolitan areas oversampled by DAWN, rates of drug-related ED episodes (Tables 14.2.1 through 14.2.21):

  - For patients age 12 to 17, ranged from a high of 496 episodes per 100,000 population in Philadelphia to a low of 122 in New York. Three other metropolitan

areas—Minneapolis (424), San Francisco (415), and Phoenix (409)—had rates exceeding 400.

- For patients age 18 to 25, ranged from a high of 1,137 episodes per 100,000 population in Philadelphia to a low of 310 in Dallas. No other metropolitan area oversampled in DAWN had a rate exceeding 1,000.

- For patients age 26 to 34, ranged from a high of 1,248 episodes per 100,000 population in Philadelphia to a low of 255 in Dallas. One other metropolitan area—Baltimore (1,126)—had a rate exceeding 1,000.

- For patients age 35 and older, ranged from 607 episodes per 100,000 population in Chicago to 138 in Dallas. Detroit (570), San Francisco (565), and Baltimore (514) had rates over 500.

Major Substances of Abuse

- Across the age groups, the top 3 drugs mentioned (among the major substances of abuse) came from the same 4 drugs: alcohol-in-combination, cocaine, heroin, and marijuana. Dividing the age groups a little differently than is common in DAWN, we can see some interesting patterns (Tables 4.6.0, 4.8.0, 4.10.0, and 4.12.0):

  - Marijuana was the most commonly mentioned drug, followed by alcohol-in-combination and then cocaine among youth age 12 to 19.

  - Cocaine ranked first, followed by alcohol-in-combination among patients age 26 to 44.

  - Alcohol-in-combination ranked first, followed by cocaine, then heroin among patients age 45 and older.

  - Heroin ranked third among patients age 26 and older and fourth among patients age 12 to 25.

- Considering these 4 major substances of abuse (alcohol-in-combination, cocaine, heroin, and marijuana) in 2002 (Tables 14.6.0, 14.8.0, 14.10.0, and 14.12.0):

  - Rates for patients age 26 to 34 were consistently higher than rates for patients age 35 and over.

  - Rates for patients 12 to 17 were consistently lower than rates for older patients, except for marijuana. Patients age 12 to 17 had higher rates of marijuana mentions than patients age 35 and over (77 vs. 27) and rates more similar to those for patients 18 to 25 (109) and 26 to 34 (82).

  - Rates for patients age 18 to 25 were lower than rates for patients age 26 to 34 for cocaine (91 vs. 171). These age groups had statistically similar rates of mentions for heroin (52 vs. 72), alcohol-in-combination (113 vs. 155), and marijuana (109 vs. 82).

- Considering the 4 age groups (age 12 to 17, 18 to 25, 26 to 34, and 35+) in 2002 (Tables 14.6.0, 14.8.0, 14.10.0, 14.12.0 and 14.18.0):

  - Rates for alcohol-in-combination, cocaine, and heroin appeared to rise with age and peak in the 26 to 34 age group (with 155, 171, and 72 mentions per 100,000 population, respectively).

  - Rates for marijuana were similar (77, 109, and 82 mentions per 100,000 population) across a broad range of ages (from age 12 to 34), and the rate for marijuana mentions was substantially lower for patients age 35 and over (27 mentions per 100,000 population).

  - Rates for MDMA (Ecstasy) mentions appeared to peak (at 7 mentions per 100,000 population) in the 18 to 25 age group with lower rates in both the younger and older age groups (3 mentions per 100,000 population for age 12 to 17, 2 mentions for age 26 to 34; less than 1 mention per 100,000 population for patients age 35 and over).

Age 12 to 17

- From 2001 to 2002, the rate of alcohol-in-combination mentions for patients age 12 to 17 remained statistically stable. From 2000 to 2002, rates decreased 26 percent (from 43 to 32 mentions per 100,000 population) (Table 14.6.0).

- The rates of cocaine and heroin mentions for patients age 12 to 17 were stable from 2001 to 2002 and from 2000 to 2002 (Tables 14.8.0 and 14.10.0 and Figures 10 and 11). However, there was a 54 percent increase in the rate of cocaine mentions between 1995 and 2002.

- The rate of marijuana mentions for patients age 12 to 17, although stable from 2000 and 2001 to 2002, increased 112 percent from 1995 (from 36 to 77 per 100,000 population) (Table 14.12.0 and Figure 12).

Age 18 to 25

- For patients age 18 to 25, the rates of ED mentions of alcohol-in-combination (113), cocaine (91), heroin (52), and marijuana (109) were stable from 2001 to 2002 (Tables 14.6.0, 14.8.0, 14.10.0, and 14.12.0).

- From 1995 to 2002, long-term trends for patients age 18 to 25 have been upward, with the rates of marijuana, heroin, cocaine, and alcohol-in-combination mentions increasing 103, 72, 19, and 10 percent, respectively.

Age 26 to 34

- For patients age 26 to 34, the rates of ED mentions of alcohol-in-combination (155), cocaine (171), and heroin (72) have been statistically stable since 1995 and from 2000 and 2001 to 2002 (Tables 14.6.0, 14.8.0, and 14.10.0).

- The rate of marijuana mentions among patients age 26 to 34 was statistically stable from 2000 and 2001 to 2002 but increased 135 percent (from 35 to 82 mentions per 100,000 population) from 1995 to 2002 (Table 14.12.0).

Age 35 and Older

- For patients age 35 and over, the rate of alcohol-in-combination mentions, although stable from 2000 and 2001 to 2002, increased 28 percent (from 62 to 80 mentions per 100,000 population) from 1995 to 2002 (Table 14.6.0).

- Among patients age 35 and older, the rate of cocaine mentions was statistically stable from 2001 to 2002 but increased 17 percent (from 68 to 79 mentions per 100,000 population) from 2000 to 2002 (Table 14.8.0). Since 1995, this rate has increased 72 percent (from 46).

- The rate of heroin mentions among patients age 35 and older in 2002 (37 per 100,000 population) was statistically unchanged from the rates in 2000 and 2001. Heroin mentions for these patients increased 21 percent (from 31 mentions per 100,000) from 1995 (Table 14.10.0).

- For patients age 35 and over, the rate of marijuana ED mentions was stable from 2001 to 2002, but has risen 32 percent since 2000 (from 21 to 27 mentions per 100,000 population). From 1995 to 2002, the increase was 241 percent (from 8 to 27 mentions per 100,000 population) (Table 14.12.0).

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Figure 8
Number of drug-related episodes by age group: 1995 through 2002

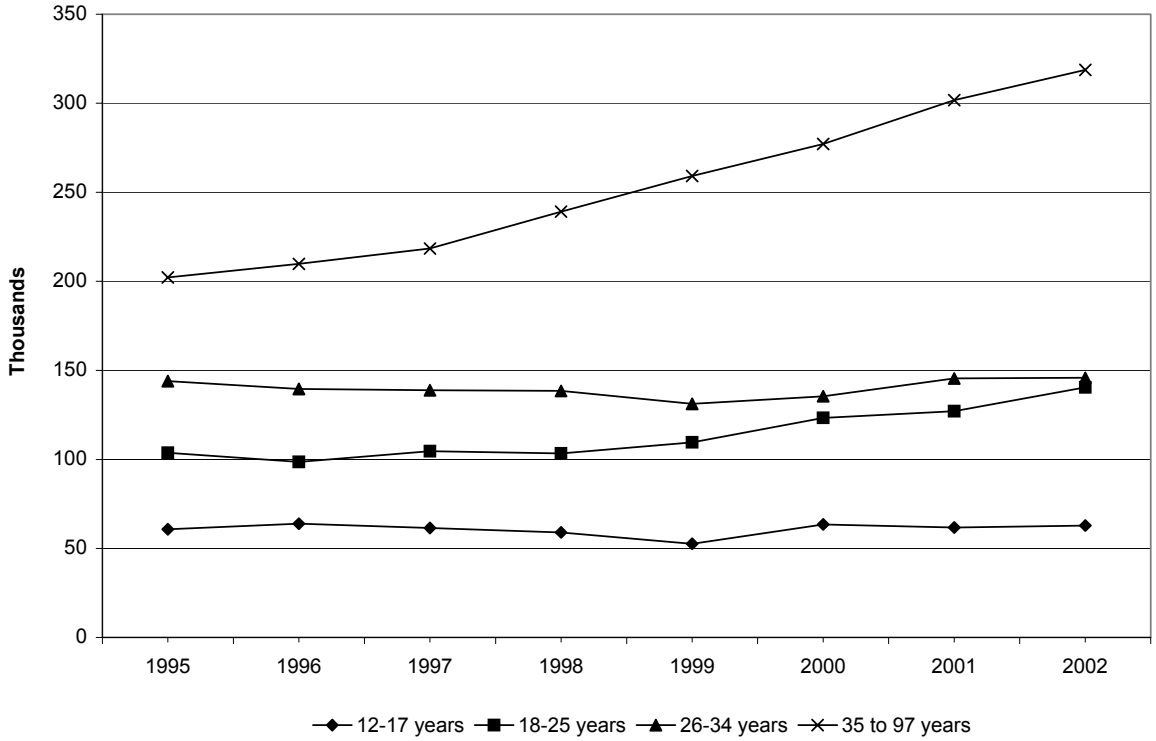

Figure 9
Rate of drug-related episodes per 100,000 population by age group: 1995 through 2002

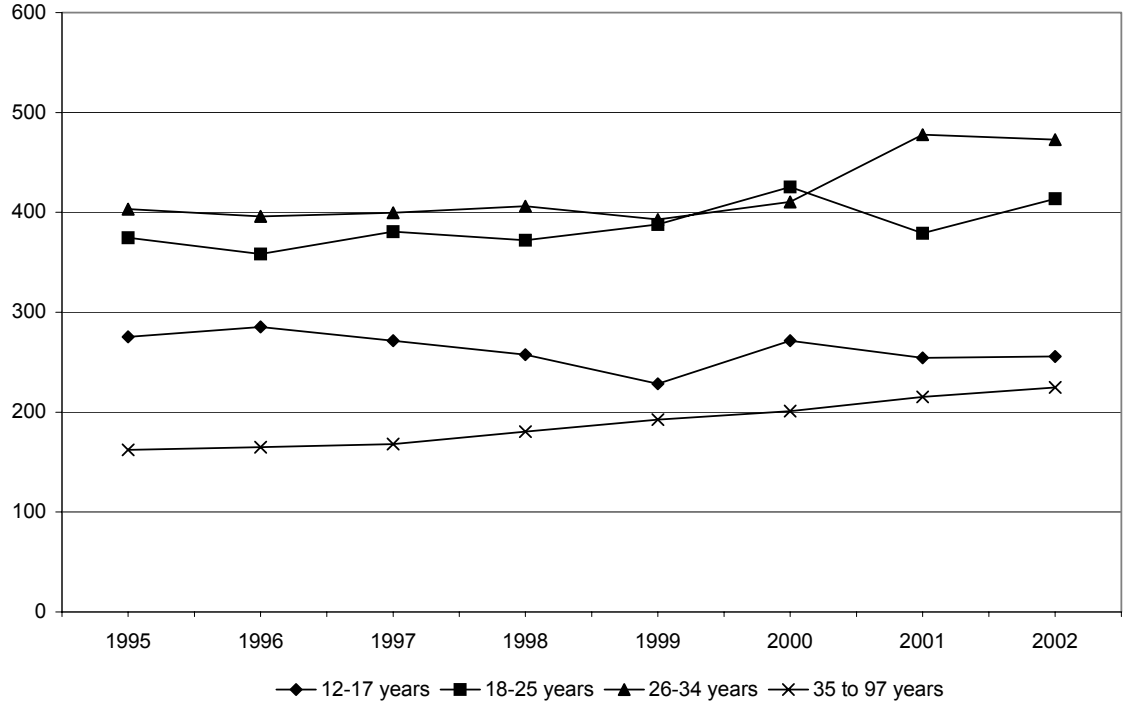

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Figure 10
Rate of cocaine mentions per 100,000 population by age group: 1995 through 2002

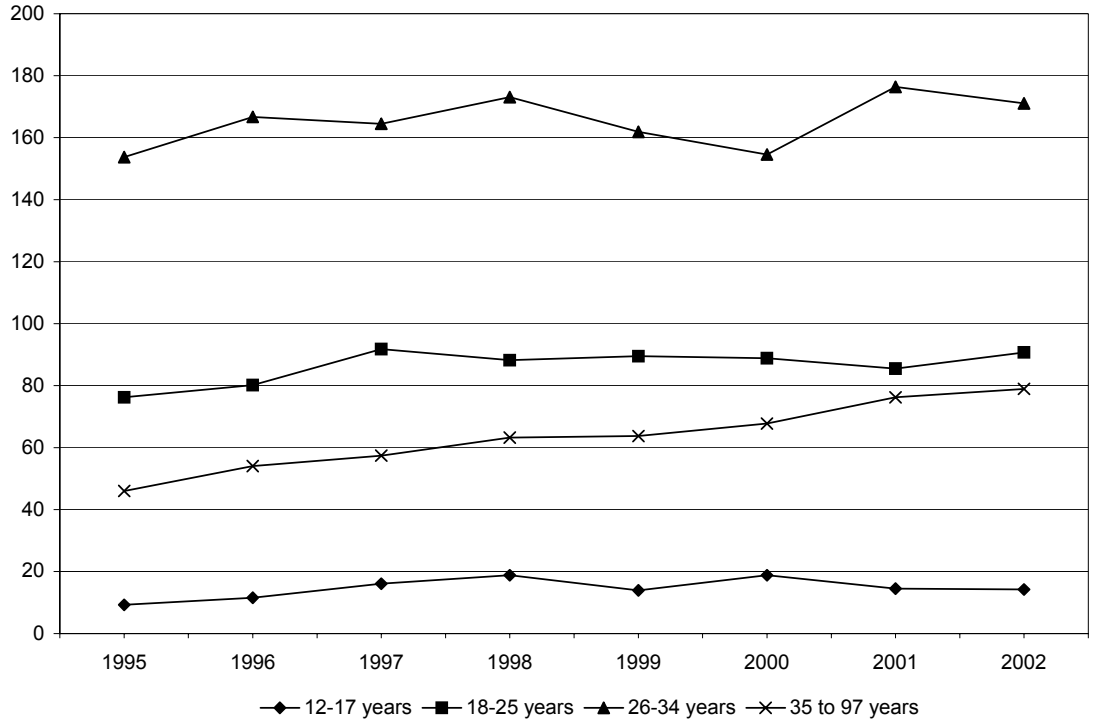

Figure 11
Rate of heroin mentions per 100,000 population by age group: 1995 through 2002

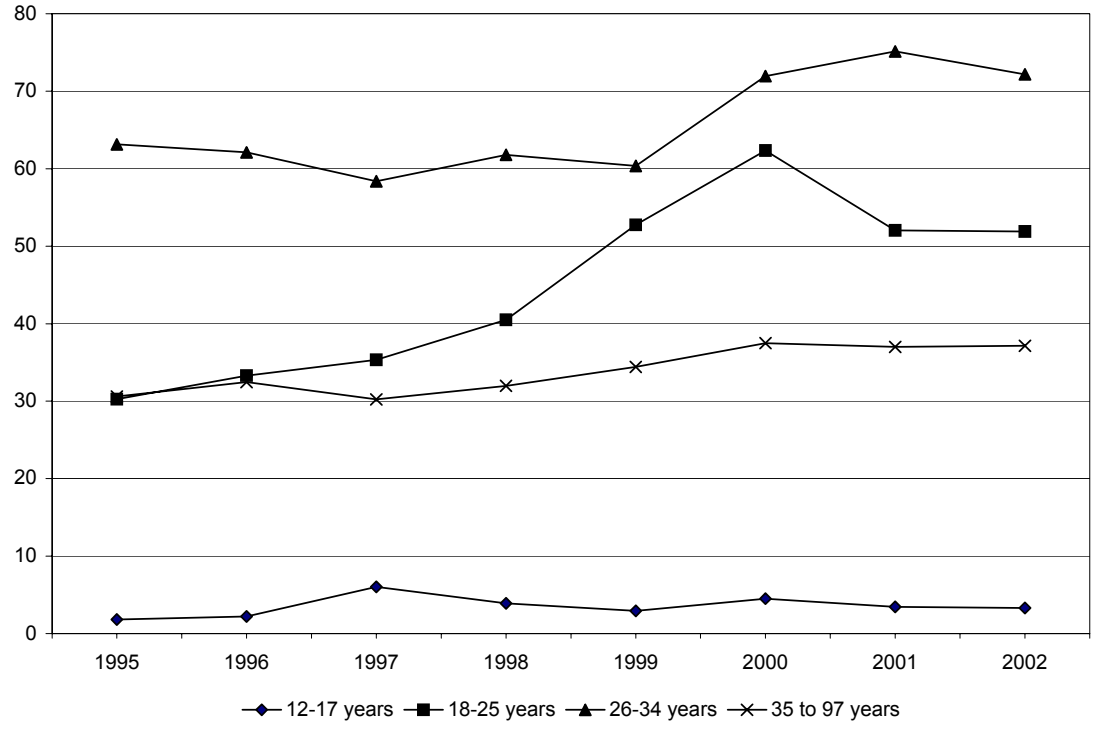

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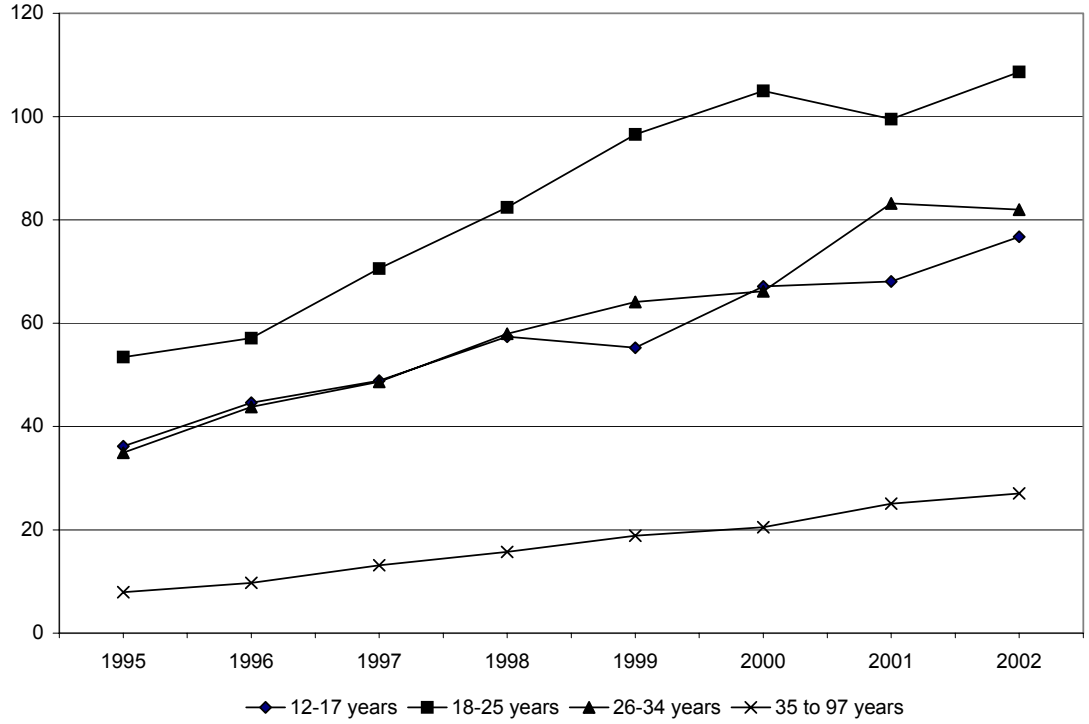
Figure 12
Rate of marijuana mentions per 100,000 population by age group: 1995 through 2002



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TRENDS IN ED DRUG EPISODES BY EPISODE CHARACTERISTICS

This section presents findings of episode characteristics for drug-related ED episodes overall (in Tables 5.1.0 and 5.2.0) and for the 15 major substances of abuse (Tables 5.5.0 through 5.34.0).

Population-based rates for episode characteristics cannot be produced for these measures, so comparisons of episode characteristics across metropolitan areas are not advised. Differences among metropolitan areas may simply reflect differences in the size of the populations available to visit an ED.

DRUG CONCOMITANCE

- The majority (54%, 365,232 episodes in 2002) of drug-related ED episodes involve more than one drug (Table 5.2.0).

- From 1995 to 2002, single-drug episodes reported to DAWN increased 25 percent (from 243,890 to 305,075) and increased 16 percent (from 263,377) from 2000 (Table 5.2.0). However, from 1995 to 2002, multiple-drug episodes increased 36 percent (from 269,539 to 365,232). Episodes overall rose 31 percent (from 513,429 to 670,307) from 1995 to 2002 and 12 percent (from 601,392) from 2000.

- In 2002, nearly half (47%) of the ED episodes involving methamphetamine (Table 5.16.0) and nearly half (46%) of episodes involving heroin (Table 5.10.0) involved *only* that one drug. By contrast, only 31 percent of episodes involving cocaine involved cocaine alone (Table 5.8.0), 30 percent of episodes involving amphetamines involved amphetamines alone (Table 5.14.0), and only 28 percent of episodes involving marijuana involved marijuana alone (Table 5.12.0). By definition, all DAWN ED episodes involving alcohol also involved another drug (Table 5.6.0).

- In 2002, among the other major substances of abuse, episodes involving club drugs or hallucinogens—MDMA (72%), LSD (77%), Ketamine (80%), PCP (80%), and GHB (84%)—were the most likely to involve more than one drug (Tables 5.18.0, 5.22.0, 5.20.0, 5.24.0, and 5.30.0).

DRUG USE MOTIVE

- In drug-related ED episodes during 2002, *dependence* (36%, 239,653 episodes) and *suicide* (28%, 189,198) were the most frequently cited motives for taking substances, followed by *psychic effects* (20%, 132,711) (Table 5.2.0). However, motive was *unknown* in a relatively high number of cases (15%, 99,567).

- From 1995 to 2002, episodes with a motive of *dependence* increased 46 percent (from 163,988 to 239,653), and episodes with a motive of *psychic effects* also increased 46 percent (from 90,996 to 132,711) (Table 5.2.0).

- In 2002, 4 of the major substances of abuse—miscellaneous hallucinogens (3%), heroin (6%), LSD (7%), and Ketamine (9%)—had relatively low rates of motive *unknown*. Among these, *dependence* was the motive for the majority of episodes involving heroin (82%), and *psychic effects* was the motive for the majority of episodes involving miscellaneous hallucinogens (85%), Ketamine (41%), and LSD (47%). Among the major substances with relatively high rates of *unknown* motives, *dependence* was the predominant motive for episodes involving cocaine (54%, with 18% unknown), and *psychic effects* was the predominant motive among episodes involving GHB (46%, with 11% unknown) (Tables 5.6.0 through 5.34.0).

REASON FOR ED CONTACT

- By far, the most common reason for ED contact cited in drug-related ED episodes in 2002 was *overdose* (39%, 258,931 episodes) (Table 5.2.0). *Unexpected reaction* (20% of total episodes) was the next most frequently reported reason for ED contact, with a 129 percent increase (from 57,371 to 131,315) from 1995 to 2002 and a 42 percent increase (from 92,497) from 2000 (Table 5.2.0).

- In 2002, taken together, *unexpected reactions* and *overdoses* were the predominant reasons for ED contact in episodes involving GHB (88%), miscellaneous hallucinogens (78%), PCP (63%), inhalants (78%, with 62% for overdose alone), MDMA (69%), amphetamines (63%), Ketamine (59%), marijuana (57%), LSD (56%), and alcohol-in-combination (54%) (Tables 5.6.0 through 5.32.0). It is important to remember that only one reason for ED contact is recorded, regardless of the number of drugs involved, and that one reason is attributed to all the drugs. For the major substances of abuse, all episodes involving alcohol-in-combination and a high proportion of episodes involving virtually all other major substances (from 47% of episodes involving inhalants to 84% of episodes involving GHB) involve multiple drugs.

- In 2002, *seeking detoxification* was a relatively frequent reason for ED contact in episodes involving heroin (37%, 34,317 episodes) and cocaine (28%, 54,778) (Tables 5.6.0 through 5.10.0). Anecdotal evidence suggests that the volume of cases recorded as *seeking detoxification* varies widely across place and time, reflecting administrative policies that, in some hospitals, require patients to receive medical clearance from the ED prior to their admission for detoxification or substance abuse treatment.

PATIENT DISPOSITION

- In 2002, almost half of drug-related ED episodes resulted in admission to the hospital (49%, 331,240 episodes) (Table 5.2.0).

- From 1995 to 2002, drug-related ED episodes resulting in the patient's being treated and released (48% of episodes) increased 34 percent (from 237,696 to 319,378) (Table 5.2.0).

- In 2002, admission to the hospital occurred for the majority of episodes involving alcohol-in-combination (55%) or cocaine (50%). Patients were treated and released in the majority of episodes involving miscellaneous hallucinogens (71%), LSD (64%), methamphetamine (63%), MDMA (61%), PCP (57%), amphetamines (56%), heroin (55%), marijuana (55%), GHB (54%), inhalants (53%), and Ketamine (51%). Again, it is important to remember that a high proportion of episodes involving major substances of abuse involve multiple drugs (Tables 5.6.0 to 5.32.0).

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DISCUSSION OF RESULTS

This publication of *Emergency Department Trends From DAWN* marks an important milestone—30 years of continuous DAWN data collection. It also marks the end of an era as 2002 becomes the final year in the longitudinal data series begun in 1988 with the introduction of a probability sample of hospitals. As a preview of things to come, we will discuss here a number of the changes coming to DAWN in 2003 and how they are designed to overcome longstanding limitations.

First, however, this discussion takes a final look at some of the important findings from DAWN for 2002, as well as some of the notable long- and short-term trends from 1995 to 2002. Continuing our usual practice, we will highlight issues that cut across topics discussed separately in previous sections of this publication and discuss some of the implications of those findings.

OVERVIEW OF TRENDS

Estimates of drug-related ED episodes and mentions reveal few significant changes from 2001 to 2002. Total drug-related ED episodes and mentions were statistically unchanged, while ED visits for any reason increased 2 percent. Over the long term, however, drug-related ED episodes and their associated drug mentions grew at roughly twice the rate of total ED visits, with a 31 percent rise in drug-related ED visits, a 34 percent rise in ED drug mentions, and a 16 percent increase in total ED visits over the 8-year period 1995 to 2002.

The *ED Trends* highlight a selected list of "major substances of abuse" as distinct from "other substances of abuse." The former is comprised of 15 mostly illicit substances of high frequency or substantial policy interest; the latter is primarily substances that are marketed legally by prescription or over the counter.

Among the 15 major substances of abuse, ED mentions of only 2 (PCP and amphetamines) increased significantly from 2001 to 2002, and 1 (LSD) declined. The most frequently mentioned drugs—alcohol-in-combination, cocaine, marijuana, and heroin—all remained stable. Among the most frequently mentioned other substances of abuse, the benzodiazepines were unchanged, while ED mentions of narcotic analgesics/combinations rose 20 percent from 2001 to 2002.

Over the period 1995 to 2002, 8 of the 15 major substances of abuse—alcohol-in-combination, cocaine, heroin, marijuana, amphetamines, MDMA (Ecstasy), PCP, and GHB—showed significant growth, while only one substance, LSD, showed a significant decrease. Long-term trends for the remaining major substances of abuse are less definitive, owing to their relatively low frequency and/or statistical precision. The trends for methamphetamine and for inhalants, for example, have tended to fluctuate quite dramatically from year to year.

Does the lack of changes from 2001 to 2002 signal a recent shift in the long-term trend?[18] The answer may depend on which measures are emphasized. Taking a slightly longer view,

[18] It is unlikely that statistically significant findings for 2002 were muted by imputation. In our imputation strategy, episodes from 2001 were used to model 2002 estimates in 5 DAWN areas in order to preserve the integrity of the national estimates (Appendix

comparing estimates for 2002 with those for 2000, we found that total drug-related ED episodes and their associated drug mentions grew at roughly 1.5 times the rate of total ED visits, with a 12 percent increase in drug abuse episodes, a 10 percent increase in drug mentions, and a 7 percent increase in total ED visits. From 2000 to 2002, ED mentions of the most frequent major substances (alcohol-in-combination and cocaine) were stable; only 2 of the major substances of abuse (marijuana and PCP) increased significantly, and 2 (LSD and GHB) decreased. Among the "other substances of abuse," significant increases were evident for both the benzodiazepines and the narcotic analgesics/combinations (16% and 45%, respectively).

On the one hand, we might conclude that ED mentions of some of the major illicit drugs have leveled off; the rapid growth in ED episodes involving MDMA (Ecstasy) and GHB has waned; and ED mentions of LSD have dropped precipitously. On the other hand, marijuana-related episodes continue to increase, and we now find an apparent resurgence in ED episodes involving PCP.

MAJOR SUBSTANCES OF ABUSE

The 4 most common major substances of abuse in drug abuse-related ED episodes are alcohol-in-combination, cocaine, heroin, and marijuana, with mentions in 2002 ranging from 93,519 for heroin to 207,395 for alcohol-in-combination (Figure 13).

Among these, ED episodes involving marijuana have shown the largest percentage increase over the long-term, climbing 164 percent over the period 1995 to 2002. Marijuana was also up significantly (24% from 110,512 to 119,472) from 2000 to 2002 but showed no significant increase from 2001. Taking changes in population into account, marijuana mentions increased 139 percent from 1995 to 2002 (from 19 to 47 per 100,000 population). This long-term trend is especially evident among patients age 18 to 25 and, to a lesser extent, age 12 to 17, although the rates for both groups have been more stable since 2000 (Figure 14). This appears to be consistent with findings from the 2001 National Household Survey on Drug Abuse (NHSDA), which showed significant increases in self-reported marijuana use between 2000 and 2001 among all Americans over the age of 12 and in particular among youth age 12 to 17.[19] Those trends in reported use occurred even though the estimated number of self-reported new users of marijuana has remained fairly constant at about 2.5 million each year since 1996. A forthcoming issue of *The DAWN Report* will examine trends in marijuana-related ED visits in more detail.

Of the less common major substances of abuse, amphetamines and methamphetamine form a middle tier in terms of numbers of drug mentions, with 2002 mentions of 21,644 and 17,696 respectively. In 2002, amphetamines and methamphetamine were each mentioned in about 3 percent of drug abuse-related ED episodes. Only rarely were amphetamines and methamphetamine reported in the same ED visit, and it is not possible to know the accuracy of distinctions between them. Mentions based solely on toxicology findings may tend to blur the

C). Presumably, this might result in some imputation-induced stability between the 2 years. We investigated this matter further by looking at whether statistically significant changes were more or less frequent for the period 2001-2002 than for 2000-2001 in specific metropolitan areas. Among the 5 metropolitan areas with imputed data, the number of significant changes in major substances of abuse was more frequent in 2 metropolitan areas, less frequent in 2, and the same in 1. A similar pattern was observed in metropolitan areas unaffected by imputation (6 areas had more frequent differences, 6 had less, and 4 had the same number).

[19] Substance Abuse and Mental Health Services Administration, *Summary of Findings from the 2001 National Household Survey on Drug Abuse*. Office of Applied Studies, NHSDA Series H-13, DHHS Publication No. (SMA) 01-3549. Rockville, MD, 2001.

differences, as methamphetamine may be rendered as amphetamine in less specific drug screens. Since 1999, the trend lines for amphetamines and methamphetamine have moved more or less in concert (Figure 15). Closer examination of DAWN data shows that most mentions classified under amphetamines (93%) were reported simply as "amphetamine." Drug mentions classified under methamphetamine were most frequently reported to DAWN as "methamphetamine" (66%), "speed" (13%), or numerous other terms. Both amphetamines and methamphetamine tended to be concentrated in the same western metropolitan areas. According to the Drug Enforcement Administration,[20] "In fact, their chemical properties are so similar that even experienced users have difficulty knowing which drug they have taken." It is therefore expedient to combine these categories when considering trends. Taken together, amphetamines and methamphetamine accounted for 39,340 mentions nationwide in 2002. Although mentions of amphetamine or methamphetamine were statistically unchanged from 2001 to 2002 and from 2000 to 2002, they have increased 54 percent since 1995 (from 25,515).

ED mentions of amphetamines and methamphetamine in 2002 were concentrated in 6 metropolitan areas in the western United States. Accounting for differences in population, the highest rates of these stimulants were found in San Francisco (91 per 100,000 population), San Diego (68), Phoenix (66), Seattle (46), Los Angeles (39), and Denver (29). Long-term upward trends from 1995 to 2002 were evident in all of these metropolitan areas, except San Francisco and Denver, with increases ranging from a low of 6 percent in Phoenix to more than 70 percent in Los Angeles and Seattle. Larger increases (in percentage terms) were apparent in St. Louis (270%), Minneapolis (257%), and Atlanta (166%), which in 2002 had rates from 20 to 24 ED mentions per 100,000 population. This is consistent with the pattern of methamphetamine diffusion across the United States that has been documented most vividly in treatment data.[21] Substance abuse treatment admissions for methamphetamine began with concentrations in the West, moved eastward along the central tier of Rocky Mountain states, then into the Midwest, followed by movement into the Southeast emanating from Georgia outward. The next wave of amphetamines/methamphetamine among the DAWN metropolitan areas appears to involve New Orleans (16 mentions per 100,000 population), Boston (15), Dallas (12), Detroit (12), and Baltimore (10). These will bear watching.

The remaining 9 major substances of abuse, which form the bottom tier in terms of numbers of ED mentions, are primarily hallucinogens and the so-called "club drugs" MDMA (Ecstasy), GHB, Ketamine, and Rohypnol. Growth in the use and consequences of MDMA (Ecstasy) and GHB, in particular, has received considerable attention in recent years as an important emerging trend in drug abuse.

DAWN first reported on ED visits involving club drugs in a special report in December 2000.[22] ED mentions of MDMA (Ecstasy) were shown to have grown dramatically from 250 ED mentions in 1994 to 2,850 in 1999, with GHB growing similarly from 55 ED mentions in 1994 to 2,973 in 1999. These trends now appear to have peaked in 2000 (Figure 16). ED mentions of MDMA (Ecstasy) began to level off in 2000 and have been unchanged since. ED mentions of GHB declined by a third from 2000 to 2002. Neither has ever exceeded 2 ED mentions per 100,000 population. DAWN estimates for Ketamine and flunitrazepam (Rohypnol) have

[20] U.S. Department of Justice, Drug Enforcement Administration, *Drugs of Abuse*, Arlington, VA, February 2003.

[21] Substance Abuse and Mental Health Services Administration, Office of Applied Studies, *Treatment Episode Data Set (TEDS): 1992-2000. National Admissions to Substance Abuse Treatment Services*, DASIS Series S-17, DHHS Publication No. (SMA) 02-3727, Rockville, MD, 2002.

[22] Substance Abuse and Mental Health Services Administration, Office of Applied Studies, *The DAWN Report: Club Drugs*, Rockville, MD, December 2000.

remained low, and estimates frequently have been too imprecise for publication. Nonetheless, DAWN is one of the few data systems capable of capturing such low-frequency events, and monitoring will continue.

Findings for hallucinogens have been mixed over the 8-year period from 1995 to 2002 (Figure 17). PCP was the only major substance of abuse for which ED mentions increased in all 3 comparison periods: 28 percent from 1995 to 2002 (from 5,963 to 7,648), 42 percent from 2000 (5,404), and 25 percent from 2001 (6,102). LSD was the only major substance to *decrease* across the same periods: 84 percent from 1995 to 2002 (from 5,682 to 891), 78 percent from 2000 (4,016), and 68 percent from 2001 (2,821). Decreases in LSD appear to be widespread, with most metropolitan areas, regardless of size, posting declines. By 2002, none of the metropolitan areas in DAWN had more than 50 ED mentions of LSD.

PCP mentions appear to be concentrated in two East Coast metropolitan areas, Philadelphia (25 mentions per 100,000 population) and Washington, DC (31). The third ranking metropolitan area was Los Angeles, with 11 mentions of PCP per 100,000 population. From 2001 to 2002, PCP mentions increased in both Philadelphia and Washington but the long-term patterns are quite different (Figure 18). In Philadelphia, PCP mentions rose steadily over the period from 1996 to 2002, with large increases from 2000 to 2002 (89%) and from 2001 to 2002 (46%). By contrast, PCP mentions in Washington declined from 1994 to 1999 (from 1,301 to 176 mentions). Since then, PCP mentions in Washington have grown each year, returning to 1,302 mentions (equivalent to 1994 levels) in just 3 years, with a 148 percent increase from 2001 to 2002 alone. Two additional DAWN metropolitan areas on the East Coast have shown recent increases in PCP—Baltimore (60%) and Newark (254%)—but with rates (5 and 7 per 100,000 population, respectively) considerably below those of either Philadelphia or Washington.

OTHER SUBSTANCES OF ABUSE

Drug abuse-related ED episodes involving certain prescription drugs, particularly the benzodiazepines and narcotic analgesics (pain relievers), continue to rise. From 1995 to 2002, ED mentions of benzodiazepines increased by more than one-third (38%), and mentions of narcotic analgesics/combinations increased 2.6 times (from about 45,000 to nearly 120,000).

By 2002, ED mentions of the benzodiazepines were about as frequent as mentions of heroin or marijuana but ranked below cocaine and alcohol. Similarly, mentions of narcotic analgesics/combinations were as frequent as mentions of heroin or marijuana in 2002 and ranked below cocaine and alcohol. Collectively, the 6 most frequently mentioned drugs—alcohol-in-combination, cocaine, heroin, marijuana, the benzodiazepines, and the narcotic analgesics—accounted for 7 out of every 10 drug mentions in drug abuse-related ED visits in 2002. In 1995, these drugs accounted for 6 out of every 10 drug mentions.

Among the benzodiazepines, the most frequent were those reported without a specific ingredient being named (34,697 mentions, 33% of all benzodiazepine mentions). (We classify all of these as benzodiazepines-NOS.) Alprazolam (27,659, 26% of benzodiazepine mentions), clonazepam (17,042, 16%), diazepam (11,193, 11%), and lorazepam (11,042, 10%) were the most frequently named benzodiazepines. Only benzodiazepines-NOS (up 55% from 2000 to 2002) and alprazolam (up 25% from 2000 to 2002) showed recent increases. Long-term increases were evident for benzodiazepines-NOS (199% from 1995 to 2002), alprazolam (62%),

and clonazepam (33%). Neither short- nor long-term changes in ED mentions of diazepam or lorazepam were evident.

Among the narcotic analgesics and narcotic analgesic combinations, the most were those reported without a specific ingredient being named frequent (42,211 mentions, 35% of all such mentions). Most of such mentions (96% in 2002) were reported to DAWN as "opiates" or "opioid," which could indicate the presence of a prescription opiate or heroin. We classify all of these as narcotic analgesics-NOS. The unnamed narcotic analgesics were followed in frequency by mentions of narcotic analgesics and combinations containing hydrocodone (25,197, 21% of all mentions of narcotic analgesics/combinations), oxycodone (22,397, 19%), and methadone (11,709, 10%). The long-term findings for unnamed narcotics, as well as those containing hydrocodone, oxycodone, and methadone, are consistent. Mentions for each of these have risen substantially from 1995 to 2002: hydrocodone/combinations 160 percent, methadone 176 percent, narcotic analgesics-NOS 341 percent, and oxycodone/combinations 560 percent. In terms of recent increases, ED mentions of oxycodone/combinations doubled from 2000 to 2002, while mentions of narcotic analgesics-NOS rose 63 percent, methadone 50 percent, and hydrocodone/combinations 25 percent.

The less frequent narcotic analgesics show different patterns. Mentions of codeine/combinations rose 33 percent from 2001 to 2002 (from 3,720 to 4,961), but this still represents a 43 percent decline from 1995 (8,732). Mentions of morphine/combinations doubled from 1995 to 2002 (from 1,283 to 2,775) but have been stable in recent years. Meperidine/combinations (722 mentions in 2002) and propoxyphene/combinations (4,676) have also been stable. Fentanyl/combinations rose to 1,506 ED mentions in 2002. Although still relatively infrequent, this is remarkable because its mentions doubled in a single year (from 710 mentions in 2001). Fentanyl is marketed in several forms, as an injectable, transdermal patch, and oral lozenge, which have been approved by the FDA at different times over the past 2 decades.[23] Unfortunately, DAWN data cannot reliably tell us which form is more prevalent in drug abuse-related ED episodes.

Two confounding factors that affect the interpretation of these findings for narcotic analgesics are important to emphasize. First, a toxicology finding that is positive for "opiates" could point to any of a number of prescription opiates *or heroin*. For this reason, we cannot attribute to any particular drug the findings associated with narcotic analgesics-NOS nor can we assume that the prescription opiates are necessarily represented proportionately.

Second, as we have reported previously, classification issues also affect the interpretation of findings for the named narcotic analgesics. Categories noted as "oxycodone/combinations," "hydrocodone/combinations," etc., which aggregate single- as well as multi-ingredient formulations, were designed to account for variability in source documentation on which DAWN case reports are based. For example, narcotic analgesics containing hydrocodone are usually reported to DAWN as acetaminophen-hydrocodone compounds, but if secondary ingredients such as acetaminophen, aspirin, or ibuprofen are not documented in source records, they would also be unavailable for reporting to DAWN. Therefore, mentions attributed to hydrocodone alone may include any of the hydrocodone compounds. Similarly, mentions attributed to oxycodone could include undocumented acetaminophen- or aspirin-oxycodone compounds as well as single-ingredient formulations.

[23] Food and Drug Administration, Center for Drug Evaluation and Research, *Electronic Orange Book: Approved Drug Products with Therapeutic Equivalence Evaluations*, http://www.fda.gov/cder/ob/default.htm, May 2003.

DAWN REDESIGNED

As noted earlier, this is the last publication in a lengthy, longitudinal data series related to drug abuse. Permanent disruption of such a long statistical trend is not undertaken lightly and such was the case with DAWN. Although its demise may be regretted in some quarters, it is not without reward.

The rationale for fundamental change in DAWN is straightforward. While the population of the U.S. and its health care system changed dramatically over the past 3 decades, DAWN data collection continued to operate under a protocol that was essentially static since its inception in 1972. Most of the features of DAWN, from the cases and data items collected to the choice of metropolitan areas, are historical artifacts that do not reflect the realities of today's health care system or necessarily fulfill the needs of DAWN's users. This has led to misunderstandings about DAWN's design and its data, misinterpretation and criticism of its findings, and unfounded assumptions about whom and what it represents.

To address these issues and concerns, the Office of Applied Studies at SAMHSA initiated a formal assessment of DAWN's strengths and shortcomings in late 1997. This was followed by a 2-year evaluation of design alternatives out of which a series of recommendations and then a whole new design emerged. Throughout this process, the needs of users and the feasibility of proposed changes were in constant consideration. The new design is being implemented beginning with the 2003 data year. Some of its most important features and the problems they were designed to solve are discussed below. Emphasis here is given to the solutions to problems highlighted earlier in this publication.

For its entire 30-year history, DAWN has collected data on drug abuse-related visits to hospital emergency departments. Only visits meeting restrictive criteria for "drug abuse" were included and "drug abuse," as defined by DAWN, hinged on the patient's intent. That is, a case was reportable if the patient's reason for the using the drug was drug dependence, an attempt to commit suicide, or to achieve psychic effects. (So-called "recreational use" would usually fall into the psychic effects category.) Reportable cases could involve the use of an illegal drug, the nonmedical use of a legal drug, or the inhalation of a non-pharmaceutical substance, but visits in which "intent to abuse" was absent were excluded, regardless of the drug involved.

In the real world, ED medical records rarely include such explicit documentation of intent, as it is largely inconsequential for patient care and frequently an obstacle to insurance payment. Thus, the definition of a DAWN case, with the patient's intent as an essential element, was difficult to implement and impossible to implement consistently. If the definition were strictly applied, cases involving use or misuse of a drug were lost any time the source record lacked documentation of *abuse* as defined by DAWN. If the definition were improperly or inconsistently applied—that is, if intent were inferred rather than documented—the data were systematically flawed. Moreover, the case criteria were difficult to explain and led to substantial confusion about what DAWN actually measured. Excluded were certain classes of ED visits of interest to DAWN users, such as ED visits related to misuse of prescription and OTC drugs, drug-facilitated assaults, adverse reactions to prescription or OTC drugs, and alcohol (in the absence of other drugs). Included were current drug abuse cases as well as cases having only a history of drug abuse, leading to a mix of acute and chronic conditions.

Beginning in 2003, the definition of a DAWN-reportable case has changed. A case is any patient treated in an ED for a condition induced by or related to drug use. DAWN no longer relies on a flawed determination of a patient's intent. The criteria are deliberately broad and

simple to implement. They are practical because they were designed with a recognition of the limitations of medical record documentation. Supplementary data items will be used to parse out 8 different types of cases captured by this "broad net": Suicide attempts, those seeking detox, underage alcohol use (with no other drug involved), adverse reactions to legal drugs, overmedication, malicious poisonings (e.g., drug-facilitated sexual assault), accidental ingestions, and all others, including explicit drug abuse. Different case types, singly and in purposeful combinations, will be of interest to different audiences or user groups.

For about 20 years, DAWN has been the responsibility of the U.S. Department of Health and Human Services, but no information about health was ever collected. Beginning in 2003, presenting complaint(s), diagnoses, and a verbatim case narrative are being collected on DAWN cases. These will provide for better understanding of both the reason for the ED visit and of the health consequences of drug use and abuse. However, DAWN cases involving chronic conditions associated with a history of drug abuse (and no current use) are no longer collected.

DAWN continues to collect detailed drug information, but the approach to collecting this data also is changing. Beginning in 2003, the number of reportable drugs is expanded from 4 to 6, in light of the growth of multiple drug use and to make the ED data consistent with the mortality data collected from medical examiners and coroners. Training for DAWN data collectors now emphasizes reporting drug names as specifically and accurately as possible. To this end, automatic prompts have been added to electronic data entry systems to help DAWN reporters improve specificity and accuracy. Entry of a nonspecific class of drug, such as "opiates" or "benzodiazepine," is challenged and the reporter is prompted to enter a more specific drug name, if such information exists in the patient's chart. Entry of potentially duplicative information, such as "opiates" and "heroin" or "alprazolam" and "benzodiazepine," is challenged and the reporter is prompted to remove the less specific entry, if it refers to the same drug. For each drug, a data item has been added to indicate whether the presence of the drug was confirmed by toxicology testing. This will provide a much-needed measure of reliability for the drug information. Reporting of current medications unrelated to the ED visit has been eliminated from the DAWN protocol. In old DAWN, such "incidental reporting" was an accepted, but unmeasurable, practice.

In addition to changes in content, structural changes to the DAWN sample have begun.

For most of its 30 years, DAWN has focused particular attention on the same 21 metropolitan areas chosen purposefully in the 1970s. Since that time, the population of the U.S. has changed, with a preponderance of migration to the south and west.

Beginning in 2003, DAWN has begun an expansion that, upon completion, will reach into the most populous metropolitan areas in each of the 9 Census divisions of the U.S. A total of 48 major metropolitan areas is planned; all of the current 21 will be preserved. The goal is to enhance both population and geographic coverage. By focusing on the 9 Census divisions, no area of the country will be unrepresented, and considerable variation in metropolitan area size will be achieved.

Since 1988, DAWN has produced estimates based on a probability sample of hospitals designed a few years earlier. Since that time, the health care system and, most especially, the hospital industry, have changed dramatically. The old sample design was stratified using location (metropolitan areas divided into central city and outside central city) and characteristics of hospitals (volume of ED visits exceeding 80,000, presence of outpatient units and inpatient

substance abuse treatment) that were pertinent at the time. "National" estimates from this sample represented only the coterminous U.S., the 48 States and the District of Columbia. Other limitations of this design have grown over time. Although hospitals changed in size and outpatient units became ubiquitous, hospitals in the DAWN sample were fixed in their original sampling strata. Moreover, precision was limited, and strata containing a single hospital became problematic if critical data were missing.

Beginning in 2003, DAWN has begun to implement a newly designed sample of hospitals. The new sample will be capable of producing estimates for the entire Nation as well as the additional metropolitan areas discussed above. Metropolitan-area definitions have been updated to current standards. The sampling strata are designed to be more flexible and are based on location (specific metropolitan area or National Panel region) and the hospitals' characteristics in terms of ownership (public or private) and size. The size of the sample was derived with the explicit purpose of improving the precision of estimates.

These are some of the most important and fundamental changes to DAWN. In each instance, the decision to change was arrived at through a deliberate process that included an evaluation of alternatives and assessment of feasibility. None of these changes, in content or structure, is minor, and none could be accomplished without a disruption in trends. Therefore, with the next publication of *ED Trends From DAWN*, we will begin anew.

CONCLUSION

DAWN data show one dimension of the total consequences of drug abuse, specifically the impact of drug use that manifests in visits to hospital EDs. Compared with other significant public health issues, relatively few data sources are available to help us understand drug abuse. For 3 decades, DAWN has been one of the few sources of such data. With the changes discussed above, DAWN will become a much more effective and reliable source in the future.

DAWN does not measure the prevalence of drug use in the population, the untreated health consequences of drug use, or the impact of drug use on health care settings other than hospital EDs. While ED visits are one useful indicator of the drug abuse problem in communities, the population that presents to a hospital ED may differ dramatically from the drug-using population at large. For measures of prevalence, we refer readers to the National Household Survey on Drug Abuse (NHSDA),[24] a national survey of households that explores drug abuse in the population. For example, according to the 2001 NHSDA, 15.9 million Americans age 12 and over had used an illicit drug or certain prescription drugs nonmedically in the past month. This number rose to 28.4 million when the period was extended to include use of such drugs in the preceding year. DAWN estimated just over 670,000 ED visits related to drug abuse in 2002. Even discounting the presence of multiple visits for a single individual, only a fraction of individuals using drugs ever present to an ED for a problem related to that drug use. Further, those individuals are unlikely to be a representative cross-section of drug abusers.

Many factors, some related to drug abuse and others totally unrelated (e.g., insurance coverage), will influence whether an individual seeks care in an ED. These, in turn, can influence the DAWN estimates of ED visits and mentions of particular substances. Changes in the number of drug-related emergencies may be due to changes in the use of drug

[24] Substance Abuse and Mental Health Services Administration, *Summary of Findings from the 2001 National Household Survey on Drug Abuse*. Office of Applied Studies, NHSDA Series H-13, DHHS Publication No. (SMA) 01-3549. Rockville, MD, 2001.

combinations; patterns of drug use, such as route of administration; amount of drug used per administration; drug purity; or drug price. For example, a decrease in the purity of cocaine or heroin could result in fewer users experiencing unexpected reactions and overdoses. Estimates of drug-related ED episodes could increase or decrease over time for reasons unrelated to the size of the drug-using population, such as factors that affect reporting patterns. Examples of these include:

- Greater awareness of drug abuse problems by hospital staff who therefore document drug use more carefully in medical charts,
- Changing patterns of ED use by drug users,
- Different ED usage patterns by population subgroups, and
- Other data collection or sample composition changes (see Appendix B).

Appendix B includes a detailed account of known procedural anomalies in DAWN. Analysis of procedural factors that might contribute to spurious results suggests that procedural factors are unlikely to account for the differences reported here. However, the impact of changes preparatory to the redesign cannot be ruled out entirely. For example, when SAMHSA selected a new data collection contractor for DAWN, the entire transition from old to new contractor transpired during 2002.

Finally, although DAWN is capable of detecting certain drugs of abuse before their appearance in other data systems, findings from DAWN alone cannot define an emerging drug abuse problem or quantify precisely the abuse potential of prescription drug products. Instead, DAWN identifies sentinel events—*indicators* of a *potential* drug abuse problem—which DAWN can then monitor over time. This information can be put together with information from other sources (other indicators) to determine whether a new drug abuse problem is emerging. Relying on information from DAWN alone would likely result in false positives—identification of problem substances when no problem exists—but this is a hazard when trying to track any problem in its early stages, and it is not a hazard peculiar to DAWN.

In addition, with all prescription and OTC drugs, it is possible that some proportion of ED mentions will be prescription drugs taken as directed and present coincident with another reportable substance. It is not possible to quantify this issue, but we urge public policymakers, regulators, and others to take these factors into account.

Figure 13
ED mentions of alcohol-in-combination, cocaine, heroin, and marijuana: 1995 through 2002

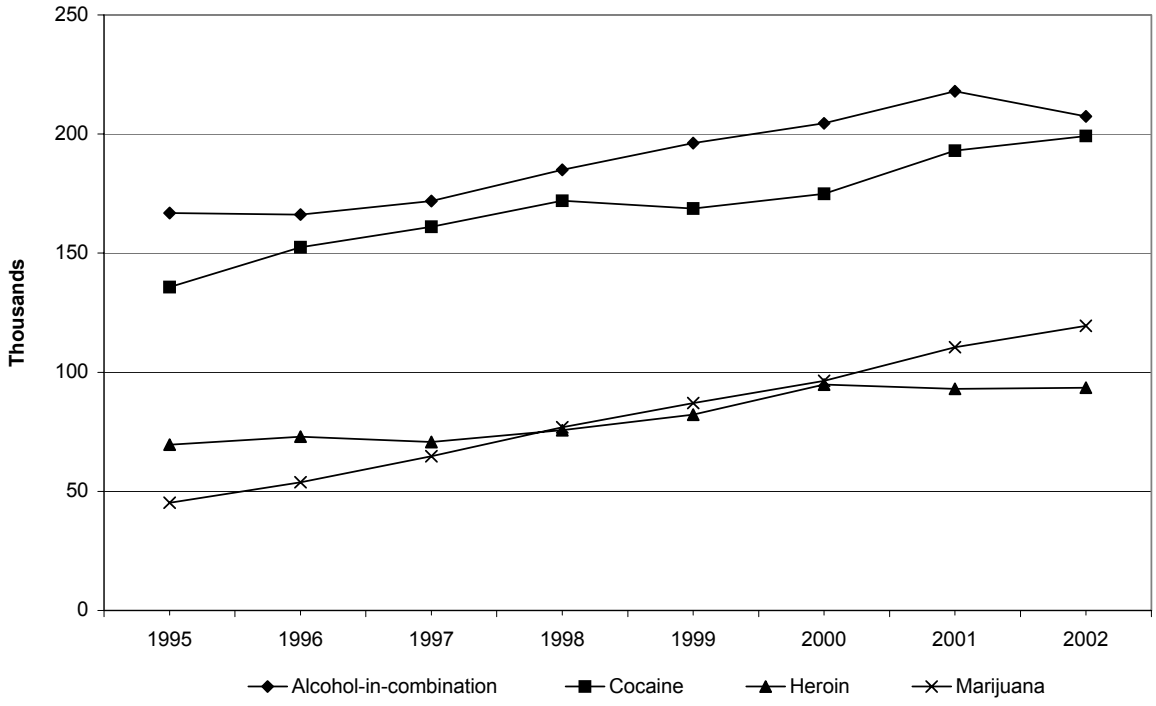

Figure 14
ED mentions of marijuana among patients age 12 to 17 and age 18 to 25: 1995 through 2002

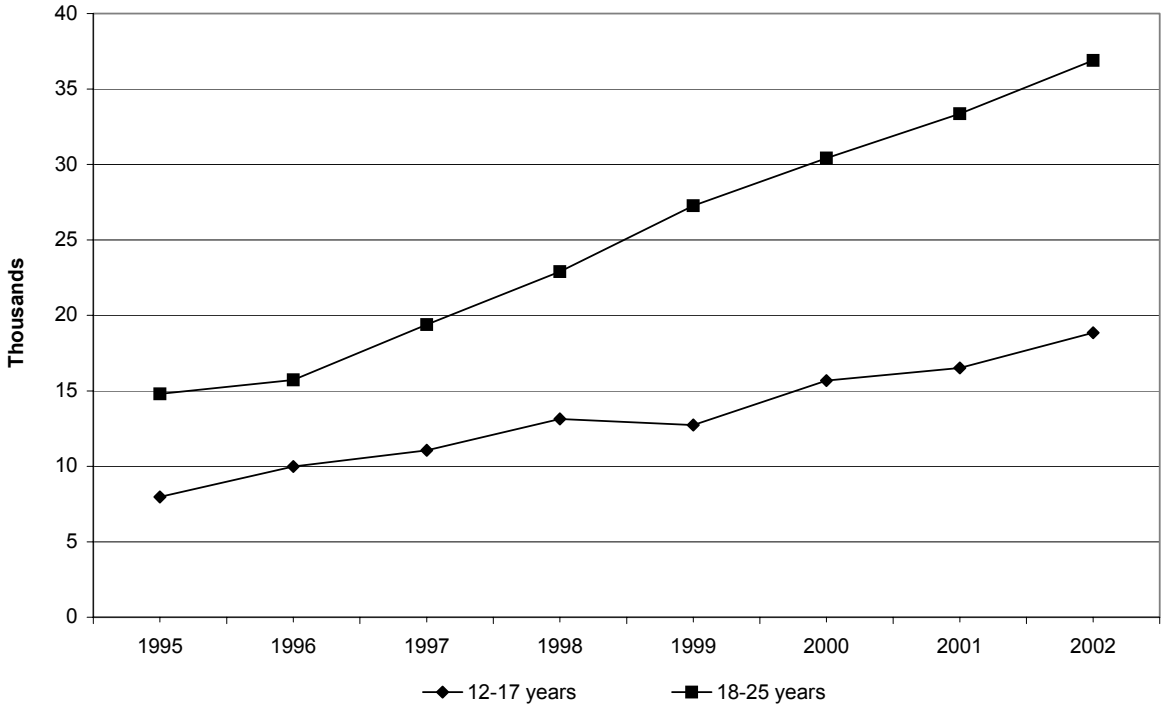

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Figure 15
ED mentions of amphetamines and methamphetamine:
1995 through 2002

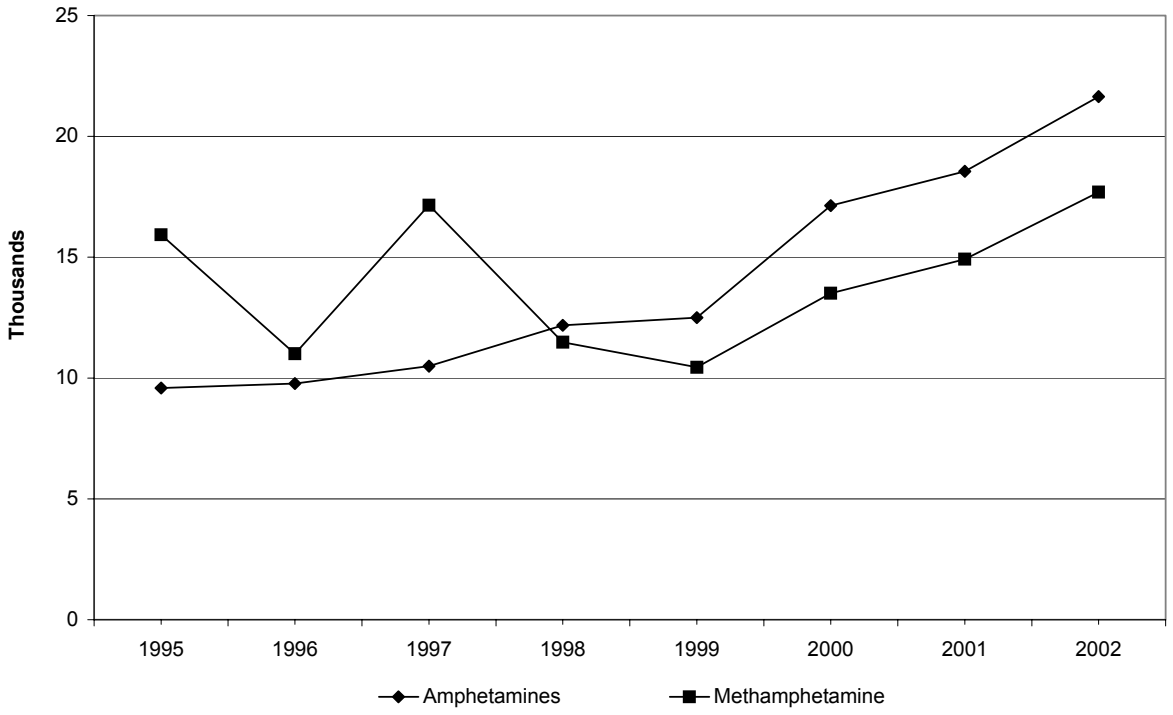

Figure 16
ED mentions of MDMA (Ecstasy) and GHB:
1995 through 2002

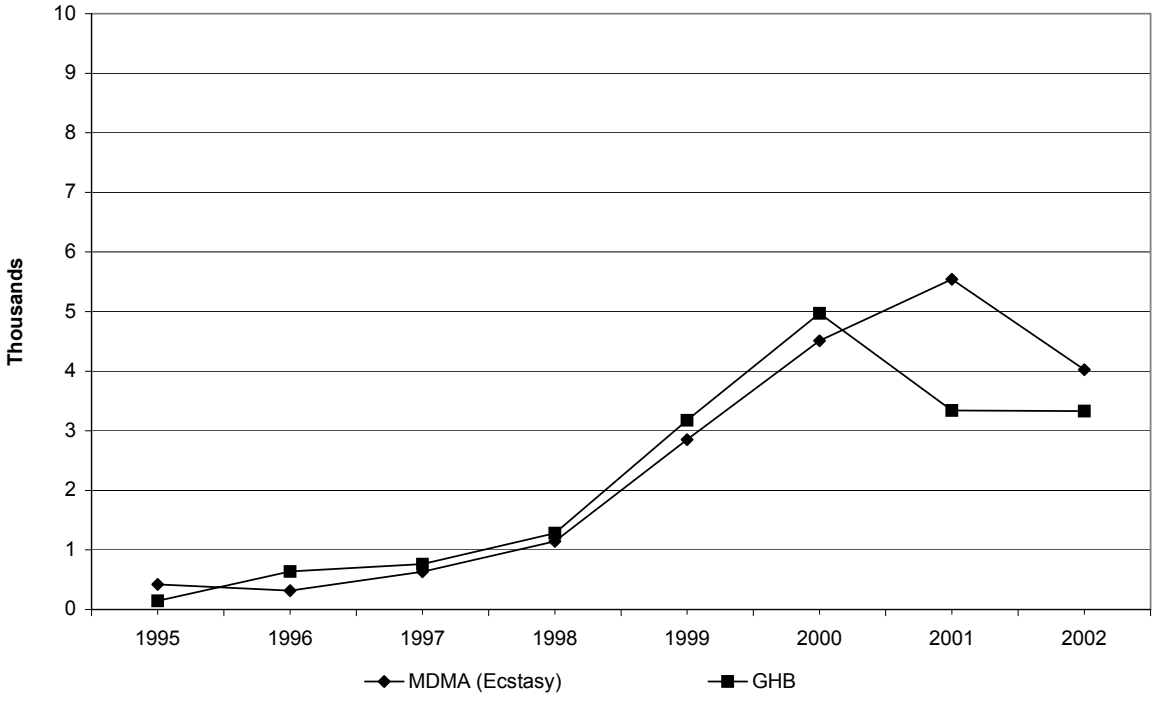

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Figure 17
ED mentions of LSD and PCP:
1995 through 2002

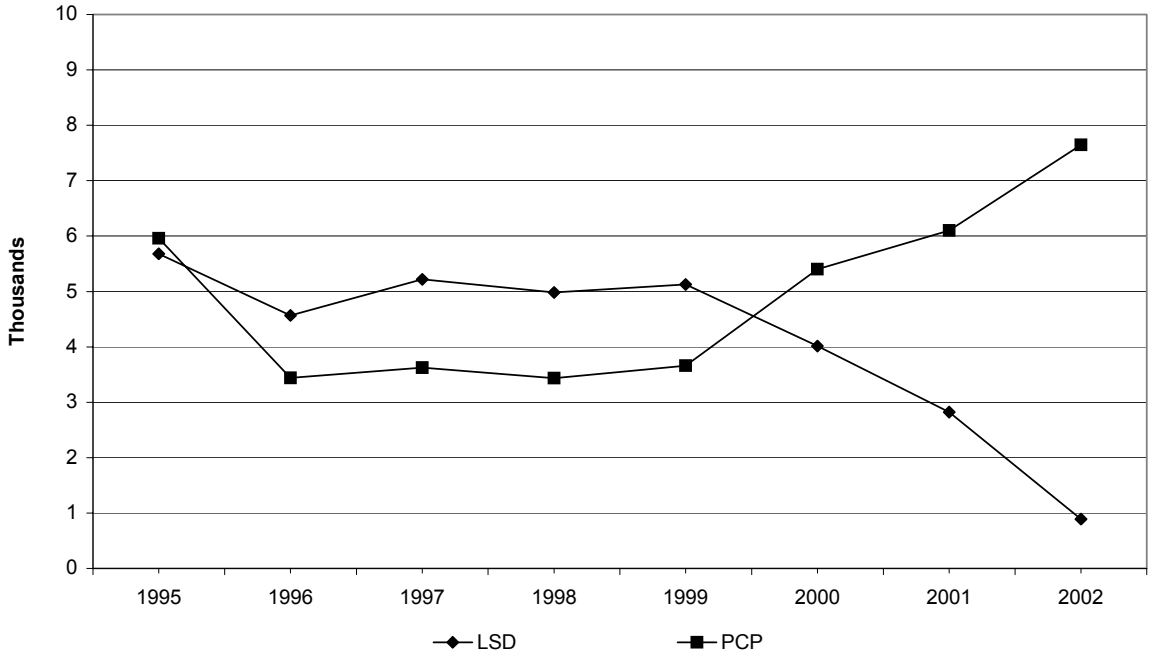
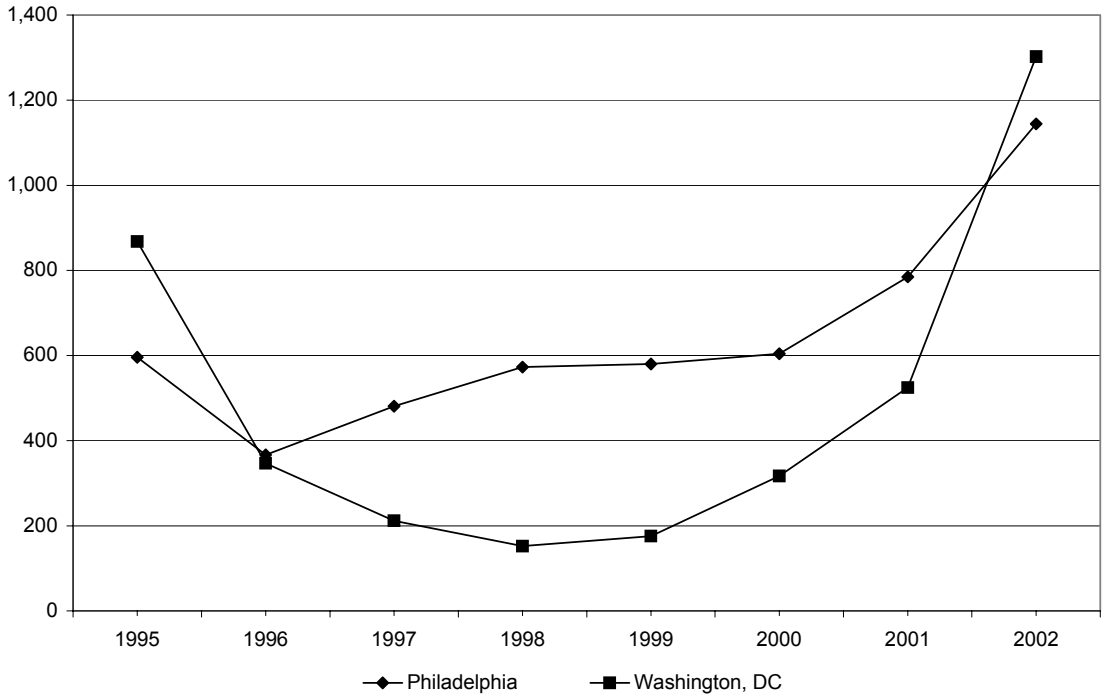


Figure 18
ED mentions of PCP in Philadelphia and Washington, DC:
1995 through 2002



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APPENDIX A:
RACE AND ETHNICITY DATA IN DAWN

Beginning in January 2000, the race and ethnicity categories on DAWN data collection forms changed to match a revised standard protocol.[25] The new protocol permits separate reporting of race and Hispanic ethnicity, and it incorporates 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 2 categories, "Asian" and "Native Hawaiian or Other Pacific Islander"); and elimination of the "Other" category. The complete DAWN report form is reproduced in Appendix F.

Despite the increased detail allowed by the new categories, the actual race and ethnicity data extracted from source records and submitted to DAWN changed very little. This is because the source documents—ED medical records from which DAWN data are abstracted—rarely contain such detailed information on race and ethnicity of patients.

For reference, estimates of race and ethnicity in drug-related ED visits are presented in Table 1.10.[26] This analysis, which is based on the most detailed coding of race and ethnicity in DAWN case reports, reveals that estimates for the following categories are too small to be meaningful:

- Two or more races (that is, 2 or more races 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 the categories used previously to tabulate DAWN data, with one exception. A new category called "Race/ethnicity not tabulated above (NTA)" is used to tabulate those categories that are too small to report independently.[27] 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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[25] See Office of Management and Budget, *Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity, Federal Register,* 62 FR 58782, October 30, 1997.

[26] These detailed estimates conform to the OMB guidance on tabulation of race and ethnicity data in Office of Management and Budget, *Draft Provisional Guidance on the Implementation of the 1997 Standards for the Collection of Federal Data on Race and Ethnicity*, February 17, 1999.

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

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APPENDIX B: DETAILED DESCRIPTION OF DAWN

This section gives a detailed description of the methods and some of the history behind DAWN analysis. The section begins with a description of the sample design, followed by weighting, precision of the estimates, preliminary versus final estimates, rates per 100,000 population, and revision of the estimation system.

SAMPLE DESIGN

The Drug Abuse Warning Network (DAWN) is a voluntary, national data collection system that gathers information on substance abuse that manifests in visits to hospital emergency departments (EDs) in the coterminous U.S. Currently, DAWN provides semi-annual and annual estimates of the number of drug-related visits to hospital EDs from a nationally representative sample of hospitals located throughout the coterminous U.S. The DAWN system is managed by the Office of Applied Studies (OAS), a component of the Substance Abuse and Mental Health Services Administration (SAMHSA) of the U.S. Department of Health and Human Services (DHHS).

Several changes have been made to the sample design since DAWN began in 1972 under the Drug Enforcement Administration (DEA). In the early 1970s, the DAWN sample consisted of a random sample of hospital EDs. Over time, however, a number of facilities were lost from the original sample because of closures, mergers, attrition, or voluntary termination. New hospitals were recruited to participate, but no sample maintenance plan was devised for selecting new hospitals to sustain the randomness of the sample. As a result, attrition and nonrandom replacement led to a sample that was no longer representative of all hospital EDs in the coterminous U.S.

When the National Institute on Drug Abuse (NIDA) assumed responsibility for DAWN in 1980, one of the agency's goals was to implement a new sample that could be used to produce estimates for the Nation as a whole and for the separate DAWN metropolitan areas. Once a design was determined and the units were selected, the sample required the recruitment of 300 new hospitals. The cost of the project delayed its initiation until early 1986.

Hospitals eligible for DAWN are non-Federal, short-stay general surgical and medical hospitals in the coterminous U.S. that have a 24-hour ED. The American Hospital Association's (AHA) 1984 and 1985 Annual Surveys of Hospitals were used to obtain a sampling frame. (For a definition of sampling frame and other technical terms used in this publication, see the Glossary of Terms in Appendix D.)

Hospitals in the sampling frame were stratified according to several characteristics. First, the sampling frame was divided into the 21 DAWN metropolitan areas and the remainder of the country (called the National Panel). Hospitals having 80,000 or more annual ED visits were assigned to a single stratum for selection with certainty. Then, the remaining hospitals in the 21 metropolitan areas were classified by location (inside or outside the central city) and by whether the hospital had an organized outpatient department and/or a chemical/alcohol inpatient unit

(that is, whether it had zero, one, or both types of units). Similarly, hospitals in the National Panel were classified by the presence/absence of such units.

The 21 metropolitan area boundaries correspond to the Office of Management and Budget (OMB) 1983 definitions of Metropolitan Statistical Areas (MSAs) and Primary Metropolitan Statistical Areas (PMSAs) with a few exceptions. In the case of the Boston metropolitan area, the OMB definition was replaced by the definition for the New England County Metropolitan Area (NECMA). In several metropolitan areas, use of the PMSAs excluded some counties covered by DAWN prior to 1988, such as Nassau and Suffolk Counties in New York, certain counties in the Chicago area, and Niagara County in the Buffalo area. In other areas, such as Atlanta, counties not previously covered in DAWN were included. In addition to geographic coverage, the central cities in the new statistical areas differ from those in the old MSAs used previously in DAWN. For example, Hialeah joined Miami as a central city in the new Miami-Hialeah area, and Long Beach joined the Los Angeles-Long Beach area. In some instances in this publication, only the first city name is cited, but it always refers to the complete metropolitan area.

Sample sizes for the metropolitan areas and the National Panel were determined for each stratum so as to achieve specified levels of precision in the estimates. In this context, precision refers to the amount of sampling fluctuation inherent in the estimate; the less the fluctuation, the greater the precision. Target precision levels were expressed as relative standard errors (RSEs), defined as the ratio of the standard error (SE) of an estimate to the value of the estimate, expressed as a percentage. Lower RSE values are associated with higher levels of precision and, other things being equal, increases in sample size serve to reduce the RSE and thus increase the level of precision of the estimates. Estimates are considered unreliable and are suppressed in DAWN if their RSEs exceed 50 percent. Target RSEs for total episodes were 6 percent for the national estimates; 6 percent for the Chicago, Los Angeles, and New York metropolitan areas; and 8 percent for all other metropolitan areas. In 5 of the metropolitan areas (Baltimore, Buffalo, Denver, San Diego, and San Francisco), such a large proportion of facilities in each area would have been required to reduce the RSE to 8 percent that the decision was made simply to select all eligible hospitals. Figure 1 shows RSEs for total drug-related episodes by metropolitan area.

Once the sample size for each metropolitan area and the National Panel was determined, the number of sample units was allocated to the various strata based on the theory of optimal allocation. With this approach, strata with greater variability in drug-related episodes (from hospital to hospital) receive a proportionally larger number of sample units. Optimal allocation serves to reduce the RSE of the estimates for a given overall sample size or to enable a specified RSE to be achieved with a smaller sample, relative to proportional or random allocation to strata.

A total of 685 hospitals were selected for the new sample. Many of the facilities selected, particularly the larger ones, were already participating in DAWN. As noted earlier, 300 new hospitals had to be recruited. Recruitment started in April 1986 and proceeded in phases. By 1988, recruitment of the selected facilities was sufficiently complete to produce estimates based on the new sample.

Some facilities already participating in DAWN were not selected for the new sample. These facilities were retained in the system for sufficient time to obtain overlapping data for calibrating the estimates and developing estimation procedures for prior years. The period of overlap differed by metropolitan area but generally included the last quarter of 1988 and the first half of

1989. Most terminations of nonselected facilities were made in the second half of 1989 or in 1990.

The total number of eligible sample facilities has not remained at the original 685 because some hospitals have closed or become ineligible since the sample was selected while others have been added as part of sample maintenance. To preserve the integrity of the sample and ensure that the DAWN estimates will continue to be representative, sample maintenance is performed annually. Maintaining the sample involves updating the sampling frame with the most recent available information on the population of eligible hospitals. One purpose for updating the sampling frame is to identify newly eligible hospitals, or hospitals that are eligible and previously did not have a chance of selection, so that they can be sampled. A second purpose, which focuses on the estimation process, is to determine the population of eligible hospitals to which the estimates must apply, as well as the total number of ED visits among this population, which is used in the calculation of the analytical weights.

SAMPLING WEIGHTS

By 1988, hospital recruitment had progressed to a point where national estimates and estimates for each of the 21 metropolitan areas could be made with reasonable precision. National estimates are obtained by adding the estimates from the 21 metropolitan areas and the estimate from the National Panel for each estimation category.

The development of estimates from the sample data involves the application of analytical weights calculated on the basis of data from the sampling frame and from DAWN reporting records. Weights are calculated for each quarter of data using a 3-component model that considers:

- The base sampling weight calculated as the reciprocal of the sampling probability;
- An adjustment for nonresponse based either on complete nonparticipation or failure to provide data on all the reporting days in a given time period; and
- A correction (benchmark) factor, applied within metropolitan areas, that adjusts the total number of ED visits among participating sample hospitals to the total for the population of hospitals as determined from the sampling frame.

The estimation procedure was modified in 1989 to include the adjustments for 2 types of nonresponse and the ratio or benchmark adjustment based on ancillary data from AHA.

PRECISION OF THE ESTIMATES AND STANDARDS FOR PUBLICATION

Each estimate from the DAWN ED sample data is subject to sampling variability, which is the variation in the estimate that would be observed if different samples were drawn from the same population using the same procedures. The sampling variability of an estimate is measured by its standard error (SE) and relative standard error (RSE), which is defined as the SE expressed as a percentage of the value of the estimate. The precision of an estimate is inversely related to the degree of sampling variability as measured by the RSE; the greater the RSE value, the lower the precision.

For example, if there are 10,000 estimated mentions of a given drug and this estimate has an SE of 500, then the RSE value is 5 percent. Therefore,

RSE = SE/Estimate
RSE = 500/10,000
RSE = 0.05

Confidence intervals (CIs) for estimates can be calculated using the corresponding RSE values published in these tables. If the sampling distribution for the estimate is normal, then the 95-percent CIs would be calculated as

$$CI = Estimate \pm 1.96 \times RSE \times Estimate$$

where 1.96 comes from the table of normal distribution z-values. Ninety-five percent of the normal distribution lies between the z-values of ± 1.96.

Applying the formula in our example, the confidence limits would be as follows:

$10{,}000 \pm 1.96 \times 0.05 \times 10{,}000 = 10{,}000 \pm 980.0$
Lower limit: 10,000 - 980 = 9,020
Upper limit: 10,000 + 980 = 10,980
Confidence interval: 9,020 to 10,980

This means that if new samples were drawn from the same population of hospitals using the same sampling and data collection procedures, then the estimated total mentions of the drug in question would lie between 9,020 and 10,980 in 95 percent of the sampled hospitals.

One simple rule is that in 68 percent of the episodes, estimates derived from repeated sampling would be expected to differ from the observed estimate by a percentage no more than the RSE value in either direction.

It is important to recognize when this CI formula should and should not be used. This formula can be used to calculate CIs around individual estimates, but some statistical comparisons between estimates (e.g., tests for differences across time) should not be made using this formula. For example, a reader might want to calculate CIs around 2 estimates and use those CIs to make a statistical comparison for which we did not publish a statistical test. (We publish only a fraction of the statistical tests that might be of interest.) However, the CI formula above may yield overlapping CIs, even though the difference between the 2 estimates is statistically significant. This is because a comparison of 2 estimates must take into account not only the variance (var) of each estimate, but also the covariance (cov) between the estimates as follows:

$$var(x - y) = var(x) + var(y) – 2cov(x,y)$$

Therefore, the above method for calculating CIs can be used only to compare independent estimates (i.e., where the covariance is zero). Whenever 2 estimates are not independent, as with ED episodes from 2 different years, their covariance must be taken into account.

The tests of statistical significance published in *ED Trends* account for the covariance between estimates from different years. From this, we know that the covariance between

DAWN estimates is often sizable. Given the tremendous number of possible comparisons between DAWN estimates, it is not possible to publish comprehensive covariance matrices at this time.

Examples of estimates, SEs, RSEs, and CIs are shown in Tables 1.6 and 1.8. RSE values for total episodes vary according to metropolitan area, not only because of differences in the target precision levels in the sample design, but also because of nonresponse. Table 1.8 shows estimates of mentions for selected drug categories for the total coterminous U.S. As illustrated in this table, larger estimates tend to have lower RSE values, at least in the national estimates.

DAWN estimates with an RSE value of 50 percent or higher are regarded as too imprecise for publication and are not shown in tables. With an RSE of 50 percent, the 95-percent CI for an estimate ranges from 2 percent to 198 percent of the estimate's value. In the tables, the symbol "…" is substituted for estimates that have an RSE of 50 percent or higher. The 3-dot symbol identifies cells in which the estimates do not meet the standard of precision required for publication.

Historically, estimates of less than 10 were not shown in the tables because we deemed them and their associated RSEs to be unreliable. Percentages corresponding to these numbers were shown or suppressed according to the same rules.

Beginning with the 1999 ED data, estimates of less than 10 are no longer suppressed in DAWN Detailed ED Tables or other ED publications. Many estimates as small as this will be suppressed by virtue of having RSEs greater than 50 percent. For those that are shown in the tables, we note for the reader that small numbers and their associated RSEs should be interpreted with caution.

Beginning with the 1999 ED and 1997 mortality data, we began suppressing small cells in selected tables to protect the confidentiality of individuals who are the subjects of these data. We will continue this practice for tables that involve detailed cross tabulations of patient and geographic characteristics.

PRELIMINARY VERSUS FINAL ESTIMATES

Final estimates are produced annually when all hospitals participating in DAWN have submitted their data for that year and when ancillary data used in estimation have become available. In recent years, the final publication has included separate final estimates for the first half and the second half of the year (quarterly estimates were produced in earlier years). In addition to the final estimates, preliminary estimates are also produced semi-annually based on data from responding hospitals. Data are weighted to produce national and metropolitan area estimates of ED drug-related mentions. The following factors clarify differences between preliminary and final estimates:

- Preliminary estimates may be based on less complete data than final estimates. Data from late-reporting hospitals are used in the production of final estimates. Data are continuously updated for a fixed time period. As such, final estimates usually have higher response rates.

- The DAWN sample is updated once annually, before the production of final estimates. Additional hospitals are added to the sample and incorporated into the final estimates

for a given year (not the preliminary estimates for that same year). Most of these hospitals are "newly eligible" because they became DAWN eligible sometime after the original sample was selected. The final DAWN estimates are produced after we receive the most current AHA Annual Survey of Hospitals file. This file is used initially to establish a sampling frame for DAWN. The most current AHA file is used once a year to maintain representativeness of the sample. Between the releases of the preliminary and final estimates, the use of the newer AHA survey can result in hospitals being added to the sample and incorporated into the final estimates.

- Data from the most current AHA file also are used to produce the final benchmark-adjusted weights.

ESTIMATES OF RATES PER 100,000 POPULATION

Rates of ED episodes or mentions per 100,000 population are generated using population data from the U.S. Bureau of the Census. The Office of Management and Budget (OMB) defines *Metropolitan Area* as the city core and its immediately adjacent geographic areas that are highly integrated economically and socially with the city core. For each metropolitan area and for the coterminous U.S., estimates of incidence rates are obtained by taking the estimates of total episodes and mentions for a given demographic category, dividing by the population estimate for that demographic category, and dividing by 100,000. These standardized measures provide the means for comparing drug abuse episodes and mentions across cities and over time. Semi-annual estimates are based on preliminary data from the first half of the year and are not comparable to annual estimates, which are based on 12 months of data.

Population estimates are derived from the following U.S. Census Bureau files:

- Civilian Noninstitutional Population of the United States by Age, Sex, and Race, which provides monthly population estimates by age, gender, race, and Hispanic origin for the total United States;

- Decennial Census Counts by Age, Sex, and Race, which provides population estimates by state and county, broken out by combinations of age, gender, race, and Hispanic origin; and

- County-Level Population Estimates, which provides estimates of annual total population by county as of July 1 of each year.

Population estimates[28] are obtained by:

- Adjusting the annual County-Level Population Estimates to the Census Counts by Age, Sex, and Race to produce annual county demographic counts;

- Adjusting the annual county demographic counts to the Civilian Noninstitutional Population data to produce monthly county demographic counts; and

[28] Table 1.9 shows population estimates by age and gender by metropolitan area.

- Summing the monthly county demographic counts across all counties in the metropolitan area and across all months in the quarter (half year or year), to produce semi-annual or annual demographic counts for each DAWN area.

DAWN estimates of rates per 100,000 population for 1994 through 2000 rely on annual population estimates extrapolated from 1990 Census data, and those beginning with 2001 use population estimates projected from the 2000 Census. Inevitably, the accuracy of population estimates deteriorates over time relative to actual census counts. Population estimates for 2001, which are based on the 2000 Census, are considerably higher than population estimates generated for recent years. As a result, the incidence rates for 2001 and 2002 may appear to have decreased significantly (or not to have increased as much as expected), but this may be an artifact of the increase in the population denominators for these rates. Changes in rate estimates between 2001 and 2002 and prior years should be verified by comparing changes in the corresponding episode or mention estimates and their significance levels. If a statistically significant change in episode or mention estimates did not occur, it is likely that the statistically significant change in the rate was due to the changes in population.

REVISION OF ESTIMATION SYSTEM

In 1997 and 1998, the SAMHSA contractor, Westat, conducted a thorough review of the DAWN estimation system. As a result of this review, the computer programs that compute the weighted estimates were rewritten to make them more accurate and efficient. While the methodology for computing weights did not change, errors were discovered in the prior programs that affected the estimates for 1995 and 1997. Final estimates for these 2 years were presented for the first time in *Mid-year 1998 Preliminary ED Data from DAWN*. The 1995 estimate of total drug-related episodes decreased by less than 1 percent (from 517,800 to 513,600) while the 1997 estimate increased by 5.5 percent (from 487,600 to 514,300). These changes had varying effects on the metropolitan area estimates.

The following changes had the greatest effect on the estimates:

- A change was made in the method for assigning eligibility status to a hospital. The current system tracks partial year eligibility, which improves the sensitivity of the DAWN nonresponse adjustment. Formerly, there was no recognition that a hospital could change its eligibility status during the year.

- A concerted effort was made to ascertain the current eligibility status of all nonparticipating DAWN sampled hospitals. Changes in status from eligible nonrespondent to ineligible (or vice versa) also affected the nonresponse adjustment.

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APPENDIX C:
SOURCES OF ERROR IN DAWN ESTIMATES

When producing estimates from any sample survey, 2 types of errors are possible—sampling and nonsampling errors. The sampling error of an estimate is the error caused by the selection of a sample instead of a census of hospitals. Sampling error is reduced by selecting a large sample or by using efficient sample design and estimation strategies such as stratification, optimal allocation, and ratio estimation. Nonsampling errors include nonresponse, difficulties in the interpretation of the collection form, coding errors, computer processing errors, errors in the sampling frame, and reporting errors.

Many procedures, such as data auditing and periodic retraining of data collectors, are used in DAWN data collection to minimize nonsampling errors. Moreover, nonrespondent hospitals are identified for additional recruitment. Late reporters are assigned for priority data collection and respondents with changes in reporting are designated for followup. Since data are abstracted from medical records, the accuracy of DAWN case reports depends on the careful recording of relevant conditions by the hospital staff that treated the patients.

It is also important to recognize that DAWN does not provide a complete picture of problems associated with drug use, but rather focuses on the impact that these problems have on hospital EDs in the United States. If a patient is admitted to another part of the hospital for treatment, or treated in a physician's office or at a drug treatment center, the episode would not be included in DAWN.

CHANGES IN SAMPLE COMPOSITION AND REPORTING OF EPISODES

Periodic minor modifications are made to the sample to keep it current. Adjustments are made in the weights to account for lapses in reporting by the sampled hospitals. It is unlikely that modifications to the sample will affect DAWN estimates of drug mentions over time. Analyses of the previous changes in the sample composition have found them to have little impact on trends across several years.

It is important to consider the potential impact on DAWN trends from changes in the sample composition or reporting anomalies in key sample hospitals, particularly for metropolitan area data. Historically, DAWN analysts and field staff have attempted to identify and document such situations in the period before data release, and any that may have had a significant impact on the estimates were published in this section.

However, choosing the particular situations to highlight often involves more art than science, given that the actual impact on the estimates rarely has been known at the time of publication. This practice led us to question whether the situations that were being highlighted actually had the anticipated impact on DAWN estimates.

We analyzed some specific situations highlighted in recent DAWN publications to determine if those situations had the anticipated effect on DAWN estimates. These analyses have shown that generally, the types of situations published previously as limitations did not have the anticipated effects. Changes in small hospitals do not have a large impact on the estimates, and the DAWN estimation system already corrects for many nonsampling errors. Extensive

quality control measures have been implemented to investigate and address irregularities in the data prior to publication.

As a result of this analysis, we have concluded that listing inconsequential, nonsampling errors discredits the DAWN system unnecessarily and possibly contributes to misinterpretation of DAWN data. Therefore, we have decided to discontinue reporting data limitations unless the impact on the estimates is clear.

NOTEWORTHY SOURCES OF ERROR IN DATA FOR 2001 AND 2002

Unlike data systems that rely on samples of patients or discrete time periods, DAWN expects continuous data collection from a census of ED cases throughout the year in each sampled facility. For a variety of reasons, the ideal of 100-percent complete data is not always feasible. In most instances, the nonresponse adjustment to the sampling weight for a facility is utilized to compensate for periodic, but infrequently missing data. Occasionally, depending on the particular sampled unit and/or time period affected, missing data may jeopardize estimates for an entire metropolitan area. The national estimate in DAWN is equal to the sum of the metropolitan area estimates and the National Panel estimate. Consequently, if data are insufficient to produce reliable final estimates for any metropolitan area, the national estimate is also compromised. In these instances, we have adopted an imputation approach to preserve the integrity of the national estimates. Imputation refers to the assignment of values to replace missing data and typically involves standard statistical methods and procedures.

In 2001, we experienced significant missing data in the Atlanta metropolitan area. Reliable Atlanta estimates could not be produced for January to June 2001 because insufficient data were submitted by participating facilities for this period. The column of estimates for January to June 2001 have been suppressed and are indicated by "---" (3 dashes) in tables for Atlanta in this publication and in tables published online. More Atlanta data were available for the second half of 2001, although missing data were still a concern. In this case, the imputation used statistical models to determine what characteristics (e.g., drug mentions and patient demographics) the imputed episode records should contain. The statistical models used data submitted by all Atlanta hospitals prior to 2001, along with the available Atlanta data for 2001.

As a conservative measure, we suppressed all Atlanta estimates for the second half July–December of 2001 that were derived from more than 25 percent imputed data. Suppressed cells are indicated by "---" (3 dashes) in published tables. This suppression rule affected only a few Atlanta estimates for the second half of 2001 and none of the national estimates.

In 2002, we experienced significant missing data in 5 metropolitan areas represented in DAWN: Boston, Detroit, Los Angeles, New York, and St. Louis. We used imputation to address the missing data problem in each of these areas and preserve the integrity of the national estimates. In this case, the imputation approach consisted of two steps. First, we used statistical time series models to estimate the likely 2002 episode and drug-specific mention counts for each unit and month with missing data. Second, we sampled reported episodes from 2001 within the same unit at rates that would allow us to match the modeled monthly 2002 episode and mention counts for the unit, taking patterns of drug combinations into account. Some data were imputed for both the first and second halves of 2002 in each of the 5 metropolitan areas.

As a conservative measure, we have suppressed final estimates for 2002 that were derived from more than 25 percent imputed data (indicated by "---"). This suppression affects the DAWN areas listed above and some of the estimates for the coterminous U.S. as well.

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APPENDIX D: GLOSSARY OF TERMS

This glossary defines terms used by the Drug Abuse Warning Network (DAWN) in data collection activities, analyses, and publications. DAWN collects data and publishes findings separately for emergency departments (EDs) and medical examiner/coroner (ME/C) jurisdictions. As a result, there are a number of terms that are unique to each component of DAWN.

This appendix is divided into 3 sections. The first section contains terms common to both the ED component and the ME/C or mortality data component of DAWN. The second section focuses on terms specific to the DAWN ED system, while the third section focuses on terms specific to the mortality data system.

DEFINITIONS OF TERMS COMMON TO DAWN'S ED AND MORTALITY COMPONENTS

Drug abuse: The nonmedical use of a substance for any of the following reasons: psychic effect, dependence, or suicide attempt/gesture. In DAWN, nonmedical use means:

- The use of prescription drugs in a manner inconsistent with accepted medical practice;
- The use of over-the-counter drugs contrary to approved labeling; or
- The use of any substance (e.g., heroin, marijuana, peyote, glue, aerosols) for psychic effect, dependence, or suicide.

Drug category: A generic grouping of substances reported to DAWN, based on the classification of generic drugs by 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/. The DAWN system has accumulated a vocabulary of thousands of substance names that have been mentioned in incidents of abuse. This vocabulary is updated monthly by the inclusion of new abuse substances and, through receipt of identifying information, the reclassification of drugs. Occasionally, this reclassification may result in a drug being shifted to a different drug grouping. The DAWN drug groupings are periodically reviewed in order to reflect the most recent changes in pharmaceutical classifications and drug legislation. Occasional changes in drug classification should be taken into consideration when comparing drug data from this publication with other DAWN publications. These classifications may involve street names and brand names, which are sometimes used to identify a substance and its generic drug group. Individual drugs comprising the most commonly reported drug categories can be found in Tables 2.3 to 2.7 of *Emergency Department Trends From DAWN.*

Additional clarification is provided for the following drug categories:

- *Alcohol-in-combination* – DAWN does not gather data on alcohol used alone, only alcohol used concomitantly with another abused substance. Therefore, all alcohol mentions are combination mentions.

- *All other substances not tabulated above (NTA)* – This category contains any substance reported to DAWN that could not be classified in other categories and has too few mentions to warrant being reported independently in DAWN tables. This category also includes certain terms that cannot be assigned reliably to any new category such as: (1) ambiguous, nonspecific terms that could fall into any of several categories (e.g., "AIDS medicine" could be an anti-infective, an anticonvulsant, or any number of other drugs); (2) undocumented, nonspecific terms (e.g., "thought organizer"); and (3) street terms for illicit substances that could not be linked reliably to a particular illicit substance (e.g., "T," "butterflies").

- *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.

- *Club drugs* – During the 1990s, use of certain illicit drugs was linked to "raves" and dance clubs. These substances are commonly referred to as "club drugs." When used in DAWN, the term "club drugs" includes Ketamine, flunitrazepam (Rohypnol), gamma-hydroxy butyrate (GHB, or its precursor, gamma butyrolactone [GBL]), and methylenedioxymethamphetamine (MDMA or Ecstasy). Although commonly used in the rave scene, methamphetamine and hallucinogens are classified separately from the club drugs in DAWN.

- *Combinations not tabulated above (NTA)* – This category includes combinations composed of 2 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 separate mentions of heroin and cocaine 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).

- *Drug unknown* – "Drug unknown" may be recorded when drug abuse was known or suspected to have been involved, but the specific substance could not be determined. This includes 2 types of cases: those in which the drug was reported to DAWN as "unknown" and those in which drugs were reported to DAWN as "polysubstances." For the purposes of DAWN, polysubstance refers to the abuse of more than one substance when the individual substances were not identified by the source record. Because DAWN cases are identified through retrospective medical chart review, there will always be cases in which the drug abuse was known, but the particular substance was unknown or unknowable.

- *Heroin* and *Heroin/morphine* – This is the only drug classified differently in the ED and mortality components of DAWN. In the ED publications, heroin is classified as a major substance of abuse, separate from morphine, which is classified as a narcotic analgesic under CNS agents. In the mortality data publications, heroin and morphine are classified together in a single category. When heroin is ingested, it is metabolized to morphine, so that the toxicology testing commonly used in death investigations often

does not distinguish between the 2. Therefore, a mention of either substance is recorded as heroin/morphine. A case mentioning both heroin and morphine will be "de-duplicated" and counted as a single heroin/morphine mention.

- *Inhalants* – This category includes anesthetic gases and psychoactive nonpharmaceutical substances for which the documented route of administration was inhaled, sniffed, or snorted. Psychoactive nonpharmaceuticals fall into one of the following 3 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.

- *Major Substances of Abuse* – We use this term to refer to the most commonly abused drugs (e.g., alcohol-in-combination and cocaine) and those drugs that are typically referred to as "illicit."

- *Other Substances of Abuse* – We use this term to refer to pharmaceutical agents not included in the Major Substances of Abuse.

Drug mention – This refers to a substance that was recorded ("mentioned") in a DAWN case report. In addition to alcohol-in-combination, up to 4 substances ("mentions") can be reported for each ED episode, and up to 6 substances can be reported for each drug abuse death. Therefore, the total number of drug mentions exceeds the total number of ED visits or deaths. Even when only one drug is mentioned, it should not be assumed that the substance was the sole and direct cause of the episode or death; allowances should be made for reportable drugs not mentioned or other contributory factors. (See also ***Single-drug episode/death***.)

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. The current DAWN ED sample, which was redesigned in the 1980s, is based on the definitions of Metropolitan Statistical Areas (MSAs) and Primary Metropolitan Statistical Area (PMSAs) issued by the Office of Management and Budget (OMB) in 1983, with a few exceptions. Metropolitan areas represented in the DAWN mortality data system are consistent with those represented in the DAWN ED system, also with a few exceptions. Users of DAWN should note that the ED component provides estimates for each of the 21 metropolitan areas. However, in the mortality data component, only raw counts are provided, and in many instances less than 100 percent of the MSA is represented in those counts.

Not otherwise specified (NOS): A catch-all category for substances that are not specifically named in the listing. 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 and death investigation case files).

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

Race/ethnicity: Beginning in January 2000, the race and ethnicity categories collected on DAWN case report forms changed to match a change in the standard protocol issued by the OMB in 1997.[29] The new protocol permits separate reporting of race and Hispanic ethnicity; the ability to capture more than one race for an individual; modifications in nomenclature (e.g., "Black" was changed to "Black or African American"); division of certain categories ("Asian or Pacific Islander" was split into 2 categories, "Asian" and "Native Hawaiian or Other Pacific Islander"); and elimination of the "Other" category.

The race/ethnicity categories on the DAWN data collection forms are as follows:

Race

- *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.
- *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.
- *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.
- *Native Hawaiian or Other Pacific Islander* – A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
- *Unknown* – Used when documentation of race is not available from source records.

Ethnicity

- *Hispanic or Latino* – A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race.
- *Not Hispanic or Latino* – Ethnicity does not meet the definition of Hispanic or Latino.
- *Unknown* – Used when documentation of ethnicity is not available from source records.

Despite the increased detail allowed by the new categories, the actual race/ethnicity data reported to DAWN changed very little because race and ethnicity are often not documented with this level of specificity in patient/decedent records. As a result, we have retained the classification used previously to tabulate DAWN data. The one exception is that we now collapse the less commonly used categories into a category termed "Not tabulated above

[29] See Office of Management and Budget, *Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity*, *Federal Register*, 62 FR 58782, October 30, 1997.

(NTA)" instead of "Other." Categories used to tabulate race and ethnicity data in the ED 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 is placed in the category Hispanic, regardless of race.
- *Race/ethnicity NTA* – This includes those categories that are too small to report independently including: 2 or more races, American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander.
- *Unknown* – Race and ethnicity are unknown. Those who are identified only as Hispanic are classified as Hispanic.

In *Mortality Data from DAWN*, race/ethnicity data are tabulated as White, Black, Hispanic, and All others, where "All others" includes other reported races and ethnicities as well as unknown or missing data.

Route of drug administration: DAWN reporters are asked to record the method by which the substance was taken into the drug abuser's body according to the following categories:

- *Oral* – Substance was ingested through the mouth (swallowed).
- *Injection* – Substance entered the body through a vein (intravenously), into the muscle (intramuscularly), or under the skin (subcutaneously).
- *Inhaled* – Gases or fumes of a substance were taken into the body by inhaling through the nose or mouth into the lungs (e.g., inhaling the fumes of glue, aerosols, paints, gasoline).
- *Smoked (includes freebase)* – Substance was consumed by smoking a cigarette, pipe, or similar device.
- *Sniffed/snorted* – Substance, acquired in a powder or crystalline form, was forcefully inhaled through the nose.
- *Other* – This category is used when the route of administration of the substance cannot logically be included as any of the above.

Readers should note that this information is often not documented in patient/decedent files and is therefore missing in DAWN tabulations. Caution should therefore be exercised in interpreting this information.

Single-drug episode/death: A single-drug episode or death is that in which only one drug was involved. Because multiple substances may be recorded for each DAWN case (see ***Drug mention***), readers should exercise caution in interpreting the relationship between a given drug and the number of associated ED visits or deaths. For example, if records for a given patient "mentioned" marijuana, this does not mean that marijuana was the only drug involved in the ED visit or that the marijuana caused the ED visit. One should always consider whether and how many other drugs were used in combination, but even then attributing a causal relationship between the visit and a particular drug may not be possible. Additionally, because alcohol is only documented if used in combination with another drug, DAWN cannot provide single-drug episode/death totals for alcohol.

DEFINITIONS OF TERMS FOR THE DAWN ED COMPONENT

Coterminous U.S.: The contiguous 48 States and Washington, DC; excludes Alaska and Hawaii. National estimates from DAWN refer only to the coterminous U.S.

Disposition of ED patient: Suggestions or recommendations made or actions taken by the hospital as they relate to the patient's presenting problem:

- *Treated and released or referred* – The patient was given appropriate ED treatment and was released or, after appropriate ED treatment, the hospital referred the patient to another agency or to a private physician for additional services.
- *Admitted to hospital* – The patient was admitted as an inpatient to a hospital.
- *Left against medical advice* – The patient left the treatment setting without a physician's approval.
- *Died* – The patient expired.

Drug abuse episode: A reported ED visit that involved drug abuse. Episodes involving patients under the age of 6 or over the age of 97 are not reported to the DAWN system. The number of ED patients in DAWN is not synonymous with the number of patients involved. One patient may make repeated visits to an ED or to several EDs, thus producing a number of episodes. It is impossible to determine the number of unique patients involved in the reported ED episodes because no patient identifiers are collected.

Drug concomitance: This term refers to whether a drug abuse episode involved a single drug (one mention) or multiple drugs (multiple mentions).

Drug use motive: DAWN classifies ED drug abuse episodes according to one or more of the following reasons for taking a substance(s):

- *Psychic effects* – A conscious action to use drugs to improve or enhance any physical, emotional, or social situation or condition. Two categories of psychic effect are:
  - Use of drugs for experimentation or to enhance a social situation (e.g., curiosity, peer pressure, "just wanted to know what it felt like," "wanted to have fun," "to get high," "for kicks," "to party"); and

- Use of drugs to improve or enhance any mental, emotional, or physical state (e.g., depression, anxiety, to relieve headache, reduce pain, stay awake, lose weight, relax, help study, get to sleep). Referred to in DAWN as "other psychic effects."

- *Dependence* – A physiological or psychological condition characterized by a compulsion to take the drug on a continuous or periodic basis in order to experience its effects or to avoid the discomfort of its absence (e.g., had to take, had to have, needed a fix).

- *Suicide attempt or gesture* – Successful or unsuccessful action(s) taken for the purpose of self destruction or to gain attention.

- *Other reason* – Used when the reason for taking the substance cannot be classified into the categories above.

Estimate: A statistical estimate is the value of a parameter (such as the number of drug-related ED episodes) for the universe that is derived by applying sampling weights to data from a sample. DAWN produces representative statistical estimates for 21 metropolitan areas based on data from a sample of EDs in each of the 21 areas. An estimate for the coterminous U.S. is produced by summing estimates for the 21 metropolitan areas and an estimate for the National Panel.

Form in which drug was acquired: The form in which the substance was received by the user/abuser, not the form in which the substance was consumed. Categories are: tablet/capsule/pill, aerosol, liquid, powder/crystal, paper, pieces/chunks, injectable liquid, cigarette, plant material, unknown, and other. Readers should note that this information is often not documented in ED records and is therefore missing in DAWN tabulations. Caution should therefore be exercised in interpreting this information.

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 with EDs that are open 24 hours a day, 7 days a week, and located in the coterminous U.S. Specialty hospitals; hospital units of institutions; long-term care facilities; pediatric hospitals; hospitals operating part-time EDs; hospitals in Alaska and Hawaii; and hospitals operated by the Veterans Health Administration and the Indian Health Service are excluded.

National Panel: This term is used to denote 2 concepts relative to DAWN ED data: (1) the universe of eligible hospitals outside the 21 DAWN metropolitan areas but within the coterminous U.S. and (2) the sample of hospitals in DAWN that were selected from this universe. The National Panel sample is weighted to produce estimates for the National Panel universe. (See also ***Metropolitan area***.)

p-value: A measure of the probability (*p*) that the difference between 2 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 2 DAWN estimates has a p-value of 0.01 that means there is a 1 percent 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 of 50 percent or higher 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***.)

Rank: A rank indicates the relative frequency of a measure, such as mentions for a particular drug category. For example, a drug category ranked second indicates that it accounted for the second highest number of mentions among all drug categories. When 2 or more drugs receive equal numbers of mentions, they are assigned the same rank. A difference in rank should be considered only as indicative of a difference in frequency among drugs reported to DAWN, regardless of the size of the difference. Such differences are not necessarily meaningful or statistically significant.

Reason for present ED contact: The reason for the patient's visit to the ED based on documentation provided in the medical record. Categories are:

- *Overdose/toxic ingestion* – Either intentional or accidental (e.g., effects of suicide attempt, coma). Anyone whose reason for contact is overdose is placed in this category, regardless of other reasons.
- *Unexpected reaction* – The drug's effect was different than anticipated, thus causing concern (e.g., bad trip, panic, hallucinations).
- *Withdrawal* – Symptoms which occur when a patient stops taking a substance upon which he or she is physiologically dependent and suffers physical symptoms, including abdominal pain, cold sweat, hyperactivity, and tremors that require treatment.
- *Chronic effects* – Secondary conditions resulting from habitual use or dependence, including malnutrition, tetanus, blood poisoning, and so forth.
- *Seeking detoxification* – Patients with identified problems with chronic substance abuse who seek admission to a detoxification program and receive treatment from ED staff. This category was added to the data collection form in 1987. Some hospitals require patients to be processed in the ED prior to admission for detoxification. Caution should therefore be exercised in interpretation of this category and the remaining information.
- *Accident/injury* – Injuries resulting from accidents that were caused by or related to drug abuse. This category was added to the data collection form in 1987.
- *Other* – Reasons which cannot be classified into one of the aforementioned categories.

Reason for taking substance: See ***Drug use motive***.

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 mentions with an SE of 200 mentions has an RSE of 10 percent. Estimates with an RSE of 50 percent or more 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 of Hospitals.

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

Sampling weights: Numeric coefficients used to derive population estimates from a sample.

Significance level: The *p*-value cut-off point that is used to determine whether the difference between two estimates is statistically significant. By convention in most public health research, a difference is considered statistically significant if the *p*-value is less than 0.05; in other words, if there is less than a 5 percent probability that the difference between the estimates is due to chance. In DAWN, only results with a *p*-value less than 0.05 are considered statistically significant.

Source of substance: The immediate source of the substance that the patient abused is coded as follows:

- *Patient's own legal prescription* – This is coded only when the abuser was legally prescribed the drug of abuse. If one patient obtains a drug by legal prescription and sells it to another who abuses it, the source to the abuser is marked "street buy." If the patient for whom the prescription was issued gives the drug to another patient who abuses it, the source to the abuse is "other unauthorized procurement."

- *Street buy* – The drug abuser purchased a drug and/or prescription from a source other than legitimate channels.

- *Other unauthorized procurement* – The drug was acquired in a manner not consistent with accepted medical care but was not bought on the street. This category includes drugs purchased using forged prescriptions, stolen, or received as a gift.

- *Other* – Used when the source of the substance cannot logically be included as any of the above. This category includes all over-the-counter medications.

- *Unknown* – Reported when information on source was unavailable.

Readers should note that this information is often not documented in ED records and is therefore missing in DAWN tabulations. Caution should therefore be exercised in interpreting this information.

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 cocaine mentions with an SE of 500 indicates that the SE is 500 mentions.

Strata (plural), stratum (singular): Subgroups of a population 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 21 metropolitan area cells plus an additional cell for the National Panel. Then, within these cells strata are defined according to the annual number of ED visits, whether the hospital is located inside or outside the central city of the metropolitan area, and by the presence or absence of an organized outpatient department, alcohol/chemical dependence inpatient unit, or both. The strata are as follows:

Stratum	Annual ED visits	Location within metropolitan area	Outpatient department or alcohol/chemical dependence inpatient unit
In the 21 DAWN metropolitan areas:			
0	≥80,000	Not applicable	Not applicable
1	<80,000	Central city	Both
2	<80,000	Central city	One only
3	<80,000	Central city	Neither
4	<80,000	Outside Central city	Both
5	<80,000	Outside Central city	One only
6	<80,000	Outside Central city	Neither
In the National Panel:			
0	≥80,000	Not applicable	Not applicable
7	<80,000	Not applicable	Both
8	<80,000	Not applicable	One only
9	<80,000	Not applicable	Neither

Note: Stratum "0" is defined for each of the 21 metropolitan areas and the National Panel cells. See *Drug Abuse Warning Network Sample Design and Estimation Procedures: Technical Report*, November 1997.

Statistically significant: A difference between 2 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***.)

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 coterminous U.S. with EDs open 24 hours a day, 7 days a week. (See also ***Coterminous U.S.***).

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DEFINITIONS OF TERMS FOR THE DAWN MORTALITY COMPONENT

Cause of death: Cases are reportable to DAWN if the death investigation concludes that the death was either directly or indirectly caused by drug abuse. If a death was directly caused by drug abuse (e.g., a drug overdose), DAWN refers to the death as ***drug-induced***. If drug abuse was a contributing factor in the death, but not the immediate or sole cause, then DAWN refers to the death as ***drug-related***. It is important to note that DAWN data include both types of deaths. It is also important to note that a drug-induced death may involve more than a single drug. (See ***Single-drug episode***.)

Certified death: Any case accepted and reviewed by a medical examiner or coroner, who uses information from the death investigation to complete the death certificate.

Consistent panel: DAWN does not impute missing data for jurisdictions that have not reported for all or part of a given year. Therefore, tables and charts showing trends in deaths over time are based on a ***consistent panel*** of reporting jurisdictions. A consistent panel includes those jurisdictions that have reported data for at least 10 months of each year reflected in the trend table/chart. The reason for a consistent panel is to ensure that apparent changes over time are not a result of gaps in reporting. Because participating jurisdictions may change from year to year, consistent panels used in published reports will also change from year to year. This means that trends published in one annual publication are not necessarily comparable to trends published in subsequent annual publications.

Coroner: Death investigation jurisdictions typically use either a medical examiner system or a coroner system. Unlike medical examiners, coroners need not be physicians; usually the only prerequisite for serving as a coroner is that the individual be more than 18 years of age and a resident of the county or district to be served. Coroners are typically elected rather than appointed. They may have jurisdiction over counties or districts within states. (See also ***Jurisdiction*** and ***Medical examiner***.)

Drug combinations: Published tables from the DAWN mortality data refer to “drug combinations” rather than “drug concomitance” (the term used in the ED component). This term refers to multiple drug mentions for a single death, and tables show particular combinations of substances reported for deaths. Readers should note that DAWN cannot differentiate between drugs actually *used* in combination (simultaneously) and drugs used sequentially.

Drug-induced death: A death directly resulting from drug abuse or other substance abuse, such as drug overdoses or the interactive effects of drug combinations. When more than one drug is mentioned, it cannot be determined which or whether one drug was the sole and direct cause of the episode or death.

Drug-related death: A death in which the abuse of a drug is a contributing factor, but is not the sole cause of death. Such cases include drug abuse that exacerbates a pre-existing *physiological condition*; drug abuse in combination with an *external physical event* (e.g., a fall or automobile accident); or a *medical disorder* that was itself caused by drug abuse (e.g., hepatitis contracted through injection drug use). Drug-related deaths are classified into 2 types, *confirmed* and *presumed*. The drug-relatedness is “confirmed” if documentation in the decedent’s file substantiates that conclusion. The drug-relatedness is “presumed” if the investigation suggests drug involvement, but the medical examiner/coroner has insufficient

evidence to list drug abuse as a contributing cause on the death certificate. Both confirmed and presumed deaths are included in the published mortality data tables.

Jurisdiction: DAWN uses the term "jurisdiction" to mean the geographic area for which a medical examiner/coroner's office is responsible. In many states, there is a 1:1 correspondence between jurisdictions and counties. In some states, there are multiple medical examiner/coroner offices within a given county, or there may be multiple counties covered by a "district" that includes one or more medical examiners/coroners. A few states are organized as a single statewide jurisdiction.

Understanding jurisdictions is important because this assists readers in interpreting aggregated data. Published DAWN mortality data are aggregated into metropolitan areas, which often comprise multiple jurisdictions. In some states, there are different death investigation procedures for different jurisdictions (most notably, some jurisdictions have medical examiner systems, while others have coroner systems). There are nearly always some differences in death investigation procedures across states (and notably, some metropolitan areas include jurisdictions in multiple states). Readers should be mindful of these variations when interpreting or comparing data.

Information on death investigation practices and an updated list of jurisdictions throughout the U.S. and Canada are available from the Centers for Disease Control and Prevention, Epidemiological Program Office at www.cdc.gov/epo/dphsi/mecisp/death_investigation.htm.

Manner of death: This variable is used to describe how the decedent died. It is applicable to both drug-induced and drug-related deaths. On the DAWN data collection form, manner of death is coded into the following categories:

- *Accidental/Unexpected* – Although the drug abuse was deliberate, the resulting death was unintended.
- *Suicide* – Death in which there is evidence that the decedent deliberately used drugs to bring about his or her demise.
- *Homicide* – Death in which the decedent's life was taken by another individual by means of drugs. These cases, which do not involve the intentional abuse of drugs by the decedent, are not currently included in published tabulations of DAWN mortality data.
- *Natural* – Death was due to natural causes such as a medical disorder or disease process, if drug abuse caused or worsened the decedent's condition.
- *Undetermined* – The manner of death cannot be determined from all available evidence.

In *Mortality Data from DAWN*, manner of death is collapsed into 3 categories: suicide, accidental/unexpected, and "all others." The "all others" category includes cases for which manner of death was recorded as natural, unknown, or undetermined, and cases for which manner of death was missing.

Medical Examiner (ME): Death investigation jurisdictions typically use either a medical examiner system or a coroner system. Most medical examiners are licensed physicians or forensic pathologists, and are generally appointed (rather than elected). They may have jurisdiction over a county, district, or entire state. (See also ***Coroner*** and ***Jurisdiction***.)

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APPENDIX E:
MULTUM LICENSE AGREEMENT

LEXICON LICENSE

Multum Lexicon[1]

End-User License Agreement

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B. THE END-USER ACKNOWLEDGES THAT MULTUM: (A) HAS NO CONTROL OF OR RESPONSIBILITY FOR THE END-USER'S USE OF THE DATABASE OR CONTENT PROVIDED THEREON, (B) HAS NO KNOWLEDGE OF THE SPECIFIC OR UNIQUE CIRCUMSTANCES UNDER WHICH THE DATABASE OR CONTENT PROVIDED THEREON MAY BE USED BY THE END-USER, (C) UNDERTAKES NO OBLIGATION TO SUPPLEMENT OR UPDATE CONTENT OF THE DATABASE, AND (D) HAS NO LIABILITY TO ANY PERSON FOR ANY DATA OR INFORMATION INPUT ON THE DATABASE BY PERSONS OTHER THAN MULTUM.

C. MULTUM SHALL NOT BE LIABLE TO ANY PERSON (INCLUDING BUT NOT LIMITED TO THE END-USER AND PERSONS TREATED BY OR ON BEHALF OF THE END-USER) FOR, AND THE END-USER AGREES TO INDEMNIFY AND HOLD MULTUM HARMLESS FROM ANY CLAIMS, LAWSUITS, PROCEEDINGS, COSTS, ATTORNEYS' FEES, DAMAGES OR OTHER LOSSES (COLLECTIVELY, "LOSSES") ARISING OUT OF OR RELATING TO (A) THE END-USER'S USE OF THE DATABASE OR CONTENT PROVIDED THEREON OR ANY EQUIPMENT FURNISHED IN CONNECTION THEREWITH AND (B) ANY DATA OR INFORMATION INPUT ON THE DATABASE BY END-USER, IN ALL CASES INCLUDING BUT NOT LIMITED TO LOSSES FOR TORT, PERSONAL INJURY, MEDICAL MALPRACTICE OR PRODUCT LIABILITY.

5. MISCELLANEOUS

A. You warrant that you have authority within the organization you identified during registration for the Database to enter into license agreements with other organizations including Multum.

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APPENDIX F: DAWN EMERGENCY DEPARTMENT REPORT FORM

FORM NUMBER

XXXXXXX

(Sample Form Only)

DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE

SUBSTANCE ABUSE AND MENTAL HEALTH SERVICES ADMINISTRATION

FORM APPROVED:
OMB NO. 0930-0078
Expires: 11/30/2002

DRUG ABUSE WARNING NETWORK (DAWN) EMERGENCY DEPARTMENT REPORT

(Sample Form Only)

1. PROVIDER NUMBER

2. CROSS REFERENCE *(Facility Use Only)*

PATIENT INFORMATION

3. DATE OF VISIT — Month / Day / Year

4. TIME OF VISIT — Hours / Minutes *(Mark [X])*
1. ☐ am
2. ☐ pm
3. ☐ military

5. AGE *(Must be 06-97 yrs.)*

6. SEX
1 ☐ Male 2 ☐ Female

7a. ETHNICITY *(mark [x] one response)*
1 ☐ Hispanic or Latino
2 ☐ Not Hispanic or Latino
3 ☐ Unknown

7b. RACE *(mark [x] for all that apply)*
☐ White
☐ Black or African American
☐ American Indian or Alaska Native
☐ Asian
☐ Native Hawaiian or Other Pacific Islander
☐ Unknown

8. PATIENT'S HOME ZIP CODE

(Otherwise mark [X] one response)
1 ☐ Unknown 2 ☐ No Fixed Address *(See reverse side)*

9. REASON FOR TAKING SUBSTANCE(S) *(Mark [X] one response)*
1 ☐ Dependence
2 ☐ Suicide Attempt or Gesture
3 ☐ Psychic Effects: "Recreational Use" *(e.g., to get high, kicks)*
4 ☐ Other Psychic Effects *(See reverse side)*
5 ☐ Unknown
6 ☐ Other *(Specify)* _____

10. REASON FOR PRESENT CONTACT
A. Was This an Overdose/Toxic Ingestion?
1 ☐ Yes ☐ No

B. If "No," mark one response
2 ☐ Unexpected Reaction
3 ☐ Chronic Effects *(See reverse side)*
4 ☐ Withdrawal
5 ☐ Seeking Detoxification
6 ☐ Accident/Injury
7 ☐ Unknown
8 ☐ Non-toxic Ingestion/Other
(Specify) _____ *(See reverse side)*

11. DISPOSITION FROM EMERGENCY DEPARTMENT
1 ☐ Treated and Released or Referred
2 ☐ Admitted as Inpatient to This or Any Hospital
3 ☐ Left Against Medical Advice
4 ☐ Died

DRUG/SUBSTANCE INFORMATION

12. ALCOHOL INVOLVED *(Mark [X] one response)*
1 ☐ Yes 2 ☐ No 3 ☐ Unknown

13. LIST EACH DRUG/SUBSTANCE SEPARATELY *(Generic, Trade, or Street Name)* IN ONE OF THE SPACES BELOW **(Do NOT list alcohol)**

SAMHSA USE ONLY

Mark [x] if confirmed by toxicology tests

1 ☐
2 ☐
3 ☐
4 ☐

*For each non-alcohol substance listed above, mark [X] **one** response in each data item below.*

14. FORM IN WHICH DRUG WAS ACQUIRED		SUBSTANCES 1	2	3	4
Tablet/Capsule/Pill	01				
Aerosol	02				
Liquid *(oral)*	03				
Powder/Crystal	04				
Paper *(e.g., LSD/Acid)*	05				
Pieces/Chunks *(e.g., Crack)*	06				
Injectable Liquid	07				
Cigarette	08				
Plant Material	09				
Unknown	10				
Other	11				

15. ROUTE OF ADMINISTRATION		SUBSTANCES 1	2	3	4
Oral	1				
Injection	2				
Inhaled *(e.g., fumes)*	3				
Smoked *(Includes Freebase)*	4				
Sniffed, Snorted	5				
Unknown	6				
Other	7				

16. SOURCE OF SUBSTANCE		SUBSTANCES 1	2	3	4
Patient's Own Legal R_x	1				
Street Buy	2				
Other Unauthorized Procurement *(e.g., stolen, gift, etc.)*	3				
Unknown	4				
Other (Includes Over-The-Counter [OTC])	5				

17. CODED REMARKS
(If case involves an IV drug user with HIV+/AIDS, please write "HIV+" or "AIDS" in the first four spaces below.)

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(Sample Form Only)

SELECTED REPORTING GUIDELINES AND INSTRUCTIONS DRUG ABUSE WARNING NETWORK (DAWN) EMERGENCY DEPARTMENT REPORT

I. General

The following abbreviated guidelines and instructions highlight critical reporting items. Please refer to the detailed instructions found in the Instruction Manual for Emergency Departments for further information.

II. Reporting Guidelines

Report data on all patients seen in the emergency department for problems induced by or related to drug abuse. For DAWN, drug abuse is defined as the use of any illegal drug or the nonmediacal use of a legal drug where the reason for taking the substance was for: psychic effects, dependence, or suicide attempt or gesture.

Detailed discussion of the "nonmedical" use definition and other case selection criteria can be found in Chapter II, Case Identification Guidelines, of the Instruction Manual for Emergency Departments.

III. Abbreviated Instructions for Completing Selected Items

Data Item #8 - Patient's Home Zip Code

Use *"no fixed address"* for the homeless (even if staying at a shelter) and for prisoners brought into the hospital.

Data Item #9 - Reason for Taking Substance(s)

The response categories are: Dependence, Suicide Attempt or Gesture, Psychic Effects: "Recreational Use," Other Psychic Effects, Unknown, and Other (Specify). The definitions are as follows:

1. *Dependence* - A physiological or psychological condition characterized by a compulsion to take the drug on a continuous or periodic basis in order to experience its effects or to avoid the discomfort of its absence (i.e., to avoid withdrawal).

2. *Suicide Attempt or Gesture* - Successful or unsuccessful action(s) taken for the purpose of self-destruction or to gain attention.

3. *Psychic Effects: "Recreational Use"* - Use of drug(s) for experimentation or to enhance social situations or conditions. Examples of common patient responses are: "just wanted to know what it felt like," "wanted to have fun," or "to get high."

4. *Other Psychic Effects* - Use of drug(s) to improve or enhance, any mental, emotional, or physical state. Examples of common patient responses concerning this self-applied medication are: "needed to relax," "wasn't feeling well," "to stay awake," "depression," "anxiety," "lose weight," "fight with a boyfriend/mate."

5. *Unknown* - Should be used only if information is unobtainable or unavailable.

6. *Other* (Specify) - Should be used only when the Reason for Taking the Substance cannot be classified into the categories above. Write the appropriate reason in the space provided.

Data Item #10 - Reason for Present Contact

This data item has two parts, A and B. Part A requires a selection of "YES" or "NO" to indicate whether the case is an Overdose / Toxic Ingestion. If the response to part A is "NO," part B requires a response.

3. *Chronic Effects* - Includes Hepatitis, Abscess, Cellulitis, Tremors, and AIDS contracted by IV drug abuse (see manual for additional examples).

8. *Non-Toxic Ingestion / Other* (Specify) - Should be used only when Reason for Present Contact cannot be classified into the categories above. (For example, police bring patient in for toxicological testing related to commission of a crime or parents force a child to come in to be checked because of strange behavior.) If Other, write reason in space provided.

Data Item #17 - Coded Remarks

Please be certain to write "HIV+" or "AIDS" in the first four blocks if the patient is a confirmed IV drug user.

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