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ABSTRACT

This report was prepared in response to requests from the media, law enforcement, and community leaders for information about club drugs. By being able to utilize statistics from hospital emergency departments and by compiling statistics on drug-related deaths, the Drug Abuse Warning Network (DAWN) is able to alert parents, educators, and others involved in the education of young adults about the danger of these drugs. An increased interest in club drugs follows recent publications of the use and effects of these drugs. Six drugs known as club drugs are highlighted in this report. They are: (1) d-lysergic acid diethylamide (LSD); (2) Gamma-hydroxy butyrate (GHB); (3) Ketamine; (4) methamphetamine; (5) methylenedioxymethamphetamine (Ecstasy); and (6) Rohypnol. According to DAWN, most emergency department episodes involving club drugs also involve other drugs. Club drugs are predominately used by adults under 25 years of age and whites make up 61% of all emergency department episodes. The report contains background information about the drugs, followed by trends in drug use for the years 1994-1998. Tables are used to describe trends in club drugs in multi-drug emergency department visits, and drug related deaths. Demographic characteristics of emergency department cases are described along with a look at the metropolitan areas where they occurred. (JDM)



DECEMBER 2000

Club Drugs

In Brief

According to DAWN, emergency department (ED) visits attributable to club drugs are relatively rare. ED visits for some, but not all, club drugs increased significantly from 1994 to 1999.

- Among the club drugs discussed in this report, methamphetamine accounts for the largest share of DAWN ED mentions and is most frequent in metropolitan areas in the western U.S.
- LSD is the next most common in ED mentions, followed by GHB, MDMA (Ecstasy), Rohypnol, and Ketamine.
- ED episodes involving club drugs usually involve multiple substances, such as marijuana, cocaine, and other club drugs. Alcohol is a particularly common factor in these ED episodes.
- ED episodes related to GHB, Ketamine, and MDMA increased significantly from 1994 to 1999, and GHB and MDMA mentions increased dramatically from 1997 to 1999.
- An apparent increase in Rohypnol mentions was not statistically significant. That is, the variability in Rohypnol estimates from 1994 to 1999 is likely due to random fluctuation.
- Young people are disproportionately represented in ED visits involving club drugs.

Deaths associated with club drugs other than methamphetamine are quite rare in DAWN data.

- Cumulatively, 2,601 deaths associated with methamphetamine abuse, 46 deaths associated with Ketamine, and 27 with MDMA were reported by participating medical examiners over the 5-year period from 1994 to 1998.
- There were no notable increases in deaths involving club drugs from 1994 to 1998.

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“According to DAWN, most ED episodes involving club drugs also involve other drugs...”

Background

This brief report was prepared in response to a multitude of requests for information on “club drugs” from the Drug Abuse Warning Network (DAWN). These requests have originated from the media, drug surveillance organizations, and the scientific community. This increased interest in club drugs follows recent publications on the use and effects of these drugs (ONDCCP, 2000; NIDA, 1999).

The term “club drugs” came from the association of these drugs with “raves” and dance clubs. The 6 drugs commonly thought of as club drugs and highlighted in this report are:

- d-lysergic acid diethylamide (LSD),
- Gamma-hydroxy butyrate (GHB, or its precursor gamma-butyrolactone [GBL]),
- Ketamine,
- methamphetamine,
- methylenedioxyamphetamine (MDMA or Ecstasy), and
- Rohypnol (flunitrazepam).

None of the DAWN publications to date have reported data on individual club drugs, with the exception of methamphetamine¹ and LSD. Yet, DAWN is the only national surveillance system that routinely captures such detailed data that new and emerging drug problems, such as club drugs, can be analyzed retrospectively from visits to hospital emergency departments and drug-related deaths. Box A, located at the end of this report, provides a brief description of DAWN, its uses and limitations.

Trends in Club Drugs in ED Visits, National Estimates: 1994–1999

Figure 1 shows the trend in ED visits related to the abuse of club drugs from 1994 to 1999. For 1999, DAWN estimated more than 10,000 ED mentions of methamphetamine, 5,000 mentions of LSD, nearly 3,000 mentions each of Ecstasy and GHB, more than 500 mentions of Rohypnol, and just under 400 mentions of Ketamine.

Mentions of GHB, Ketamine, and MDMA were significantly higher in 1999 than in 1994 (Table 1). Significant changes over the past two years, 1998 to 1999, occurred only for GHB and MDMA. Of particular note, the apparent growth in ED visits involving Rohypnol, from 13 mentions in 1994 to 540 in 1999, is not statistically significant—that is, this amount of variability *could have occurred by chance alone*. LSD mentions have been quite stable across the 6-year period. Mentions of methamphetamine were significantly lower in 1999 than in 1994; however, the year-to-year volatility of these estimates is well known and has been discussed at length elsewhere (OAS, 1999).

Worth noting are the seemingly parallel trends of GHB and MDMA, both with statistically significant increases from 1997 to 1999. The stability of LSD mentions is evident in the figure, as is its greater frequency of mentions, when compared with the other 5 club drugs shown.

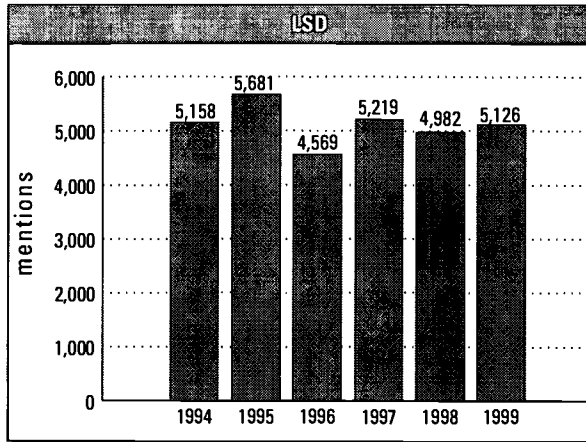
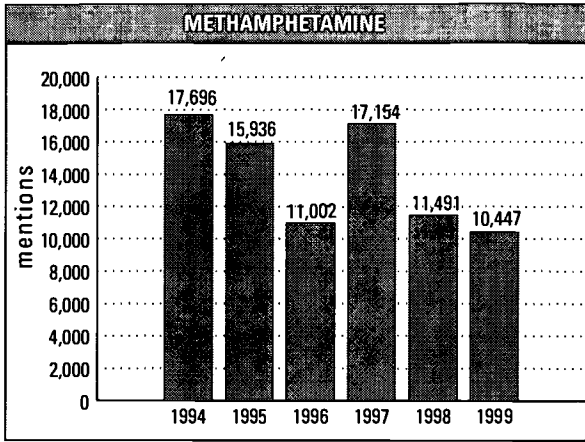
Although some of the changes over time are statistically significant, even the largest of these numbers is quite small. Drug-related ED episodes, of which these are a subset, are relatively infrequent—together, *all* drug-related ED episodes (554,932 in 1999) represent only 0.6 percent of the more than 91 million ED visits overall in 1999. By comparison, mentions of club drugs are truly rare events. In 1999, the most frequent of the club drugs, methamphetamine and LSD, comprised 0.5 and 1.0 percent of ED drug mentions, respectively. Ecstasy and GHB mentions comprised only 0.3 percent of ED drug mentions and Ketamine and Rohypnol a fraction of that (0.04 and 0.05 percent, respectively).

By way of comparison, the most frequent drugs reported to DAWN—alcohol-in-combination, cocaine, and marijuana²—comprise 19, 17, and 9 percent of ED drug mentions, respectively (OAS, 2000).

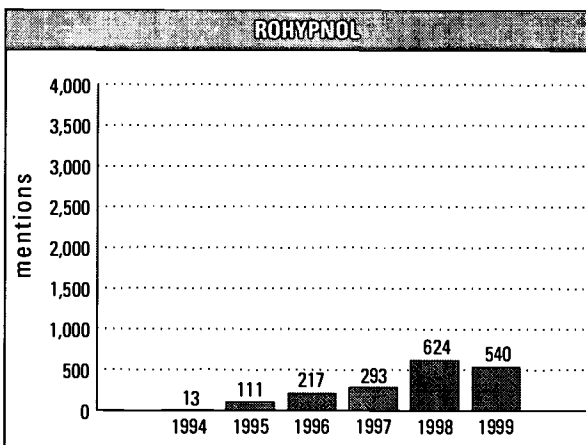
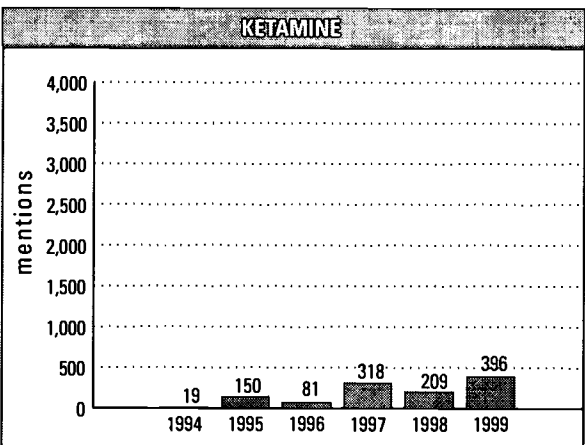
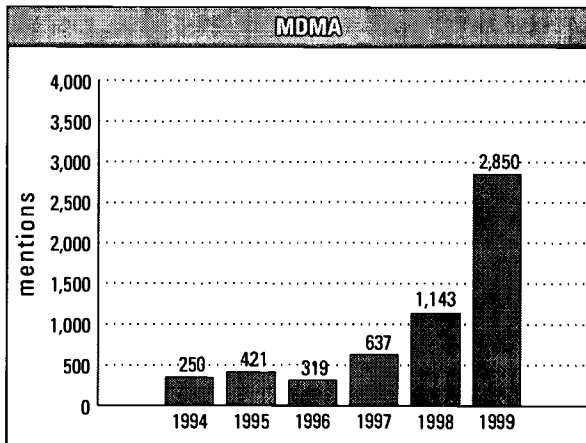
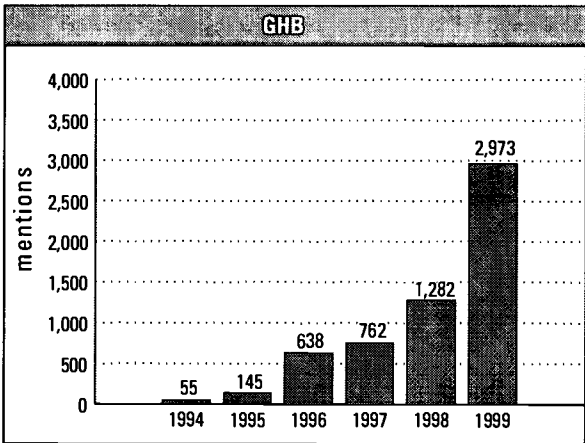
It is not appropriate to sum mentions across club drugs because of the potential for double counting. Each ED episode may have as many as 4 drug mentions plus alcohol. More information on drugs reported in combination is discussed below.

Remember also that these national estimates of club drug mentions may be based on very little data (i.e., actual unweighted mentions), and in some cases, from very few facilities (Table 2, p. 5). For example, the lack of a statistically significant trend in Rohypnol mentions is not surprising given that the 1999 estimates for Rohypnol are based on only 51 cases from 33 facilities. (In 1999, 488 hospitals participated in the DAWN sample.)

FIGURE 1.
Number of ED mentions of club drugs: 1994 to 1999



Not a statistically significant trend



Not a statistically significant trend

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 1999 (03/2000 update).

TABLE 1.

Weighted emergency department estimates for the coterminous U.S. and unweighted medical examiner counts by year: 1994 to 1999

	Total 1994	Total 1995	Total 1996	Total 1997	Total 1998	Total 1999	p-value 1998, 1999 ¹	p-value 1997, 1999 ¹	p-value 1994, 1999 ¹
Emergency Department (ED)									
GHB	55	145	638	762	1,282	2,973	0.001 +	0.008 +	0.001 +
Ketamine	19	150	81	318	209	396	0.193	0.424	0.028 +
LSD	5,158	5,681	4,569	5,219	4,982	5,126	0.868	0.904	0.970
MDMA	250	421	319	637	1,143	2,850	0.000 +	0.000 +	0.000 +
Methamphetamine	17,696	15,936	11,002	17,154	11,491	10,447	0.389	0.002 -	0.005 -
Rohypnol	13	111	216	293	624	540	0.686	0.276	0.214
DRUG EPISODES	518,978	513,633	514,347	527,058	542,544	554,932	0.610	0.373	0.294
DRUG MENTIONS	900,890	901,206	907,561	943,937	982,856	1,015,206	0.488	0.245	0.085
TOTAL ED VISITS ²	89,696,517	88,548,056	91,172,482	89,719,807	89,682,719	91,099,635	0.000 +	0.000 +	0.003 +
Medical Examiner (ME)³									
GHB	0	1	1	5	5				
Ketamine	4	7	9	16	10				
LSD	4	2	1	2	1				
MDMA	1	6	8	3	9				
Methamphetamine	507	487	484	622	501				
Rohypnol	0	1	1	0	2				
TOTAL NO. OF DECEDENTS	8,793	9,269	9,357	9,549	10,072				

¹ In this column, "+" and "-" denote statistically significant increases and decreases, respectively, between estimates for periods noted. For the purposes of this report, p-values less than 0.05 are considered to be statistically significant.

² DAWN estimates of ED visits should be close to but will not necessarily equal totals from previous year's American Hospital Association (AHA) Annual Survey.

³ Excludes data on homicides, deaths in which AIDS was reported, and deaths in which "drug unknown" was the only substance mentioned. Based on consistent panel of facilities with similar reporting history over the period 1994 to 1998. Medical examiner data for 1999 were not available at the time of printing. Significance tests cannot be performed on the ME portion of this column because ME data are not based on a statistical sample.

NOTE: Emergency department data are weighted estimates based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the coterminous U.S. Data from the MEs DO NOT represent national estimates; they are unweighted counts based on the voluntary participation of coroners and MEs in selected metropolitan areas.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 1999 (03/2000 update) for ED and 1998 (09/1999 update) for ME data.

TABLE 2.

Number of unweighted emergency department mentions and number of reporting facilities: 1999

Drug	Unweighted Mentions	Reporting Facilities (of 488 total)
GHB	923	170
Ketamine	114	77
LSD	1,355	361
MDMA	747	218
Methamphetamine	2,779	411
Rohypnol	51	33

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 1999 (03/2000 update).

Club Drugs in Multi-drug ED Episodes: 1999

According to DAWN, most ED episodes involving club drugs also involve other drugs (Table 3). More than 70 percent of ED episodes involving GHB, Ketamine, LSD, MDMA, or Rohypnol involve more than one drug; more than 50 percent of methamphetamine episodes involve other drugs. Alcohol is the most frequent substance mentioned in combination episodes involving GHB (56%), MDMA (47%), Rohypnol (41%), Ketamine (38%), and methamphetamine (28%). Marijuana is more frequently found in combination with LSD (39%), with alcohol ranking second (32%).

Sometimes the ED episode involves multiple club drugs. For example, 37 percent of Ketamine episodes and 15 percent of GHB episodes also involve MDMA. Other illicit drugs, such as amphetamines, cocaine, heroin,³ and marijuana, are prominent as well. Marijuana is involved in a high percentage of episodes with LSD (39%), Rohypnol (29%), MDMA (28%), and Ketamine (21%), whereas only 5 percent of GHB episodes also report marijuana. Cocaine is frequently present in combination with Rohypnol (28%), LSD (22%), MDMA (18%), and methamphetamine (17%).

Trends in Club Drug-related Deaths: 1994–1998

To date, the numbers of club drug-related deaths reported to DAWN are small (Table 1). Under ordinary circumstances, we would not report numbers this small. They are reported here for two purposes: first, to calm speculation and second, to correct recent media errors related to these data. It is important to stress that although DAWN medical examiner (ME) data come from many of the large metropolitan areas in the U.S., they are not derived from a statistical sample. Therefore, *these ME counts are not national estimates* and should not be generalized to the population at large.

Cumulatively, MEs participating in DAWN from 1994 to 1998 reported 2,601 deaths involving methamphetamine (range 484 to 622), 46 deaths involving Ketamine (4 to 16), and 27 deaths involving MDMA (1 to 9). The 5-year death totals associated with GHB (12), LSD (10), and Rohypnol (4) never exceeded 5 in any of these individual years. Due to the small number of ME deaths attributable to club drugs, no further analyses of these data were performed.

Demographic Characteristics of ED Cases: 1999

Age. The common wisdom is that club drugs tend to be used by young people. DAWN data support this view (Figure 2). Whereas 29 percent of DAWN ED cases overall involve patients age 25 and under, at least 80 percent of Ketamine, LSD, MDMA, and Rohypnol mentions and 59 percent of GHB mentions are attributed to ED patients 25 and under. Children and adolescents age 6 to 17, which account for only 10 percent of total drug-related ED cases, account for 57 percent of Rohypnol mentions, 38 percent of LSD mentions, and 27 percent of Ketamine mentions. Young adults age 18 to 25, who account for 20 percent of total drug-related ED cases, account for disproportionate shares of MDMA (67%), Ketamine (58%), GHB (50%), LSD (46%), Rohypnol (32%), and methamphetamine (31%) mentions.

Race/Ethnicity. White patients account for 61 percent of all ED episodes, followed by black (26%) and Hispanic (11%) patients. With the exception of Rohypnol, the majority (69% to 80%) of ED mentions of club drugs involve white, non-Hispanic patients (Figure 3), which is a fairly typical reflection of the U.S. population.⁴ However, a disproportionate share of Rohypnol ED mentions involve Hispanic (56%) ED patients.

“Young people are disproportionately represented in ED visits involving club drugs.”

TABLE 3.
Number of weighted emergency department episodes of club drugs used in combination with other drugs for total coterminous U.S.: 1999

<i>Drug groups and episode characteristics</i>	GHB	Ketamine	LSD	MDMA	Meth.	Rohypnol
Drug concomitance						
Single-drug episodes	859	75	1,513	636	5,118	159
Multi-drug episodes	2,114	321	3,613	2,214	5,329	381
TOTAL CLUB DRUG EPISODES	2,973	396	5,126	2,850	10,447	540
Drug combinations						
GHB		16	15	459	42	2
Ketamine	16		57	146	6	1
LSD	15	57		304	361	1
MDMA	459	146	304		161	51
Methamphetamine	42	6	361	161		...
Rohypnol	2	1	1	51	...	
Alcohol-in-combination	1,672	151	1,632	1,345	2,971	224
Amphetamine	112	2	81	86	38	2
Cocaine	183	32	1,132	508	1,779	153
Heroin	14	15	137	57	461	...
Marijuana	159	84	2,009	796	1,685	159
Drug combinations— percent of total club drug episodes						
GHB		4%	0%	16%	0%	0%
Ketamine	1%		1%	5%	0%	0%
LSD	1%	14%		11%	3%	0%
MDMA	15%	37%	6%		2%	9%
Methamphetamine	1%	2%	7%	6%		0%
Rohypnol	0%	0%	0%	2%	0%	
Alcohol-in-combination	56%	38%	32%	47%	28%	41%
Amphetamine	4%	1%	2%	3%	0%	0%
Cocaine	6%	8%	22%	18%	17%	28%
Heroin	0%	4%	3%	2%	4%	0%
Marijuana	5%	21%	39%	28%	16%	29%
TOTAL MULTI-DRUG EPISODES	71%	81%	70%	78%	51%	71%

* Meth. = Methamphetamine

... indicates that the figure does not meet standard of precision (estimates with a relative standard error of 50 percent or higher are suppressed).

NOTE: Emergency department data are weighted estimates based on a representative sample of non-Federal, short-stay hospitals with 24-hour EDs in the coterminous U.S.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 1999 (03/2000 update).

FIGURE 2.
Number of ED mentions of club drugs by age: 1999

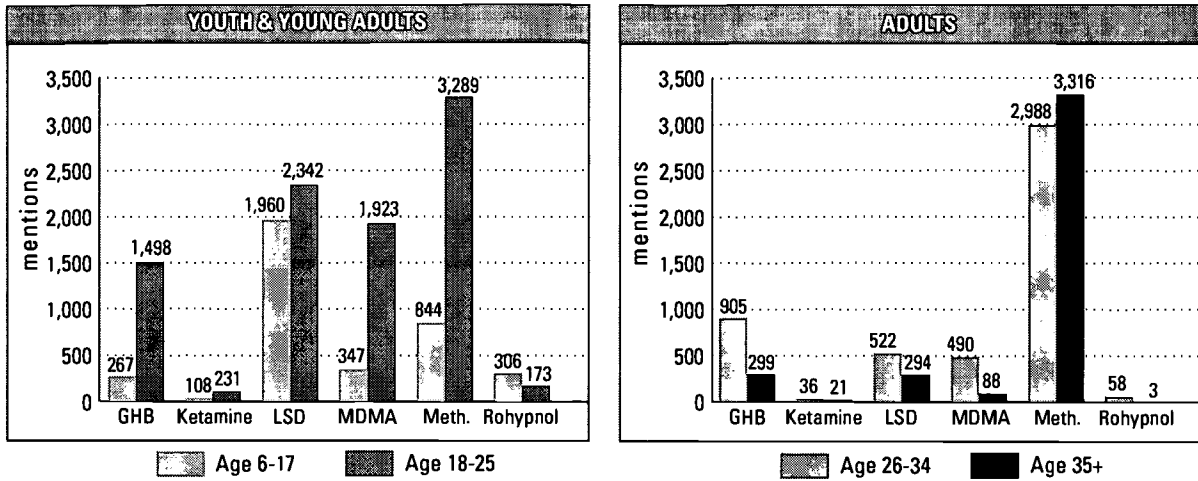
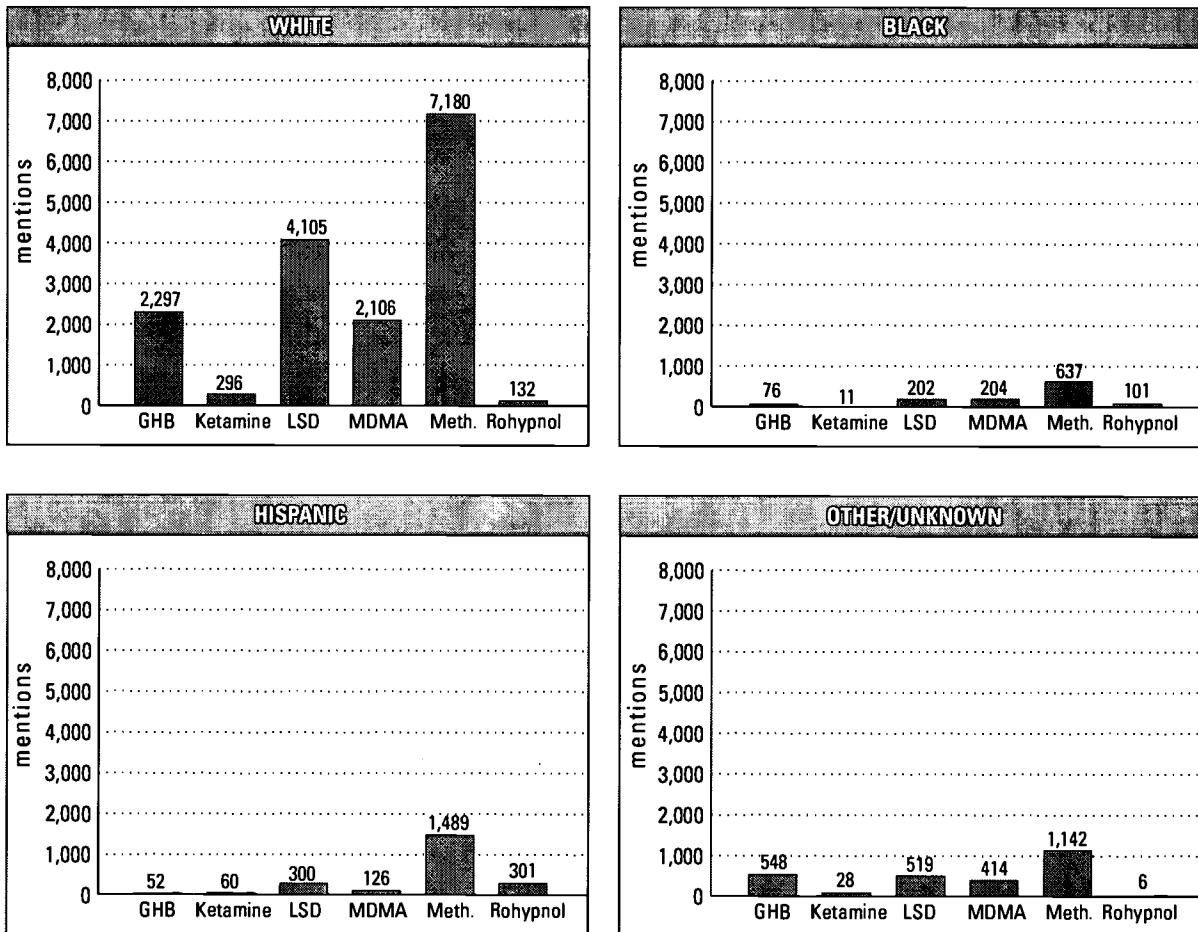


FIGURE 3.
Number of ED mentions of club drugs by race/ethnicity: 1999



Meth. = Methamphetamine

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 1999 (03/2000 update).

TABLE 4.

Estimated rate of club drug emergency department mentions per 100,000 population, by metropolitan area: 1999

	GHB	Ketamine	LSD	MDMA	Meth.	Rohypnol
TOTAL U.S.	1.2	0.2	2.1	1.2	4.3	0.2
Atlanta	4.5	0.5	3.1	2.2	3.0	0.2
Baltimore	0.2	0.0	2.3	1.5	0.4	0.4
Boston	0.6	0.3	1.2	2.3	0.3	0.1
Buffalo	0.3	0.0	2.7	1.7	0.7	0.0
Chicago	2.3	0.1	2.3	1.7	0.4	0.0
Dallas	6.0	0.1	4.3	1.0	4.1	0.2
Denver	4.3	0.1	5.5	0.9	6.3	0.0
Detroit	1.0	0.1	1.5	0.9	0.2	0.0
Los Angeles - Long Beach	1.5	0.1	2.7	0.6	10.7	0.0
Miami - Hialeah	1.0	0.5	2.6	3.1	0.5	0.4
Minneapolis - St. Paul	1.3	0.0	2.7	0.7	4.7	0.0
New Orleans	6.3	0.7	6.3	4.2	1.9	0.0
New York	0.2	0.4	0.6	1.6	0.2	0.0
Newark	0.4	0.8	1.1	2.1	0.2	0.0
Philadelphia	0.9	0.1	2.5	1.9	1.0	0.0
Phoenix	0.8	0.2	7.6	1.0	16.5	0.0
St. Louis	0.3	0.0	2.9	0.6	4.3	0.0
San Diego	3.1	0.5	2.7	1.0	24.3	0.2
San Francisco	8.6	0.2	3.4	2.9	34.4	0.0
Seattle	1.8	0.2	6.2	1.6	18.2	0.1
Washington, DC	0.3	0.1	2.2	0.5	0.9	0.1

Meth. = Methamphetamine

NOTE: These estimates are based on a representative sample of non-Federal, short-stay hospitals with 24-hour emergency departments in the coterminous U.S.

SOURCE: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network, 1999 (03/2000 update).

ED Mentions in Metropolitan Areas: 1999

Patterns of drug availability, usage, and therefore, the consequences of use tracked by DAWN, often show geographical variation. Table 4 shows the estimated rates of 1999 ED club drug mentions per 100,000 population for each DAWN metropolitan area. Rates, rather than numbers of mentions, facilitate comparisons across metropolitan areas by removing the confounding effect of population size. Nonetheless, conclusions based on such small numbers will be tentative at best.

We have discussed elsewhere (OAS, 2000) the geographic concentration of ED mentions of methamphetamine in metropolitan areas in the west: San Francisco (34), San Diego (24), Seattle (18), Phoenix (17), and Los Angeles (11).

Other club drugs appear to be more geographically diffuse:

- The highest rates of ED mentions of LSD appear in Phoenix (8), followed by New Orleans, Seattle, and Denver (all with 6 mentions per 100,000 population).
- Rates of GHB mentions appear highest in San Francisco (9), New Orleans (6), and Dallas (6).
- Rates of MDMA mentions appear highest in New Orleans (4), Miami (3), and San Francisco (3).
- Rates of Ketamine and Rohypnol mentions are extremely low, with none of the DAWN metropolitan areas topping 1 mention per 100,000 population. Therefore, it is not possible to assess with certainty whether Ketamine in New Orleans and Newark and Rohypnol in Baltimore and Miami are emerging problems or simply noise in the data.

Again, any conclusions should be tempered with the understanding that these estimates are based on very little data.

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- Office of National Drug Control Policy (August 1, 2000). Press release: Media campaign. Drug Czar's media campaign to target rave club drug 'ecstasy.' Washington, DC.

Endnotes

- ¹ Methamphetamine mentions also include mentions of speed.
- ² Marijuana mentions also include mentions of hashish.
- ³ Heroin mentions also include mentions of morphine and other opioids.
- ⁴ The U.S. population (July 1, 1999) was estimated to be 72 percent non-Hispanic White (82% including Hispanic White), 12 percent non-Hispanic Black (13% including Hispanic Black), and 12 percent Hispanic of any race (U.S. Census Bureau, 6/28/2000).

Box A DAWN Overview

The Drug Abuse Warning Network (DAWN) is an ongoing, national drug abuse surveillance system that monitors visits to hospital emergency departments (EDs) and deaths reviewed by medical examiners (MEs) and coroners that are attributable to drug abuse. DAWN cases do not include accidental ingestion or inhalation of a substance with no intent of abuse, or adverse reactions to prescription or over-the-counter medications taken as prescribed. Therefore, cases in which club drugs are administered to others without their knowledge (e.g., date rape associated with GHB or Rohypnol) are not reportable to DAWN.

A DAWN episode may have multiple drug mentions. Up to 4 different substances, in addition to alcohol-in-combination, can be recorded for each reportable ED case (6 substances plus alcohol-in-combination for each ME case). As a result, not every reported substance is, by itself, the cause of ED admission (for ED data) or death (for ME data).

DAWN collects data on drug-related visits to a national probability sample of hospital EDs. Emergency department data are weighted to create representative estimates of the actual population of drug abuse ED visits for 21 selected metropolitan areas and the coterminous U.S. (i.e., the contiguous 48 States).

Medical examiner participation in DAWN is voluntary and not based on a statistical sample. *Therefore, counts of drug-related deaths reported from DAWN do not represent the Nation as a whole or, necessarily, all ME drug abuse cases in the respective metropolitan areas.* Participation in DAWN may vary from year to year. As a result, it is necessary to use a consistent panel of facilities with constant reporting to examine trends over time. A consistent panel is composed of the subset of ME facilities reporting data for at least 10 months in all of the years of interest, in this report, 1994 to 1998. *Findings from this consistent panel cannot be compared with findings from consistent panels for other years.*

Cases reported to DAWN must meet specific criteria, listed below. As noted above, not all ED visits or deaths related to drug use are reportable, and not all reportable episodes involve drug overdoses; chronic effects of habitual drug use and unexpected reactions are also reportable.

Criteria for DAWN reportable cases from hospital EDs:

- The patient was age 6 to 97 and 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 contrary to directions; and
- The patient's reason for using the substance(s) was dependence, suicide attempt or gesture, and/or psychic effects.

Criteria for DAWN reportable cases from MEs:

- The decedent was age 6 to 97 and the death was reviewed by an ME or coroner who participates in DAWN;
- The death was drug-induced (i.e., drug[s] directly caused the death) or drug-related (i.e., drug abuse was a contributing factor in the death);
- The death involved an illegal drug or nonmedical use of a legal drug; and
- The reason for taking the substance was for psychic effect, dependence, or suicide.



A more complete description of DAWN can be obtained from DAWN reports on the OAS web site at <http://www.samhsa.gov/oas/p0000018.htm>



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