

# Epidemiology of Drug Abuse in the United States: A Summary of Methods and Findings

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*Epidemiology has recently been used to effectively track and analyze drug abuse patterns. This article generally describes methods used in the United States for estimating and monitoring drug abuse. It outlines the advantages and limitations of such data sources as surveys, indicators, and ethnography, and briefly explores the work and utility of local, national, and international drug surveillance networks. In addition, it describes national and local patterns of heroin, cocaine, and marijuana abuse.*

The recent use of epidemiology to study drug abuse has been of great value. Although drug abuse, because of its illicit nature and because of the unique behavior patterns of abusers, has proven very difficult to measure, the epidemiologic approach has provided tools to accurately quantify data and to calculate with scientific rigor such things as incidence and prevalence rates. These rates, in turn, can provide insight into the conditions which place people at risk for drug abuse and into the etiology and consequences of abuse. Medical epidemiology holds that once the causes and risk factors of a disease have been identified, a program of education, intervention, and prevention can be implemented. Even though the study of drug abuse differs significantly from the study of infectious disease—the phenomenon upon which medical epidemiology originated—the paradigm still applies.

## METHODS FOR ESTIMATING AND MONITORING DRUG ABUSE

The fact that nonmedical use of licit drugs and the abuse of illicit drugs is proscribed in society poses major difficulties and limitations for most methodologies used to measure the nature and extent of drug abuse. However, there exist several data sources, each with its own unique perspective, from which drug abuse trends can be tracked. The main data systems used in the United States are surveys, indicators, and ethnography.

### Surveys

Surveys provide the most direct measurement of the scope of drug abuse, offering the most comprehensive technique for estimating the prevalence and incidence of drug abuse as well as patterns of use and opinions about drugs; in addition, surveys allow for in-depth questioning on a variety of behavioral and attitudinal issues. Furthermore, cross-sectional surveys repeated over time can be used to monitor changes in trends. Surveys

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can cover the general population or a special population, and they can be conducted through a variety of techniques, including face-to-face interviews, telephone or mail questionnaires, and interviews administered privately or in group settings.

The National Institute on Drug Abuse (NIDA) sponsors two major national surveys—the National Household Survey on Drug Abuse and the High School Senior Survey. The former is a personal, face-to-face interview with household residents based on a multistage, stratified, random sample design; the latter is a self-administered questionnaire conducted in a group setting and based on a multistage random sample of high schools in the contiguous United States. Both surveys use probability samples, thus allowing for generalizations to be made about the total population.

NIDA also includes drug-use questions in ongoing surveys sponsored by other offices and agencies, such as the National Health Interview Survey, the Hispanic Health and Nutrition Evaluation Survey, the Department of Labor National Longitudinal Survey of Youth, the Maternal and Infant Health Survey, the Family Growth Survey, and the National Adolescent Student Health Survey. Including drug-related questions in comprehensive health surveys, which often are conducted among populations that may be at high risk for drug use, presents an opportunity to analyze the association between drug use and a wide range of health practices and social behaviors.

Population-based surveys have some limitations, however. For example, certain segments of the population—the homeless and street people in the household survey and absentees and dropouts in the high school survey—are excluded, and often these groups represent particularly vulnerable populations for drug abuse. In addition, surveys can be expen-

sive and time-consuming, and collecting data on a sensitive subject such as drug abuse poses reliability and validity problems. Also, surveys cannot reasonably be expected to provide information on relatively rare events such as heroin abuse. In those cases, other methodologies are needed to complement surveys in conducting a descriptive drug abuse epidemiology program.

## Indicators

Drug abuse indicators reflect the health and social consequences of drug abuse, and can be used to monitor changes in trends. Over the years, several indicators have emerged as the most reliable and useful for monitoring trends. Primary among these are treatment data. For example, treatment admission data can be analyzed to plot epidemic curves, and demographic and geographic characteristics can help identify high risk populations and sites where drug abuse may be prevalent. These analyses have implications for such policy decisions as where to direct intervention and outreach activities, where to locate treatment programs, and in the identification of potential clients for treatment.

Other significant indicators are drug-related emergencies and deaths. For more than 15 years, NIDA has sponsored the Drug Abuse Warning Network (DAWN), a national morbidity and mortality information system which collects data from more than 700 hospital emergency rooms and 85 medical examiners in the United States. DAWN has established a consistent reporting of drug abuse cases based on standardized guidelines, resulting in a system which produces invaluable trend information on health consequences and which is a major data source for identifying new drug abuse substances. Data such as DAWN's also can be collected and ana-

lyzed from a few or even one hospital or medical examiner's office in a city or small region, if there is reason to believe that drug-related cases would appear in those facilities.

A third major indicator is law enforcement records. Information on drug-related arrests, numbers and amounts of drug seizures, and drug price and purity gathered from local, regional, and national police and from military, drug enforcement, and customs officials and then analyzed by drug type, time, place, and person can be extremely important in documenting ongoing trends and in identifying new patterns of abuse. It should be kept in mind, however, that law enforcement statistics are particularly subject to fluctuations from policy changes based on manpower, funding, and community pressure.

The overriding limitation inherent in all of these indicators is the fact that rather than measuring prevalence or the magnitude of the drug problem, they measure trends associated with the consequences of abuse. Also, unlike surveys, they often involve secondary analysis of limited information. However, with careful interpretation, treatment, health, and law enforcement data can be analyzed together to yield a dynamic picture of specific aspects of drug abuse.

## **Ethnography**

Ethnography offers another valuable tool for studying drug abuse. It provides an informal description of a specific situation, applying as much rigor to the study as circumstances will allow. Ethnographic studies usually involve one of three general approaches: (1) the snowball technique, in which a researcher will use a contact to provide someone to interview, who, in turn, provides another person to interview, and so on; (2) a direct count approach in which the re-

searcher tallies the number of persons or activities occurring in a given area, such as a street corner or a known drug market; and (3) the participant observer approach in which the researcher plays an active role in a situation, such as asking conversational questions, while simultaneously observing activities and recording responses unobtrusively. The choice of methodology has less to do with preference than with the options that circumstances permit. The overall advantage of these approaches is that they involve real-life situations; their main limitation is the anecdotal nature of the data and the lack of scientific control.

## **EPIDEMIOLOGY WORK GROUP**

The Community Epidemiology Work Group (CEWG), established by NIDA in November 1976, is composed of researchers, primarily state, city, and local officials, who periodically analyze drug abuse patterns and trends in selected metropolitan communities throughout the United States. CEWG meets twice yearly to (1) provide timely assessment of drug abuse patterns and trends, (2) identify emerging drugs of abuse, (3) determine at-risk populations, and (4) develop methodologies for assessing data.

The importance of tapping local expertise in assessing drug abuse trends and in identifying potential outbreaks cannot be overemphasized. While national data systems provide valuable epidemiologic information, they often are limited by the delay between data collection, processing, analysis, and the dissemination of findings. In contrast, local-level data collection and analysis, such as that provided by CEWG, have shorter lag time and, in some cases, increased accuracy. For example, local drug abuse experts' unique knowledge regarding data perturbations becomes critical during data interpretation. These researchers also have

access to local surveys and studies as well as to other findings that provide an invaluable complement to core drug abuse indicator data such as morbidity, mortality, and law enforcement information. Consequently, NIDA uses data from national-level systems in conjunction with local analysis as the foundation for its descriptive epidemiology program.

The utility of local networks of drug abuse researchers who attempt to collect and analyze data in a standardized way has led to the establishment of State Epidemiology Work Groups. Modeled after CEWG, these groups comprise selected researchers and local authorities from throughout a state who periodically prepare drug abuse status reports for their area. This program aims at developing an epidemiology network in each state which would be capable of monitoring patterns and trends at the local level.

As a way to implement a worldwide drug abuse surveillance capability, an international network is being developed. The establishment of methods for the rapid exchange of epidemiologic information through telecommunication linkages also is being pursued; these will be invaluable in the effort to track trends, identify emerging problems, expedite intervention, and share epidemiologic information and findings.

## **PATTERNS AND TRENDS OF SELECTED DRUGS OF ABUSE**

This section briefly describes general national trends regarding three major drug categories.

### **Heroin**

Heroin abuse is a relatively rare event involving a population that seeks to remain hidden. These factors make it difficult to measure incidence, prevalence, and consequences of abuse through tra-

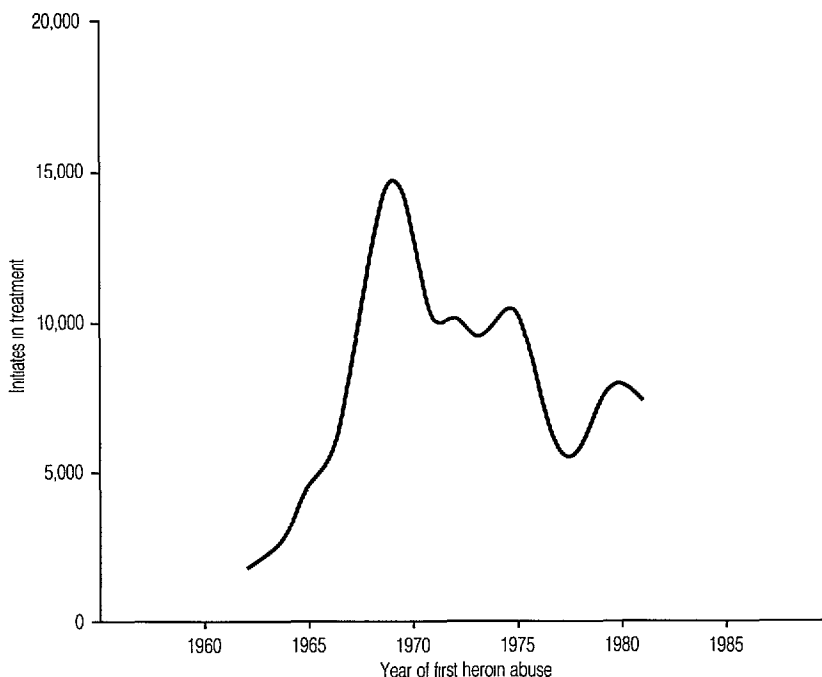
ditional research methods such as surveys. Indicators such as treatment data, however, have been used effectively to identify relative changes in incidence by calculating the year of first heroin use. Because of the difficulty in identifying denominator data, raw counts rather than rates often are used to analyze incidence trends.

Figure 1 shows that epidemics of heroin abuse occurred in the United States during the late 1960s, the mid-1970s, and the early 1980s. Unlike later epidemics, the epidemic in the late 1960s, which continued until about 1972, was national in scope and affected all regions of the United States. Some researchers believe that the widespread nature of this epidemic came about as the baby boom population matured and the social conditions of the time sparked drug experimentation and subsequent addiction.

The heroin epidemic in the mid-1970s was more prevalent in the West than in the East. This may have been due to the emergence at that time of heroin that originated in Mexico and was distributed primarily to the western United States. Some of this heroin made its way to the New York City area, but it was relatively scarce there.

Heroin from Southeast Asia fueled the epidemic in the early 1980s. Between 1979 and 1985, heroin indicators in New York and other northeastern cities increased sharply and then leveled off. However, indicators recently have begun to increase again in the northeastern section of the United States. Heroin indicators in states bordering Mexico showed a severe problem with heroin abuse starting about 1981 and continuing through the mid-1980s. Current indicators in that area of the country show a decline.

Along with these indicators of heroin availability and use, the western United States also experienced the appearance of "black tar" heroin, a gummy, dark



**Figure 1.** Incidence of heroin abuse, based on admissions to a panel of federally funded treatment programs.

brown or black heroin that has a strong bitter odor. Law enforcement officials believe that this new form of the drug is the product of poor or incomplete processing, which results in many impurities. Whether and to what extent these impurities contribute to the increase in adverse health consequences and death is currently under epidemiologic investigation.

Changes in the characteristics of abusers also have occurred over time, most notably an aging of the heroin abusing population. For example, according to reports to DAWN, the percentage of all heroin-related nonfatal emergencies which involved persons 30 years of age or older increased from 36% in 1979 to 68% in 1987, while a similar increase from 41% to 61% occurred during the period from 1979 to 1985 among heroin treatment admissions. These age data make a strong case that most current heroin

abusers were initiated into heroin abuse between the mid-1960s and the mid-1970s.

There also have been changes in the patterns of heroin use, with trends toward combining heroin ingestion with alcohol consumption and mixing heroin with cocaine. The combination of heroin with alcohol became a more prevalent pattern of use around the middle to late 1970s. An examination of heroin-related mortality shows that when heroin is ingested shortly before or shortly after alcohol consumption, it is particularly lethal.

The heroin/cocaine combination takes one of three forms: (1) cocaine is ingested at the same time as heroin in a combination called a "speedball"; (2) cocaine is taken after the heroin in an attempt to alleviate the adverse consequences of heroin dependence, such as withdrawal; or (3) the heroin is taken after prolonged

cocaine use to diminish the depression that often ensues.

The most dramatic issue of the day, though, is the association between intravenous (IV) drug abuse and acquired immunodeficiency syndrome (AIDS). Not only has the percentage of AIDS cases associated with IV drug abuse been increasing, but in some areas of the United States, such as the states of New York and New Jersey, IV drug abusers have become the main AIDS risk group, and this group is viewed as the bridge to the general population.

### Cocaine

The Household Survey on Drug Abuse shows that the number of current cocaine users in the United States, defined as

those who used the drug during the month prior to the survey, increased from 4.2 million in 1982 to 5.8 million in 1985, an increase of 38%. Based on the 1988 survey, however, the number of current users showed a dramatic decline to 2.9 million, a 50% decrease. The number of people who reported using cocaine during the year prior to the survey remained virtually level between 1982 and 1985, 11.9 million and 12.2 million, respectively. However, this population also showed a sharp decline in 1988, to 8.2 million. This strongly suggests that, as a result of education campaigns, the prevalence pool of cocaine users is beginning to recognize the dangers of cocaine use and to modify its behavior. Figure 2 shows that current cocaine use has decreased in all age groups.

**Figure 2.** Trends in cocaine past-month use by age group, 1974–1985.



Note: In 1974, 1976, and 1977 the estimates were less than 0.5% for the 26+ years age group.

Source: National Institute on Drug Abuse, National Household Survey on Drug Abuse, 1988.

Recent data also show an encouraging trend. Table 1 presents data from the 1988 High School Senior Survey. Similar to the Household Survey, it shows an increasing trend for cocaine use through 1985, with more than 17% of seniors reporting ever having used cocaine and almost 7% reporting having used it within the past month. Since 1985 there has been a significant decline in reported use of cocaine, with lifetime prevalence in 1988 down to 12.1%, annual prevalence at 7.9%, and current use at 3.4%.

For the past few years, a form of free base known as "crack" has become quite visible in many areas of the United States. Rather than a new drug, crack is the product of a new marketing technique. It is cocaine that has been converted to base form from hydrochloride using baking soda. The technique has been used for many years, but now the product is being sold on the street. Crack is sold in small amounts—about 65–100 mg—at the relatively low cost of \$10–\$20. This has made it affordable to a much larger population, including youth, who could not afford the average \$100 per gram price of hydrochloride. The 1985 Household Survey data reflect the consequences—46% of the 12–17-year-olds who reported using cocaine at least once said they had smoked free base, compared to 21% of the 18–25-year-olds and 19% of the 26–34-year-olds.

The greater frequency and more dangerous use patterns are no doubt responsible for the more than fivefold increase in cocaine-related nonfatal emergencies and deaths reported to DAWN from the latter part of 1983 to the latter part of 1988, as shown in Figure 3.

## Marijuana

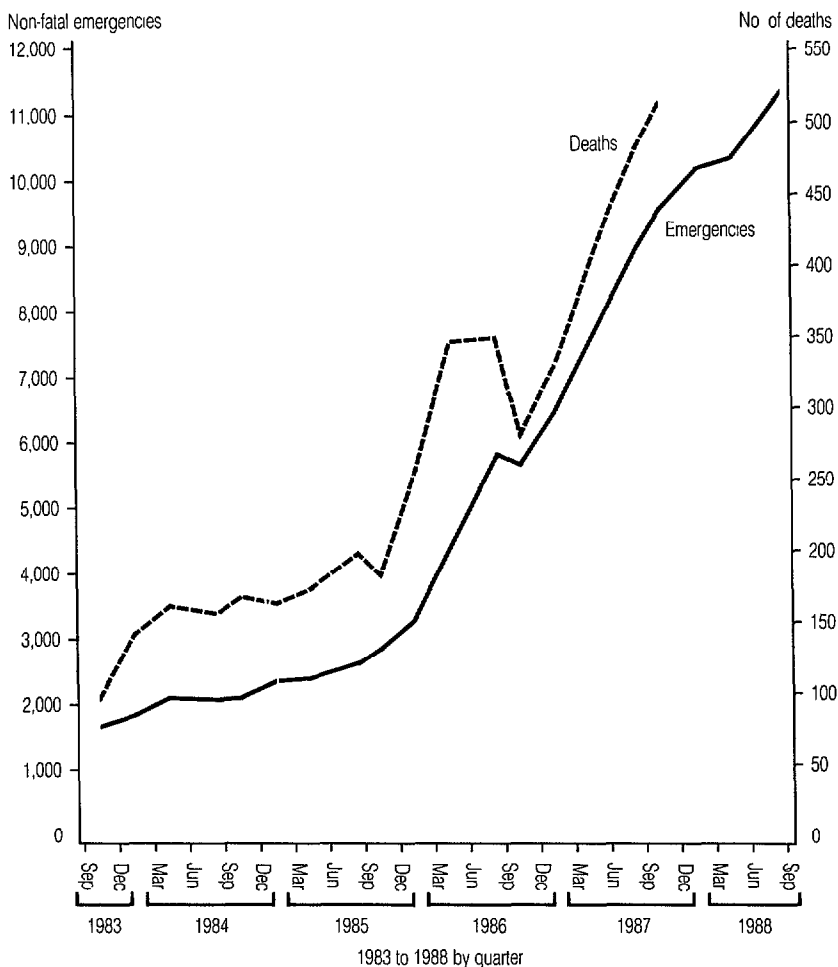
The most widely abused illegal drug in the United States is marijuana. The 1988 National Household Survey on Drug

**Table 1.** Estimated prevalence of cocaine use among high school senior classes, 1975–1988.

Prevalence	Percentage of high school seniors using cocaine													
	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Lifetime	9.0	9.7	10.8	12.9	15.4	15.7	16.5	16.0	16.2	16.1	17.3	16.9	15.2	12.1
Annual	5.6	6.0	7.2	9.0	12.0	12.3	12.4	11.5	11.4	11.6	13.1	12.7	10.3	7.9
Past month	1.9	2.0	2.9	3.9	5.7	5.2	5.8	5.0	4.9	5.8	6.7	6.2	4.3	3.4
Daily (past month)	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.4	0.4	0.3	0.2

Source: L. D. Johnston, P. M. O'Malley, and J. G. Bachman. *Monitoring the Future: A Continuing Study of the Lifestyles and Values of Youth*. University of Michigan, Institute for Social Research, 1989.

**Figure 3.** Cocaine-related morbidity and mortality, 1983–1988.



Source: National Institute on Drug Abuse, Drug Abuse Warning Network Consistent Panel.

Abuse indicates that an estimated 66 million people in the United States had used marijuana at least once and an estimated 12 million had consumed it during the month prior to the survey. While these estimates represent a substantial percentage of the national population, trends show a noteworthy decline in recent years, as shown in Table 2. Even the increase in lifetime prevalence among adults has been shown to be an aging

effect rather than a recent increase in incidence.<sup>2</sup>

Similar to those regarding cocaine, these National Household Survey trends are reflected in data from high school senior classes, shown in Table 3, which also

<sup>2</sup>Adams, E. H., J. C. Gfroerer, B. A. Rouse, and N. J. Kozel. Trends in prevalence and consequences of cocaine use. *Adv Alcohol Subst Abuse* 6(2):49-71, 1986.



**Table 2.** Estimated prevalence of marijuana use among three age groups, 1971–1988.

Prevalence	Population using marijuana (%) in:								
	1971	1972	1974	1976	1977	1979	1982	1985	1988
	12–17-year-olds								
N =	(781)	(880)	(952)	(986)	(1,272)	(2,165)	(1,581)	(2,287)	(3,095)
Ever used	14.0	14.0	23.0	22.4	28.0	30.9	26.7	23.6	17.4
Used in past year	...	...	18.5	18.4	22.3	24.1	20.6	19.7	12.6
Used in past month	6.0	7.0	12.0	12.3	16.6	16.7	11.5	12.0	6.4
	18–25-year-olds								
N =	(741)	(772)	(849)	(882)	(1,500)	(2,044)	(1,283)	(1,804)	(1,505)
Ever used	39.3	47.9	52.7	52.9	59.9	68.2	64.1	60.3	56.4
Used in past year	...	...	34.2	35.0	38.7	46.9	40.4	36.9	27.9
Used in past month	17.3	27.8	25.2	25.0	27.4	35.4	27.4	21.8	15.5
	26 years and older								
N =	(1,664)	(1,613)	(2,221)	(1,708)	(1,822)	(3,015)	(2,760)	(3,947)	(4,214)
Ever used	9.2	7.4	9.9	12.9	15.3	19.6	23.0	27.2	30.7
Used in past year	...	...	3.8	5.4	6.4	9.0	10.6	9.5	6.9
Used in past month	1.3	2.5	2.0	3.5	3.3	6.0	6.6	6.1	3.9

Source: National Institute on Drug Abuse. *National Household Survey on Drug Abuse: Main Findings*. Rockville, MD, 1989.

**Table 3.** Estimated prevalence of marijuana use among high school senior classes, 1975–1988.

Prevalence	Percentage of high school seniors using marijuana													
	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Lifetime	47.3	52.8	56.4	59.2	60.4	60.3	59.5	58.7	57.0	54.9	54.2	50.9	50.2	47.2
Annual	40.0	44.5	47.6	50.2	50.8	48.8	46.1	44.3	42.3	40.0	40.6	38.8	36.3	33.1
Past month	27.1	32.2	35.4	37.1	36.5	33.7	31.6	28.5	27.0	25.2	25.7	23.4	21.0	18.0
Daily (past month)	6.0	8.2	9.1	10.7	10.3	9.1	7.0	6.3	5.5	5.0	4.9	4.0	3.3	2.7

Source: L. D. Johnston, P. M. O'Malley, and J. G. Bachman. *Monitoring the Future: A Continuing Study of the Lifestyles and Values of Youth*. University of Michigan, Institute for Social Research, 1989.

demonstrate a declining trend through 1988 after reaching a peak in 1978–1979. This decline is thought to be associated with a current increase in the perceived harmfulness of marijuana. For instance, in 1978, monthly prevalence among high school seniors was 37%, and almost 11% used marijuana daily. At the same time, only 12% of seniors nationwide believed that there was great risk associated with occasional use of marijuana and 35% perceived great risk with regular use. By 1988, monthly prevalence declined to 18% and daily use to 2.7%, while perceived risk for regular use rose to 77%.

## CONCLUSION

The dynamic nature of drug abuse, its multifaceted etiology, and the complex set of behavioral, physical, and social circumstances that place some people at risk for drug abuse and its consequences make it extremely difficult, if not impossible, to predict trends. However, an effective epidemiology surveillance and analytical program can provide the basis for rapid identification of outbreaks of drug abuse and the risk factors involved, potentially limiting adverse effects and improving the public health.



### *Workshops Offered in Addiction Studies*

The Institute for Addiction Studies of the Merritt Peralta Institute in Oakland, California, U.S.A., offers a workshop series for persons working in the field of chemical dependency. Some of the upcoming one-day workshops deal with the following topics: "Treatment Strategies for 'Impossible' Cases," to be offered 27 April 1990, which will include descriptions of detox regimens and case studies; "Issues in Spirituality—God without Hysteria," on 22 June 1990, which will address the role of spirituality in recovery from chemical dependency; and "Kid's Power: Healing for Young Children of Alcoholics," on 13 July 1990, which will focus on techniques to help young children who have lived in alcoholic and substance-abuse environments. All these workshops will be held at the Institute for Addiction Studies, Health Education Center, Oakland, California, and the cost for each is US\$60. For further information, contact Margaret Saget, MPI CDRH, 435 Hawthorne Avenue, Oakland, CA 94609, telephone (415) 428-4104.