Drugs: Running the Numbers

Although most statistics on drug abuse appear to be reasonable extrapolations of survey results, some may not be valid and others reflect an inappropriate use of raw data

Addiction

This article is the second in a series. Next week: military interdiction.

ON 26 MAY, researchers testified before Senator John Glenn's (D–OH) committee on governmental affairs that 10.6 million Americans are alcoholics and that another 7.3 million abuse the drug. Last September, at a meeting on cocaine abuse sponsored by the National Institute on Drug Abuse (NIDA), health officials reported that there are 5000 new cocaine users daily, that 6 million people are regular users, and that 0.2 to 1 million are compulsive users.

Close examination of these statistics raises two issues. Predictably, many of the numbers are soft. Problems related to drug abuse are complex and difficult to quantify. The second issue concerns how the epidemiological data—derived from surveys—are used. Government research institutes and individual scientists are generally careful to include the best information in their reports to Congress, but occasionally, the data are not statistically sound or are extrapolated beyond the limitations of the survey.

For instance, the estimate that 10.6 million Americans are alcoholics comes from a 1979 national survey that does not include questions about alcoholism per se. Instead, the survey questionnaire asks about a range of problems related to drinking and the amount of alcohol consumed. The number of alcoholics cannot be determined precisely from this or any other survey. However, the notion that alcohol abuse affects a large number of people and costs the country a great deal of money is well supported by several surveys. Therefore, numerical precision is probably not required for Congress to make health policy decisions about alcohol research, prevention, or treatment programs.

The figures about cocaine are from a 1986 publication that includes information from different sources, some of which may not be statistically valid. The notion that 5000 people each day try cocaine for the first time, for example, is based on telephone interview data first published in 1984. According to the best recollection of the writer who compiled these data for NIDA—and who currently works for the San Francisco–based "Just Say No" Foundation—the figures were extrapolated from the responses of 500 randomly selected callers who phoned a cocaine hotline in New Jersey. The estimated number of compulsive cocaine users is from the same publication.

No one pretends that the system is infallible. "The current assessment procedures are based on survey data," says Thomas Harford of the National Institute on Alcohol and Alcoholism (NIAAA). "That is one qualification. The other qualification is defining just what an alcoholic or drug abuser is. It is not clear in everyone's mind." The validity of the survey data is at issue because people respond to questions from their own memories and willingness to be candid. The definitions of drug abuse and dependence have just been revised by the American Psychiatric Association (APA), making estimates based on previous definitions open to question. An additional concern is that by the time the statistics reach Congress, they may be outdated.

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Cocaine. *Overall use may be down slightly among young adults, but hospital emergencies are up.*

Of all drug-related problems in the United States, those involving alcohol are the most extensively studied. Robin Room, scientific director of the Alcohol Research Group of the Medical Research Institute in San Francisco, and Walter Clark, also of the Alcohol Research Group, led the 1979 study that provided the raw data for statistics presented to Glenn's committee hearing on the biological and environmental determinants of alcoholism. (In 1984 the researchers expanded their study to include a greater proportion of blacks and Hispanics, but as yet the alcohol institute has not incorporated these figures into their public projection.) "I don't know where they get their figures from," says Room in response to a query about the estimate of 10.6 million alcoholics in the United States. "It's a long story, really. It dates back to the late 1960s."

At that time, the NIAAA did not exist and alcohol research was conducted under the auspices of the National Institute of Mental Health (NIMH). "Someone from NIMH called Don Cahalan [who was then the alcohol study director] to ask how many alcoholics there were in the United States," says Room. "Cahalan told them he didn't know, that his study was not designed to predict that number." But NIMH needed the number for a congressional hearing and calculated that 9 million people were alcoholics on the basis of being "heavy, escape drinkers," a description derived from items on the survey questionnaire.

The number stuck and by 1974, 3 years after NIAAA was formed, agency officials asked Room to estimate if the number had changed. He responded that it depended on how the problem was defined. In a written

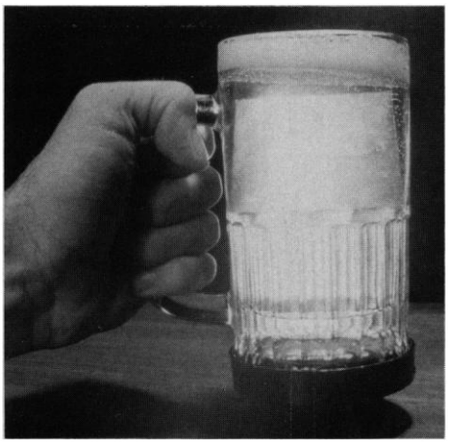
statement he said that "in the upper hundreds of thousands" of people were currently in treatment for alcohol-related problems, as many as 10 million reported some problem associated with drinking within the past year, and about 20 million said they had had an alcohol-related problem at some point during their lifetime. "In the editing process, the 20 million number got dropped," says Room, leaving 10 million as the figure everyone remembered.

Room emphasizes that his survey questions describe a continuum of drinking behaviors. "There is no clear cutoff between problem drinkers and alcoholics," he says. Even if he wanted to make the distinction, it would be impossible because the definition of the terms keeps changing. This is reflected by the newest version of the revised Diagnostic and Statistical Manual of Mental Disorders (DSM) compiled by the APA.

DSM-III, published in 1980, does not describe what an "alcoholic" is; instead the manual lists diagnostic criteria for alcohol abuse and alcohol dependence. Abuse depends on "a pattern of pathological use for at least a month that causes impairment in social or occupational functioning" and includes a "loss of control" associated with drinking. Alcohol dependence means abuse coupled with symptoms of either tolerance to the drug or physical signs of withdrawal. The 1987 DSM-III-R, however, places less emphasis on tolerance and withdrawal, and requires that a person meet three of nine diagnostic criteria for psychoactive substance dependence (see box).

Until very recently, the alcohol institute used the 1980 DSM-III definitions to estimate the numbers of alcoholics and alcohol abusers from Room's sociological data. "We ranked the relevant symptoms and analyzed them," says Harford. Now Bridget Grant, also of NIAAA, is using both DSM-III and DSM-III-R criteria to evaluate Room's 1984 survey results. Grant's analysis is not yet complete but the final statistics for alcohol dependence will be higher when the new criteria are applied to the raw data.

Although NIAAA does most of the analyses of drinking behavior in the United States, a recent study by NIMH covers some of the same territory and finds a lower prevalence of serious drinking problems. A critical difference between the projections from the two institutes, however, is that the NIMH survey is designed to identify clinically diagnosable mental health and substance abuse problems because its study questionnaire is based on DSM-III criteria, according to NIMH epidemiologist Ben Locke. (NIAAA, in contrast, used the DSM-III criteria after the fact to reevaluate Room's social epidemiological data.)



Alcohol. *Even for a legal drug, statistical precision about addiction is an unrealistic goal.* [*Credit: 1987 Ed Castle/Folio Inc.*]

Called the Epidemiology Catchment Area (ECA) study, the NIMH survey focused on specific population or "catchment" areas within five geographic regions—New Haven, Connecticut; Baltimore, Maryland; St. Louis, Missouri; Los Angeles, California; and the area around Durham, North Carolina. "It's essentially the largest psychiatric epidemiological study that has ever been done," says John Helzer of Washington University School of Medicine in St. Louis. He is just finishing an analysis of the data on alcohol use by nearly 20,000 people in the five sites and estimates that over the past year about 6.8% of them have had alcohol abuse or dependence problems. The ECA study is not designed to be a representative survey of people in the United States, says Helzer, although Locke thinks the data can be used for national projections if the proper analytical methods are applied.

An earlier report of the ECA data that included about 10,000 people in three of the cities showed that illicit drug abuse and dependence affect about 1.8 to 2.2% of those surveyed. These 6-month prevalence rates, reported by Jerome Myers and his collaborators in the October 1984 issue of the *Archives of General Psychiatry*, are an indication of current problems, rather than those that may have occurred at any point during a person's lifetime. The study also indicates that many people who seek treatment for alcohol or drug problems are also diagnosed as having depression, anxiety disorders, or antisocial personality.

In its 1987 report to Congress, NIAAA estimates that about one-third of Americans do not drink at all, another one-third are light drinkers, and the rest are moderate to heavy drinkers. The agency derives statistics on per capita consumption from sales taxes of alcoholic beverages and computes them on a state-by-state basis. The figures show that over the past 50 years alcohol consumption reached a post–World War II peak, leveled off during the 1950s, and increased steadily from about 1960 to 1980.

In this decade total consumption has decreased slightly, with the average American drinking about 2.65 gallons of pure alcohol in 1984. This is equivalent to drinking about "50 gallons of beer, 20 gallons of wine, or more than 4 gallons of distilled spirits," according to the NIAAA report. The geographic patterns of drinking vary markedly, with the highest consumption in the District of Columbia at 5.34 gallons per person per year (perhaps a statistic that reflects the high incidence of cocktail parties in the national's capital) and Utah's low of 1.53 gallons per capita. Men of all age groups drink more than women, and people in the 18- to 50-year-old age group tend to be the heaviest drinkers.

NIDA cites two surveys in particular for its statistics on national trends in drug use and abuse. The National Household Survey on Drug Abuse, done every 2 or 3 years, and the annual Survey of High School Seniors include questions designed to track patterns of drug use within the past month, year, or lifetime. The surveys are of large numbers of people, making it possible to break them into categories on the basis of age, sex, and geographic distribution for more detailed analyses. Some researchers contend that the weaknesses of the surveys are inherent because they are all based on self-reports of drug use. NIDA epidemiologist Edgar Adams says that previous studies of this issue indicate that self-report data are fairly accurate, with the exception of an underreporting of heroin use.

"The household survey is a door-to-door survey of more than 8000 people twelve years and older," says Adams. It does not include homeless and institutionalized people who probably have a higher prevalence of drug use. The full interpretation of the 1985 household survey is still not available, but the population estimates have been published. "About 12 million people used cocaine at least once during the year and between 3 to 5 million used it twelve or more times," says Adams. Based on his own use of DSM-III criteria to analyze these data, Adams estimates that "in excess of 1 million people are dependent on cocaine."

Lloyd Johnston of the University of Michigan Institute for Social Research in Ann Arbor heads the in-school survey of drug use among approximately 15,000 to 18,000 high school seniors for NIDA each year (1975 to the present). Although he samples a cross section of youths from public and private schools, the study population does not include high school dropouts,

who Johnston says comprise about 15% of that age group. Previous studies indicate that dropouts use certain drugs at a higher rate than do high school students. The Michigan researchers also use mail surveys to sample about 2400 young adults—aged 19 to 29 for the 1987 report—who have graduated from high school.

Overall, Johnston, Patrick O'Malley, and Jerald Bachman see a downward trend in lifetime use of illicit drugs among high school seniors from its peak in the early 1980s. The annual prevalence of marijuana use seems to be declining slightly, from 40.6% in 1985 to 36.3% in 1987. The annual prevalence of cocaine use peaked during 1985 and 1986 at 13.1% and 12.7%, respectively, and fell to 10.3% in 1987. Current cocaine use, defined in the study as use of a drug within the past 30 days, shows a drop among high school seniors, college students, and young adults.

A disturbing trend, however, is that more seniors report smoking cocaine or "crack," which some researchers see as potentially more addictive than "snorting" the drug. Annual heroin use among seniors was fairly steady between 1979 and 1987 at 0.5% to 0.6%. For nearly every drug mentioned in the survey, more men than women are users, and men are more likely to be heavy users.

No one's survey data are perfect. "I think a number of professionals would tell you they prefer the NIAAA survey design, because it focuses on the consequences of alcohol abuse—things like driving accidents, family breakups, and lost employment, for instance," says Richard Harwood of Research Triangle Institute in Research Triangle Park, North Carolina. "Those kinds of questions were not asked by NIDA surveys until 1985." Harwood has worked with data from both institutes as well as NIMH to assess the economic implications of alcohol and drug abuse.

For instance, in their recent reports to Congress, NIAAA (1987) and NIDA (1986) estimate that alcohol abuse costs the country a total of about $117 billion and that drug abuse costs nearly $100 billion. If the numbers are correct, or even close to being correct, they add up to more than the projected federal deficit of $150 billion for 1988. Not all the money would translate into instant revenue, however, because more than half is due to "lost productivity," according to Valley Rachal of Research Triangle Institute, who also helped to compute the numbers. The productivity estimate includes consequences attributed to drinking such as working fewer days and failing to get a promotion. Other factors that contribute to the economic costs of alcohol abuse include direct and indirect costs for health care, drug-related accidents, crime, incarceration, and social welfare.

How accurate are the economic estimates? "Some are better than others," says Harwood. "I think the productivity estimates need the most improvement, especially since they are the largest percentage [more than 50%] of the cost." The hardest data, he says, are health care expenditures related to alcohol abuse.

The same firmness in data does not hold for expenses related to drug abuse because the health consequences of cocaine abuse, for example, are not completely known. Through the Drug Abuse Warning Network, a tracking system in place for more than 20 years, hospital emergency rooms are reporting more than three times the number of admissions that may have involved cocaine use. The drug is linked to an increasing number of heart attacks, strokes, and seizures, and may also lead to damage in unborn fetuses.

Can the system for reporting drug use and abuse be improved? Probably, but according to Room, that is not the major issue. "I am not so critical of the numbers as the way the numbers are interpreted in the public domain," he says. One difficulty involves making arbitrary cutoffs in a continuum of behavioral problems. "Our preference is to try to answer in a way that suggests there is no cutoff point," says Room. "If I had my preference, I would avoid having the figures sound spuriously exact."

Another difficulty is the way the political system handles the numbers, says Room. Typically, government reports and policy statements begin with a litany of numbers, usually the highest credible numbers that can be extrapolated from research data. "The problem we are seeing here is between science and policy," says Room. And if past experience is any predictor of future events, it is a problem that is unlikely to go away.

■ DEBORAH M. BARNES

New Rules for Drug Dependence

The 1987 version of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III-R), published by the American Psychiatric Association, lists diagnostic criteria for psychoactive substance dependence, which includes dependence on alcohol, cocaine, and other drugs. The new measures are less rigid than those given in the 1980 version of the manual and are as follows.

"A. At least three of the following:

(1) substance often taken in larger amounts or over a longer period than the person intended

(2) persistent desire or one or more unsuccessful efforts to cut down or control substance use

(3) a great deal of time spent in activities necessary to get the substance (e.g., theft), taking the substance (e.g., chain smoking), or recovering from its effects

(4) frequent intoxication or withdrawal symptoms when expected to fulfill major role obligations at work, school, or home (e.g., does not go to work because hung over, goes to work or school "high," intoxicated while taking care of his or her children), or when substance use is physically hazardous (e.g., drives when intoxicated)

(5) important social, occupational, or recreational activities given up or reduced because of substance use

(6) continued substance use despite knowledge of having a persistent or recurrent social, psychological, or physical problem that is caused or exacerbated by the use of the substance (e.g., keeps using heroin despite family arguments about it, cocaine-induced depression, or having an ulcer made worse by drinking)

(7) Marked tolerance: need for markedly increased amounts of the substance (i.e., at least a 50% increase) in order to achieve intoxication or desired effect, or markedly diminished effect with continued use of the same amount

Note: The following items may not apply to cannabis, hallucinogens, or phencyclidine (PCP):

(8) characteristic withdrawal symptoms (see specific withdrawal symptoms under Psychoactive Substance-induced Organic Mental Disorders)

(9) substance often taken to relieve or avoid withdrawal symptoms

B. Some symptoms of the disturbance have persisted for at least one month, or have occurred repeatedly over a longer period of time."

■ D.M.B.