reports to the FBI. Current procedures for both the mortality and crime reporting systems discourage rather than encourage the updating of incorrect or incomplete information.

References

1. Mercy, J. A., and O'Carroll, P. W.: New directions in violence prediction: the public health arena. Violence and victims. 3: 285–301, winter 1988.
2. Vital statistics of the United States, 1986, vol. 2, Mortality, pt. A. DHHS Publication No. (PHS) 88–1122. U.S. Government Printing Office, Washington DC, 1988, (*a*) p. 2; (*b*) p. 15; (*c*) p. 10; (*d*) p. 6.
3. Uniform crime reporting handbook. Federal Bureau of Investigation, U.S. Department of Justice, Washington, DC, 1984, (*a*) p. 6; (*b*) p. 9.
4. International classification of diseases, ninth revision, clinical modification. DHHS Publication No. (PHS) 80–1260, U.S. Government Printing Office, Washington, DC, 1980, (*a*) p. 1042; (*b*) p. 1045.
5. Uniform crime reports: crime in the United States, 1984. Federal Bureau of Investigation, U.S. Department of Justice, Washington, DC, 1985.

Patterns of Rates of Mortality from Narcotics and Cocaine Overdose in Texas, 1976–87

KIRK C. HARLOW, DrPH

Dr. Harlow is Assistant Professor of Administrative Sciences, School of Business and Public Administration, University of Houston-Clear Lake.

The research was funded in part through grant No. 17 from the University of Houston-Clear Lake.

Tearsheet requests to Kirk C. Harlow, DrPH, University of Houston-Clear Lake, 2700 Bay Area Blvd., Houston, TX 77058-1096.

Synopsis

Drug overdose mortality data for narcotics and cocaine for Texas for 1976–87 reveal a cyclic pattern of narcotics mortality falling from 0.92 per 100,000 population in 1976 to a low of 0.13 in 1979, and rising to 0.62 in 1986. The data also show a sharp increase in cocaine mortality from 0.07 per 100,000 in 1983 to 0.38 in 1987. The data indicate that men consistently are at higher risk than women for overdose from both categories of drugs.

Hispanics in the El Paso and San Antonio areas were found to have much higher risk of mortality from narcotics than expected, while blacks in the Houston and Dallas areas were at higher risk of cocaine mortality. The evidence suggests that narcotics and cocaine mortality is highest among the blue collar categories of the work force.

The cyclical pattern of drug overdose mortality suggests the need for more examination of the historical interplay of public policies and social factors against the magnitude of the drug problems. The differences in mortality patterns by sex, ethnicity, and location indicate the need to develop policies and programs that address the unique characteristics of different at-risk populations.

EFFECTIVE RESPONSES TO DRUG PROBLEMS, including identifying drug use risk factors and high risk groups, require understanding epidemiologic patterns of these problems.

Variations in the nature of drug problems are seen in different localities and differ between men and women, among ethnic groups, and in the types of drugs abused (*1–5*). Several researchers have suggested that there is a cyclical pattern to the problems of drug abuse (*6, 7*). The differences manifested in drug problems indicate the complexity of the overall problems and the need for continuing examination of their patterns and the populations at risk.

Population surveys are useful for examining patterns in drug problems, but they have their shortcomings. First, the cost of surveys of sufficient size to be useful preclude conducting them locally at intervals frequent enough to characterize and monitor drug problems on a local or regional basis. Such surveys are most practical on a large scale, such as nationally. Secondly, survey samples may not be large enough to permit differences in drug problems to be examined among geographic and demographic subsets that are important to developing responses to drug problems. Lastly, the types of people involved in abuse of narcotics and cocaine are not easily reached through either face-to-face or telephone interviews, and their responses may be of limited reliability.

Table 1. Deaths from narcotics and cocaine overdose and mortality rates per 100,000 population, by year, Texas, 1976–87

Year	Narcotics			Cocaine		
	Number	Rate	CI	Number	Rate	CI
1976......	120	0.92	0.16	...	...	...
1977......	57	0.43	0.11	...	...	...
1978......	34	0.25	0.08	...	...	...
1979......	18	0.13	0.06	...	...	...
1980......	25	0.18	0.07	...	...	...
1981......	27	0.18	0.07	...	...	...
1982......	58	0.38	0.10	...	...	...
1983......	29	0.18	0.07	11	0.07	0.04
1984......	43	0.27	0.08	21	0.13	0.06
1985......	85	0.52	0.11	23	0.14	0.06
1986......	104	0.62	0.12	52	0.31	0.08
1987......	52	0.31	0.08	65	0.38	0.09

NOTE: CI = 95 percent confidence intervals. Cocaine deaths prior to 1981 were too few to permit calculation of rates.

Data on drug overdose mortality can be a useful indicator of patterns of drug abuse and can enhance and supplement surveys to identify changes in the extent of drug problems during a long period, as well as those populations at risk (*8, 9*).

We present the findings of our research on patterns of drug overdose mortality in Texas as part of an effort to develop a better understanding of the nature of drug problems sectionally and over long periods. Patterns of narcotics mortality in general, and cocaine mortality in particular, in Texas during 1976–87 were examined, and detailed analysis is offered for 1985–87.

Study Organization and Data

We included in the study those persons who died in Texas during 1976–87 for whom the primary or contributing cause of death noted by the medical examiner on the death certificate was overdose of a narcotic drug, or specifically cocaine. Narcotics deaths were defined as those resulting from the use of any narcotic drug, such as heroin, morphine, and dilaudid, since they frequently are not identified on death certificates. Cocaine included both cocaine and crack cocaine. Deaths that simply involved drugs, such as traffic accidents or homicides, were not included.

Data were abstracted from the original death certificates filed with the Texas Department of Health. In some cases, the specific drug causing death was identified by telephoning the medical examiner. Data abstracted from death certificates for 1976–87 were age, sex, ethnicity, and the name of the drug or drugs believed to have caused the death. Data for 1985–87 also included occupation, the county of the death, and the month of the death.

The data are of interest because, first, being from a specific population sample, namely Texas, rate-based comparisons can be made. This is not possible with data on drug overdose from the Drug Abuse Warning Network because they are drawn from a sample of emergency rooms. Second, the level of detail available directly from death certificates is not readily obtainable from other sources.

The data in this study reflect only deaths that were uniquely caused by either narcotics or cocaine. Deaths attributable to those drugs in combination with other drugs were not included, because data-reporting combinations often precluded accurate identification of the combinations. Examination of the data for 1985–87, as well as data from other sources, indicated that the use of mixtures of narcotics, cocaine, and other drugs has been increasing in recent years (*10*). Consequently, it is likely that the mortality figures presented in this study for that time period underreport the relative level of the problems.

Furthermore, the data are subject to the level of reliability of medical examiners' assessments of cause of death. Variations between locales may be caused partly by differences in the rigor of the medical examiner's examination. During periods of low levels of drug abuse, drug overdose mortality may be understated, because medical examiners may not be as likely to be looking for drugs as the cause of death (*8*).

Because mortality patterns reflect the relative lethality of a drug, comparisons between two categories of drugs do not necessarily represent actual differences in their relative prevalence levels (*11*). Comparisons of data for 1979 with that of other years for Texas suggests that the 1979 data may be incomplete (*10*).

Data Analysis

Our analysis consisted primarily of calculating crude and age-specific mortality rates. Indirect age standardization was used in analyzing mortality by location and ethnicity to account for age-structure differences among subpopulations and to address the relatively small number of deaths in several categories (*12*). Direct standardization was not possible because the small number of deaths in each category precluded the calculation of age-specific rates. In the indirect method, the actual number of deaths in a category was compared to the expected number of deaths calculated by applying age-specific mortality rates of a standard population to the population of the category being examined. Age-specific rates for all narcotics deaths in 1986 were used as the standard. Examination of the age structures of the populations used in the other analyses indicated that age adjustment was not necessary.

The population data for calculating most rates were estimates developed by the Texas Department of Health. The population base data used for examining occupational rates were 1980 population figures prepared by the Bureau of the Census (*13*). The figures were increased by the percent change in the size of the population since 1980, under the assumption that the composition of the work force was relatively constant during the period. Growth in the numbers of workers in service occupations since 1980 may have resulted in rates for service-based occupations being somewhat overstated, and rates for other occupations being understated. More up-to-date data, however, were not available.

Mortality Rate Patterns

Overall mortality rates. Table 1 shows a cyclic pattern of narcotics mortality rates during the period. The mortality rate fell from 0.92 per 100,000 population in 1976 to 0.13 in 1979, rose to 0.62 in 1986, and declined to 0.31 in 1987. The differences between the high rates for 1976, 1977, 1985, and 1986 were found to be statistically significant when compared to the low rates for 1979–81.

Because of the surprisingly sharp decline from 1986 to 1987, we conducted an examination of mortality rates by month from 1985 through 1987. The decline was seen to be a pattern of steady monthly decline beginning in early 1986. As noted, there was an indication that a growing proportion of drug overdose deaths in recent years was occurring as a result of narcotics used in combination with other drugs, deaths not included in this analysis. Consequently, the rates for 1985 and 1986 may underestimate the relative level of the problems. The decline in 1987 may be partially an artifact of that shift.

Prior to 1983, cocaine mortality rates ranged from one to eight deaths in a year, exceeding four deaths in only 2 years. Rates for those years are not presented. There was, however, a sharp rise in mortality from 1983 that corresponds to the introduction of crack cocaine. The differences between the rates for 1983–85 and those for 1986–87 are all statistically significant. The 0.38 mortality rate for cocaine exceeded the narcotics mortality rate for the first time in 1987, although the difference between the two is not statistically significant. In addition, the rate is still less than one-half as high as the rate for narcotics in 1976. The rates may underestimate the current level of the problems, because overdoses from cocaine in combination with other drugs are not included.

While the data suggest that the current drug crisis may be part of a larger cycle of drug abuse, it is important to note that current mortality rates include not only narcotics, but cocaine, which is pharmacologically different and may require different approaches to treatment and prevention (*14, 15*).

Figure 1. Mortality rates per 100,000 population from narcotics overdose, 1976–87, and from cocaine overdose, 1983–87, in Texas, by sex and year

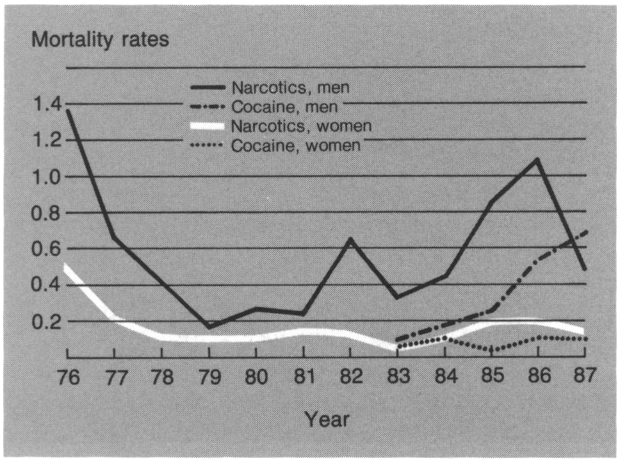


Table 2. Mean age at death from narcotics and cocaine overdose, by year, Texas, 1976–87

Year	Narcotics Mean age	Narcotics SD	Cocaine Mean age	Cocaine SD
1976	27.1	8.5	...	...
1977	29.3	11.1	...	...
1978	28.6	10.3	...	...
1979	28.5	7.4	...	...
1980	33.2	14.1	...	...
1981	30.1	9.3	...	...
1982	29.6	7.7	...	...
1983	31.9	7.2	28.1	6.6
1984	31.4	8.9	29.6	6.7
1985	31.4	7.7	31.1	5.9
1986	31.5	8.9	30.3	6.4
1987	33.0	10.3	31.4	8.1

NOTE: Cocaine deaths prior to 1981 were too few to include in the analysis.
SD = standard deviation.

Sex-specificity. Mortality rates per 100,000 population for men and women for the two drug categories are presented in figure 1. Rates for men are as much as three times higher than those for women, indicating that men are a higher risk population. For deaths from narcotics, the differences between the rates for men and women were found to be statistically significant for all years except 1979–81. For deaths from cocaine, the differences were statistically significant for 1985–87. Changes in mortality during periods of years are primarily attributable to increases or decreases in mortality among men. Mortality patterns for women show only slight changes.

Figure 2. Age-specific mortality rates per 100,000 population from narcotics overdose, Texas, 1976–87, by year

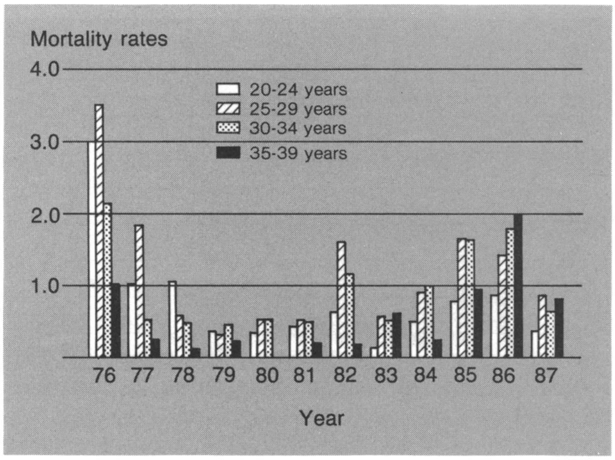
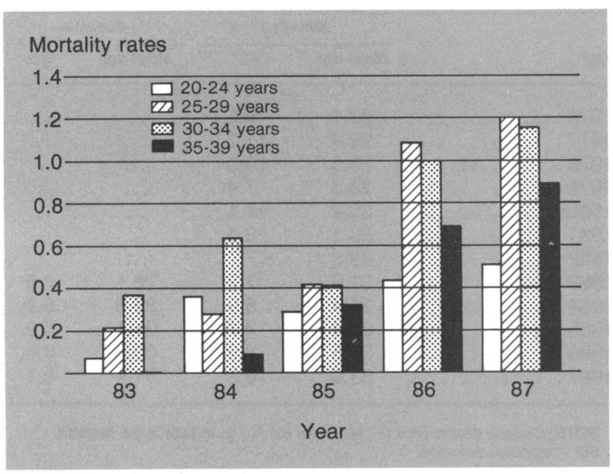


Figure 3. Age-specific mortality rates per 100,000 population from cocaine overdose, Texas, 1983–87, by year



Age-specificity. The mean ages for death from narcotics and for cocaine shown in table 2 range from 27 to 33, and indicate that drug overdose mortality is a problem of the young adult population. More than 70 percent of all deaths occurred among persons ages 20 to 39 years, both for narcotics and cocaine for each year we examined.

Because of the appearance of upward movement in the mean age at death, shown in table 2, age-specific mortality rates were examined to account for the effects of changes in the population age structure, as shown in figures 2 and 3. There has been a change in the mortality patterns among the age groups, with the 35- to 39-year group becoming more prominent, as overall mortality rates increased in the early 1980s. One explanation for the change is an increasing growth of drug abuse among that older population. Alternatively, drug abusers from earlier periods may now be using more lethal forms of drugs, such as crack.

Ethnicity and location. Table 3 shows the crude mortality rates for whites, blacks, and Hispanics throughout the study period. The patterns show a generally higher risk of narcotics overdose mortality for Hispanics than either blacks or whites for most of the study period, with the differences statistically significant for both 1985 and 1986. In addition, the rates depict a shift in the black population from narcotics overdose to cocaine overdose, as well as a greater risk of cocaine overdose mortality for blacks than either whites or Hispanics, with the differences statistically significant for both 1986 and 1987.

In order to assess the degree to which the ethnic patterns may be related to specific localities, age-standardized mortality ratios for 1985–87 were examined for three categories of Texas counties, as shown in table 4. The ratios represent a comparison of actual rates to expected rates. The first category is Bexar and El Paso counties, the two urban counties in Texas having populations in excess of 500,000 and Hispanic populations of slightly more than 50 percent of the total population. The second category is the four remaining counties having populations exceeding 500,000, and includes the Dallas-Fort Worth and Houston metropolitan areas. The last category is all other counties in Texas.

Table 4 illustrates the extent to which drug overdose mortality is related to drug type, area, and ethnicity. The Bexar-El Paso area has markedly higher narcotics mortality ratios for both whites and Hispanics than the other two areas. In particular, mortality ratios for Hispanics in the two counties are much higher than those for other groups, with deaths for this group numbering more than 25 percent of the total narcotics deaths for all 3 years.

For cocaine, however, the evidence suggests that mortality is highest among blacks, and to a slightly lesser degree among whites, in the area dominated by Houston and Dallas-Fort Worth. This indicates that cocaine emerged as an alternative to narcotics among whites and blacks in this area. The findings suggest the need to examine the role in drug problems of drug distribution networks, drug accessibility, and cultural norms.

Occupational mortality. While death certificates in Texas do not provide data on income, the deceased's usual occupation is provided, offering insights on economic status. The five categories presented in tables 5 and 6 represent the occupational groupings for which there were a sufficient number of deaths from which to calculate rates. For example, because there was only one death in any year in the farm labor category, it was not included. The clerical-service categories of clerical, household, and other service workers such as hotel clerks, were combined for statistical purposes.

The majority of those classified in this category were women. The operative and laborer categories were grouped because the available data did not permit accurate separation. The large majority (generally more than 75 percent) of those in the category were laborers. Thus, the category generally represents a lower income, blue collar group, and the rate may somewhat underestimate the actual level of the problems. The rates given here are only approximations and should be interpreted cautiously, both because of the small numbers in many of the categories and the somewhat imprecise denominator data.

As indicated in table 5, mortality rates for two occupational categories, craft persons and operatives-laborers, are generally higher for both narcotics and cocaine than other categories. The differences in rates between these two categories and the professional and clerical-service categories are statistically significant in both 1985 and 1986 for narcotics. The difference between operatives-laborers and the professional and clerical-service categories is statistically significant for cocaine in 1986 and 1987 and narcotics in 1987. This suggests that persons in usually lower wage, blue collar jobs may be at higher risk than those in other groups. Because of the growing proportion of service jobs, the observed differences between the categories may actually be greater than indicated.

The differences between the craft and operatives-laborers categories and the clerical-service category may be partially a result of sex differences, because the former categories had mainly men and the latter category had mainly women. The high rates for the sales category may be a reflection of the wide cross-section of persons who are classified as sales workers, although the prevalence of drug problems possibly is higher among those in this group. The largest gains in cocaine mortality are in the blue collar categories, without a corresponding increase in cocaine abuse among other groups. This may be related to the greater use of crack among low income persons (*5*).

Since whites, blacks, and Hispanics have different labor force participation rates depending on the occupational category, mortality rates by occupation were calculated to determine if some of the mortality rate differences between the three groups may be related to occupational factors, such as relative income (table 6). The pattern of higher mortality rates in the crafts and operative-laborer categories noted previously is evident here, and higher mortality rates for blacks and Hispanics predominate for most of the occupational categories. While this is a somewhat crude assessment, it does suggest that blacks and Hispanics are at higher risk of overdose even when similar occupational groupings are considered. Since the data represent usual occupation and do not distinguish between those who are employed and those who are not, other factors, not the least of which is economic opportunity within classes, may explain the difference.

Table 3. Deaths from narcotics and cocaine overdose and mortality rates per 100,000 population, by ethnicity and year, Texas, 1976–87

	Narcotics			*Cocaine*		
Ethnicity and year	*Number*	*Rate*	*CI*	*Number*	*Rate*	*CI*
White						
1976	61	0.66	0.17	...	...	...
1977	29	0.31	0.11	...	...	...
1978	20	0.21	0.09	...	...	...
1979	13	0.13	0.07	...	...	...
1980	14	0.14	0.07	...	...	...
1981	15	0.15	0.08	...	...	...
1982	32	0.31	0.11	...	...	...
1983	14	0.13	0.07	9	0.08	0.06
1984	23	0.21	0.09	17	0.16	0.07
1985	31	0.28	0.10	16	0.15	0.07
1986	47	0.42	0.12	25	0.23	0.09
1987	27	0.24	0.09	41	0.36	0.11
Black						
1976	29	1.84	0.67	...	...	...
1977	9	0.56	0.37	...	...	...
1978	8	0.49	0.34	...	...	...
1979	4	0.24	0.24	...	...	...
1980	5	0.30	0.26	...	...	...
1981	1	0.06	0.11	...	...	...
1982	5	0.28	0.25	...	...	...
1983	1	0.05	0.11	1	0.05	0.11
1984	3	0.16	0.18	2	0.11	0.15
1985	11	0.58	0.34	3	0.16	0.18
1986	9	0.47	0.30	15	0.78	0.40
1987	4	0.21	0.20	15	0.77	0.39
Hispanic						
1976	30	1.32	0.47	...	...	...
1977	19	0.80	0.36	...	...	...
1978	6	0.17	0.14	...	...	...
1979	2	0.08	0.11	...	...	...
1980	6	0.22	0.18	...	...	...
1981	11	0.38	0.22	...	...	...
1982	21	0.68	0.29	...	...	...
1983	14	0.42	0.22	1	0.03	0.06
1984	17	0.49	0.23	2	0.06	0.08
1985	42	1.17	0.35	3	0.08	0.09
1986	50	1.34	0.37	11	0.30	0.17
1987	21	0.55	0.23	7	0.18	0.13

NOTE: CI = 95 percent confidence intervals.

Discussion

The findings raise issues concerning drug problems and the development of effective responses. First, the substantial period of decline in drug mortality prior to

Table 4. Deaths from narcotics and cocaine overdose and age-standardized mortality rates per 100,000 population, by ethnicity, location, and year, Texas, 1985–87

Area and ethnicity	1985 Number	1985 Rate	1986 Number	1986 Rate	1987 Number	1987 Rate
			Narcotics			
Bexar and El Paso:						
White	8	1.78	14	3.10	6	1.32
Black	0	0.00	2	3.12	0	0.00
Hispanic	28	5.60	36	6.98	13	2.45
Houston and Dallas:						
White	13	0.44	15	0.50	10	0.33
Black	8	1.16	6	0.85	2	0.28
Hispanic	4	0.64	8	1.21	3	0.43
Other counties:						
White	8	0.22	12	0.33	11	0.29
Black	3	0.71	1	0.23	2	0.46
Hispanic	6	0.56	3	0.27	5	0.43
			Cocaine			
Bexar and El Paso:						
White	1	0.22	0	0.00	0	0.00
Black	0	0.00	0	0.00	1	1.54
Hispanic	0	0.00	2	0.39	0	0.00
Houston and Dallas:						
White	12	0.41	17	0.57	25	0.82
Black	2	0.29	13	1.83	10	1.38
Hispanic	2	0.32	4	0.61	2	0.29
Other counties:						
White	3	0.08	8	0.22	16	0.43
Black	1	0.24	3	0.70	4	0.92
Hispanic	1	0.09	4	0.36	5	0.43

NOTE: The Bexar and El Paso areas consist of those counties. The Houston and Dallas areas are Harris, Dallas, Tarrant, and Travis Counties, consisting mainly of the Houston and Dallas-Fort Worth metropolitan areas. Other counties are the remaining 248 counties of Texas with populations less than 500,000.

the increase beginning around 1980 raises questions about why the decline took place, as well as the causes of the current resurgence of the problems. No Statewide household survey data are available for narcotics prevalence during the same period to discern if the pattern is tied to changes in prevalence, or other factors, such as changes in the purity of the drugs. For example, some recent narcotics mortality has been attributed to the introduction of the more lethal Mexican black tar heroin (*16*). This, however, does not explain the decline in mortality during the late 1970s, and only fully explains the increase in narcotics mortality if it is assumed that a prevalent population of constant size is using the more lethal heroin at an increasing rate. Thus, it is likely that some of the changes during a period of years are related to changes in prevalence. The rapid increase in cocaine mortality coincides with household survey data for Texas showing an increase in the use of cocaine from 1980 to 1988 (*5*).

More research is needed to examine factors such as average street price, estimated levels of supply, interdiction activities, economic conditions, and prevention and treatment activities during the same period to develop some explanation of the longitudinal pattern indicated. Evidence, for example, suggests that street prices for both narcotics and cocaine decreased in constant dollar terms during the period in which mortality increased (*10, 16*). This pattern does not support the argument that the permissiveness of the sixties and seventies played a central role in the current drug problems, given the substantial decline during the mid-seventies. What it does reveal is the need to introduce historical analysis in the development of current responses to drug abuse to understand more clearly the interplay between social conditions, user characteristics, and various policy efforts as they bear on drug problems (*6*).

Although the longitudinal pattern indicates that current drug problems are not new, what is new is crack as a predominant drug. The data suggest, however, that efforts focusing on cutting the supply of crack will be effective only if alternative drugs are not available. The heavy use of narcotics among Hispanics in the El Paso and San Antonio areas and cocaine among blacks in the Houston and Dallas areas indicates the problems involve not a single drug, but patterns of abuse that are specific to areas and groups. Patterns of abuse could be related to access and to the norms of the group in question.

Smart has posited that both availability and proneness, or the willingness to use, affect patterns of abuse (*17*). Reducing the supply of a single type of drug may only lead to redirection of the existing demand. The emergence of mixtures of narcotics, cocaine, and other drugs as a cause of death suggests the need to control access to a range of drugs if a supply-oriented policy is going to work.

While occupational data showing differences among the various categories are a limited indicator that should be interpreted cautiously, they provide some indication that those in lower socioeconomic status occupations may be at greater risk of drug overdose. Household survey data and other research has been somewhat inconclusive concerning the relationship of socioeconomic conditions to drug abuse, although there is some indication that income level and employment may be related to abuse (*5, 18, 19*). At a minimum, the data suggest that those in predominantly blue collar jobs are at higher risk for narcotic and cocaine abuse, suggesting these groups may need greater attention in worksite drug abuse prevention programs.

The evidence that higher mortality rates occur among blacks and Hispanics even when controlled for occupational category is difficult to interpret. As noted above,

Table 5. Deaths from narcotics and cocaine overdose and mortality rates per 100,000 population, by occupational categories, Texas, 1985–87

Occupational category	1985 Number	1985 Rate	1985 CI	1986 Number	1986 Rate	1986 CI	1987 Number	1987 Rate	1987 CI
					Narcotics				
Professional, technical, owners, managers	5	0.25	0.22	11	0.54	0.32	4	0.19	0.19
Clerical, service	8	0.50	0.35	6	0.37	0.29	7	0.42	0.31
Sales	2	0.35	0.49	7	1.22	0.90	7	1.20	0.80
Craft	20	1.82	0.80	23	2.05	0.84	8	0.70	0.49
Operatives, laborers	37	2.97	0.96	42	3.31	1.00	18	1.40	0.64
					Cocaine				
Professional, technical, owners, managers	4	0.20	0.20	9	0.44	0.29	11	0.53	0.31
Clerical, service	2	0.13	0.17	6	0.37	0.29	9	0.54	0.36
Sales	5	0.88	0.77	5	0.87	0.76	4	0.68	0.67
Craft	2	0.18	0.25	12	1.07	0.61	14	1.23	0.64
Operatives, laborers	5	0.40	0.35	1	1.34	0.64	22	1.71	0.71

NOTE: CI = 95 percent confidence intervals.

Table 6. Deaths from narcotics and cocaine overdose and mortality rates per 100,000 population, by occupational categories and ethnicity, Texas, 1985–87

Occupational category	White Number	White Rate	White CI	Black Number	Black Rate	Black CI	Hispanic Number	Hispanic Rate	Hispanic CI
Professional, technical, owners, managers	34	0.68	0.23	2	0.55	0.76	8	1.20	0.84
Clerical, service	18	0.59	0.27	11	1.49	0.88	9	0.83	0.55
Sales	27	1.90	0.72	3	4.64	5.25	0	0.00	0.00
Craft	45	1.92	0.56	9	3.70	2.41	25	3.23	1.27
Operatives, laborers	44	2.16	0.64	24	3.93	1.57	72	5.84	1.35

NOTE: CI = 95 percent confidence intervals.

the findings suggest that factors in these ethnic communities, in addition to economic conditions, may contribute to the higher drug abuse prevalence indicated. Recall, however, that the occupational data examined are the subjects' usual occupation and do not represent absolute levels of income or levels of employment. Given the substantially higher unemployment rates of blacks and Hispanics in Texas, as well as lower median incomes, differences could be a result of differences in economic well-being within the groups classified in an occupational category.

Regardless of what interpretation is given to the different mortality rates for the ethnic groups, these findings suggest that those who are likely to be employed in lower income jobs are at higher risk of drug mortality. This is not to suggest that drug abuse is unique to lower income groups, since there is ample evidence to the contrary, but to point out further that different subgroups of the population develop different patterns of drug abuse.

This is illustrated by the evidence that changes in mortality during a period of years are dominated by patterns among men indicating that they are most susceptible to factors influencing illicit drug abuse. There is, however, evidence from the same data set that women are at higher risk of abuse and misuse of some prescription drugs (*20, 21*). Thus, effective responses to drug problems will require not only examination of ethnic and socioeconomic factors, but the interplay of sex roles with conditions that stimulate drug abuse. This finding will be particularly important for the development of prevention programs, since prevention of drug abuse among men and women may require different approaches. Comparative study of high-risk males and females together with those of low risk may be useful in identifying factors that are associated with the problem.

The evidence indicates that drug problems are currently increasing at an alarming rate in Texas, but it shows that drug problems of similar magnitudes nearly 15 years ago declined at a rapid rate. To address the current problems effectively will require a better understanding of the historical interplay of public policies and social patterns as they bear on the problems.

Drug problems involve a complex interaction between a variety of factors, evidenced by varying mortality patterns among subgroups of the population. Consequently, programs to prevent and ameliorate drug problems may need to be designed to address the unique character of specific target groups. Finally, effective coordination between Federal, State, and local agencies is needed in developing responses that appropriately address the differences between communities.

References

1. Adams, E. H.: An overview of drug use in the United States and along the U.S.-Mexico border. Paper presented at the U.S.-Mexico Border Health Association Meeting, Monterey, Mexico, April 27–30, 1986.
2. Erickson, P. G., and Murray, G. F.: Sex differences in cocaine use and experiences: a double standard revived? Am J Drug Alcohol Abuse 15: 135–152 (1989).
3. Gottschalk, L. A., et al.: Drug abuse deaths in nine cities: A survey report. NIDA Research Monograph No. 29. National Institute on Drug Abuse, Rockville, MD, November 1979.
4. National Institute on Drug Abuse: National Household Survey on Drug Abuse: 1988 population estimates. DHHS Publication No. (ADM) 89–1636. Rockville, MD, 1989.
5. Spence, R. T., Fredlund, E. V., and Kavinsky, J.: 1988 Texas survey of substance abuse among adults. Texas Commission on Alcohol and Drug Abuse, Austin, TX, March 1989.
6. Peyrot, M.: Cycles of social problem development: the case of drug abuse. Sociol Q 25: 83–96 (1984).
7. Ruttenber, A. J., and Luke, J. L.: Heroin-related deaths: New epidemiologic insights. Science 226: 14–19, Oct. 5, 1984.
8. Person, P. H., Retka, R. L., and Woodward, J. A.: Toward a heroin problem index—an analytical model for drug abuse indicators. DHHS Publication No. (ADM) 76–367. National Institute on Drug Abuse, Rockville, MD, 1976.
9. National Institute on Drug Abuse: A strategy for local drug abuse assessment. DHHS Publication No. (ADM) 80–966. NIDA, Rockville, MD, 1980.
10. Texas Commission on Alcohol and Drug Abuse: Current substance abuse trends in Texas. Austin, TX, July 1989.
11. Hunt, L. G.: Assessment of local drug abuse. Lexington Books, Lexington, MA, 1977.
12. Fleiss, J. L.: Statistical methods for rates and proportions. John Wiley, New York, NY, 1973.
13. Bureau of the Census: 1980 census of the population. Vol. 8, Characteristics of the population; ch. C, General and social characteristics, part 45, Texas. U.S. Department of Commerce, Washington, DC, 1983.
14. Jatlow, P. I.: Drug of abuse profile: cocaine. Clin Chem 33: 66B–71B (1987).
15. Johnson, E. M.: Cocaine: the American experience. *In* The cocaine crisis, edited by D. Allen. Plenum Press, New York, NY, 1987, pp. 33–44.
16. The illicit drug situation in the United States and Canada: 1984–1986. Drug Enforcement Administration, Strategic Intelligence Section, Washington, DC, 1987.
17. Smart, R. G.: An availability-proneness theory of illicit drug abuse. *In* Theories on drug abuse: selected contemporary perspectives. DHHS Publication No. (ADM) 80–967. National Institute on Drug Abuse, Rockville, MD, 1980, pp. 46–49.
18. National Institute on Drug Abuse: Highlights of the 1988 National Household Survey on Drug Abuse. *In* NIDA capsules, Rockville, MD, August 1989, pp. 1–4.
19. Smart, R. G.: Narcotic drug abuse in 152 countries: social and economic conditions as predictors. Int J Addict 20: 737–749 (1985).
20. Harlow, K., and Swint, M.: Prescription drug abuse in Texas: mortality and its economic consequences. J Drug Educ 11: 77–82 (1981).
21. Harlow, K., and Swint, M.: Patterns and economic effects of drug overdose mortality in Texas: 1980–1986. J Drug Educ 19: 165–182 (1989).

Erratum in the "Perspectives on Alcohol Abuse" Issue of *Public Health Reports*

In the article, "Alcoholism Research: Delivering on the Promise," that appeared in the November-December 1988 issue of *Public Health Reports,* an incorrect statement appeared on page 571, column one, line 25.

It should have read: "For every dog or cat that serves humanity in research, 1,000 are killed at animal shelters (*4*)."

Public Health Reports regrets the error.