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Racial/Ethnic Disparities in Overdose Mortality Trends in New York City, 1990–1998

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ABSTRACT *Racial/ethnic disparities in health and disease have been present in the United States for the past century. Although differences such as individual access to health care and health-related behaviors account for some of these health disparities, it is likely that a combination of individual and contextual-level factors determine the differential rates of disease between racial/ethnic groups. We studied fatal accidental drug overdose in New York City between 1990 and 1998 to describe differences in racial/ethnic patterns over time and to develop hypotheses about factors that might contribute to these differences. During this period, rates of overdose death were consistently higher among blacks and Latinos compared to whites. In addition, cocaine was more common among black decedents, while opiates and alcohol were more common among Latino and white decedents. Differences in situational factors, such as differential likelihood of activating emergency medical response, may in part explain the consistently higher overdose mortality rates observed among minorities. Further study to determine the individual and contextual factors that explain these observed disparities in overdose death may identify effective areas for public health intervention and provide insight into factors underlying racial/ethnic disparities in other health outcomes.*

KEYWORDS *Disparities, Drugs, Ethnic, Mortality, Overdose, Race.*

INTRODUCTION

Racial/ethnic disparities in morbidity and mortality in the United States persist despite a number of federal initiatives aimed at reducing these disparities.[1,2] Differential access to health care, income or socioeconomic gradients, and differences in environmental and living conditions are all thought to account for some of the racial/ethnic differences in health.[3,4] Although differences in behavior may partly be responsible for some of these differences, most research suggests that behavioral differences themselves account for only a small proportion of interpersonal variability in health outcomes.[5–7] It is likely that a combination of factors, at both the individual and contextual levels, shapes the racial/ethnic disparities in health that have been consistently present in the United States for the past century.

Drug overdoses are common among habitual drug users; more than two thirds of drug users reported a nonfatal drug overdose in their lifetime in one study.[8] In

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New York City, accidental fatal drug overdose continues to be a substantial cause of death. In 2000, fatalities due to drug abuse, including overdose deaths, accounted for approximately 932 deaths.[9,10] This compares to 1,961 deaths due to human immunodeficiency virus (HIV) infection in the same year.[10] Death during 2000 due to drug abuse was the ninth most common cause of death in New York City.[10]

Habitual drug users likely account for a majority of accidental drug overdose, and accidental fatal drug overdoses to some extent reflect patterns of use of illicit substances. Drug overdose decedents are typically male, long-time drug users, drug injectors, and in their late 20s and early 30s.[11] Accidental drug overdoses are a major cause of mortality for habitual drug users, and in many countries (particularly European countries) are the leading cause of death in this group.[12–14] Studies in the United States show that drug users have a mortality rate 6.9 times that in the general population, and a substantial proportion of that excess mortality is due to drug overdose.[15]

Accidental drug overdose deaths reflect a variety of underlying determinants, including characteristics of the drug user, drug-related factors, and factors related to the drug-using circumstance.[16] For example, it has been shown that fatal drug overdose is more likely to occur with use of multiple drugs[17] and soon after release from prison,[18] and that both neighborhood-level poverty and income distribution account for some of the variance in drug overdose mortality rates between communities.[19,20]

We are not aware of any analyses that specifically explored the changing patterns of drug overdose in different racial/ethnic groups in an urban context. In this study, we analyzed data on fatal accidental drug overdose in New York City between 1990 and 1998 to describe differences in racial/ethnic patterns over time. This analysis was meant to be hypothesis generating. We hoped that observations of differences in overdose trends could suggest further avenues for research that might shed light on the complex etiology of some of these differences.

METHODS

All cases of fatal accidental drug overdose occurring in adults aged 15–64 years in New York City between 1990 and 1998 were identified through manual review of medical files at the Office of the Chief Medical Examiner of New York City (OCME). The OCME is responsible for assessing all deaths of persons believed to have died in an unnatural manner in New York City. Thus, all overdose deaths in New York City would have been reviewed by the OCME and included in this chart abstraction.

The OCME investigators use the decedent's medical history, the circumstances and environment of the fatality, autopsy findings, and laboratory data in attributing cause of death and other criteria to each case reviewed. Deaths caused by human intent are not considered accidents by the OCME; therefore, overdose deaths due to suicide were not included in this analysis. Data regarding age, gender, race/ethnicity, and residence were collected for all decedents from the OCME files.

Rates of autopsy vary by manner of death. During 1990–1998, 79.4% of accidents were autopsied. All autopsied cases undergo toxicological screening. In some cases in which an autopsy was not performed, specimens were still submitted for toxicological analysis. Blood and urine samples were obtained at autopsy and stored at 4°C until they were assayed. Previous studies provide for further details on this

data collection methodology and toxicological measurement of drugs involved in these cases.[21]

Analyses were carried out on all accidental drug overdose deaths. We first described characteristics of all fatal accidental overdose in New York City between 1990 and 1998, including age, race, and gender of the decedents and the drug and alcohol toxicology. We limited our observations to the principal substances that appear in positive drug toxicology: cocaine, opiates, and alcohol. The three groups categorized in these analyses are not mutually exclusive; that is, a decedent can have positive toxicology for one or more of these substances at the same time.

We calculated the total overdose death rate and overdose death rate caused by specific drugs in New York City for each year from 1990 to 1998. All population denominators for rate determination were obtained from US census data.[22] We obtained census population counts for New York City for 1990 and 2000 and carried out a linear interpolation of the census population counts to obtain population denominators for the intervening years. All rates were expressed per 100,000 person-years. We subsequently directly standardized overall rates for New York City by age, sex, and race to the 1990 census population for New York City to enable comparability between years relevant to this analysis.

We calculated accidental drug overdose death rates in New York City between 1990 and 1998 stratified by race and sex. In this part of the analysis, we present overdose death rates for the three largest racial/ethnic groups in New York City: white, black, and Latino. Thus, we calculated the rate of overdose deaths caused by cocaine, opiates, or alcohol within each of six racial/gender strata: white male, white female, black male, black female, Latino male, Latina female. We calculated the proportions of overdose decedents with positive toxicology for each of cocaine, opiates, or alcohol among all overdose decedents for each year in the period stratified by racial/ethnic group.

RESULTS

There were 7,451 accidental drug overdose deaths extracted from OCME files in New York City between 1990 and 1998. The Table shows that 43.4% of decedents were 35–44 years old, and 28.5% were 25–34 years old. The majority (79.5%) of decedents were men. Of the decedents, 32.8% were white, 36.3% were black, and 30.0% were Latino. Drugs were detected toxicologically in 94.8% of cases; cocaine, opiates, and alcohol were present in 94.6% of all overdose deaths. Aggregated over the period, opiates were present in 73.9%, cocaine in 69.0%, and alcohol in 42.3% of overdose decedents.

Figure 1 shows overall trends in overdose death rates. The rate of fatal accidental overdose was lowest, 7.3/100,000 person-years, in 1990. Overdose mortality rates rose throughout the first half of the decade, reaching a high of 13.3/100,000 person-years in 1993. Rates stabilized at 10.0–11.3/100,000 person-years in the last 2 years of the time period studied. Trends in cocaine-positive and opiate-positive fatal overdose deaths mirrored the overall trends in overdose death rates. The rate of opiate-positive overdose deaths exceeded the rate of cocaine-positive overdose deaths in 1995 (10.2 vs. 9.3 per 100,000 person-years) and remained higher for the rest of the time period.

Figure 2 shows trends in overall overdose death rates stratified by race and sex. Rates of fatal accidental drug overdose were highest among black men consistently throughout the time period, rising dramatically between 1990 and 1995 (from 18.3

Table Characteristics of accidental overdose decedents, New York City, 1990–1998

	Overdose decedents	
	N	%
Total	7,451	100.0
Age, years		
15–24	384	5.2
25–34	2,122	28.5
35–44	3,234	43.4
45–54	1,418	19.0
55–64	293	3.9
Race		
White	2,447	32.8
Black	2,705	36.3
Latino	2,237	30.0
Other	62	0.8
Gender		
Male	5,920	79.5
Female	1,531	20.5
Place of death		
Residence	5,397	75.3
Other inside	965	13.5
Outside	806	11.2
Drug use		
Any drug*	7,066	94.8
Cocaine, opiates, or alcohol	7,052	94.6
Cocaine	5,140	69.0
Opiates	5,506	73.9
Alcohol	3,152	42.3

*Including cocaine, opiates, alcohol, and other drugs with positive toxicology (e.g., methamphetamines).

to 31.6 per 100,000 person-years) and then declining slowly to 21.3/100,000 person-years in 1998. Second highest overdose fatality rates were among Latino men throughout the period, with a peak of 29.6/100,000 person-years in 1993 and a subsequent decline to 18.9/100,000 person-years in 1998. Although rates of fatal accidental drug overdose were lower among white men than the aforementioned two groups, rates of fatal overdose death among whites increased from 9.0/100,000 person-years in 1990 to 20.2/100,000 person-years in 1993 and declined minimally thereafter, with a rate of 15.2/100,000 person-years in 1998, close to the fatal overdose mortality rate among Latinos in the same year. Rates of accidental overdose death among women were consistently lower than among men throughout the interval studied. The overdose death rates for black women were consistently higher than the rates for Latina and white women.

Figure 3 shows the proportion of cocaine-positive overdose deaths among all overdose deaths by race. Throughout the period, cocaine-positive deaths were more common among blacks (0.73–0.80) than among either Latinos (0.58–0.73) or whites

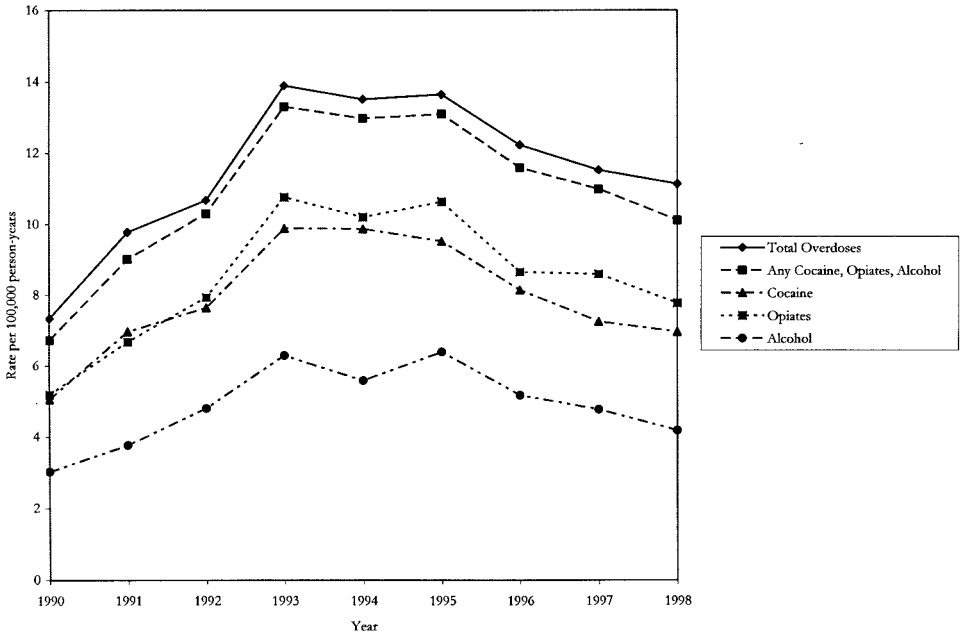

FIGURE 1. Standardized overdose death rates with drugs detected, New York City, 1990–1998.

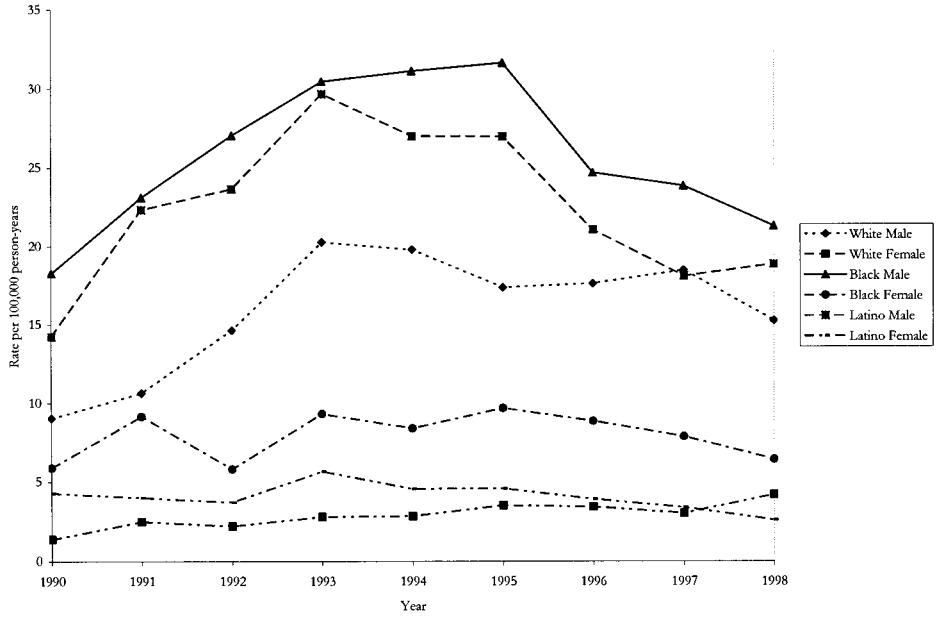

FIGURE 2. Overdose death rates by race and sex, New York City, 1990–1998.

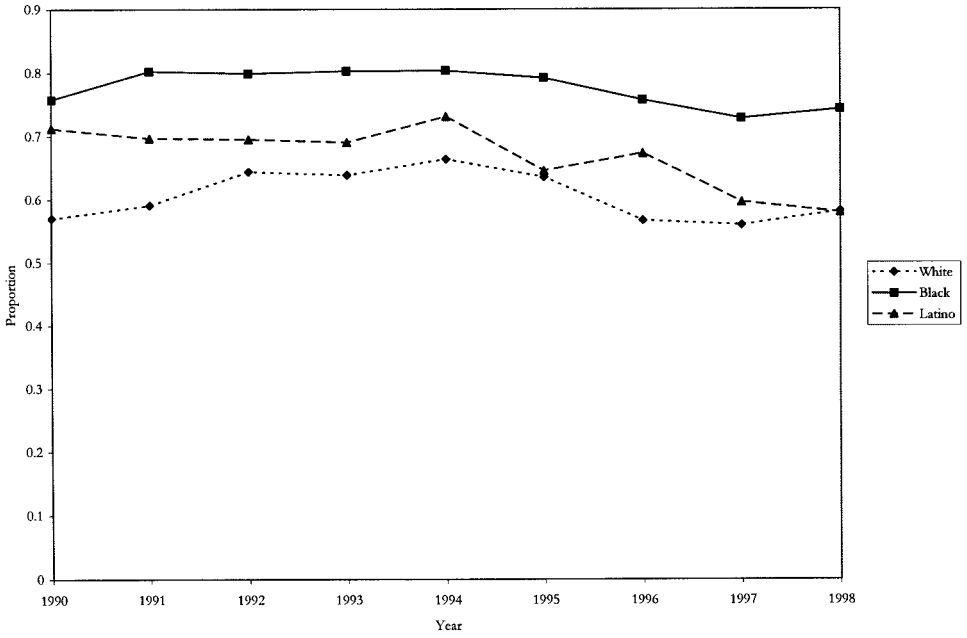

FIGURE 3. Proportion of overdose deaths with cocaine detected by race/ethnicity, New York City, 1990–1998.

(0.56–0.66). The proportions of cocaine-positive deaths among the last two racial/ethnic groups were comparable throughout the period.

Figure 4 presents the proportion of opiate-positive overdose deaths among overall overdose deaths by race. In contrast to the patterns observed in cocaine-positive deaths, whites (0.73–0.86) and Latinos (0.73–0.84) had a consistently higher proportion of opiate-positive overdoses than did blacks (0.57–0.68).

Figure 5 shows the proportion of alcohol-positive overdose deaths among overall overdose deaths by race and shows patterns consistent with the proportions of opiates. The proportion of alcohol-positive overdose deaths was higher among whites (0.39–0.52) and Latinos (0.39–0.50) than among blacks (0.33–0.44) throughout the interval studied.

DISCUSSION

In an analysis of accidental fatal overdose trends in New York City between 1990 and 1998, we found that overdose death rates peaked in the middle of the decade and declined minimally during the last 2 years of the period. Cocaine and opiates were present in more than two thirds of all overdose decedents. Rates of overdose death in New York City were high among all racial/ethnic groups and consistently higher among blacks and Latinos than among whites. In addition, cocaine was more frequently detected in black decedents, while opiates and alcohol were more common in Latino and white decedents throughout the period studied.

This analysis shows marked racial/ethnic disparities in overdose death rates in New York City between blacks, whites, and Latinos during the last decade. While the disparities in overdose death rates peaked at the beginning of the decade, the

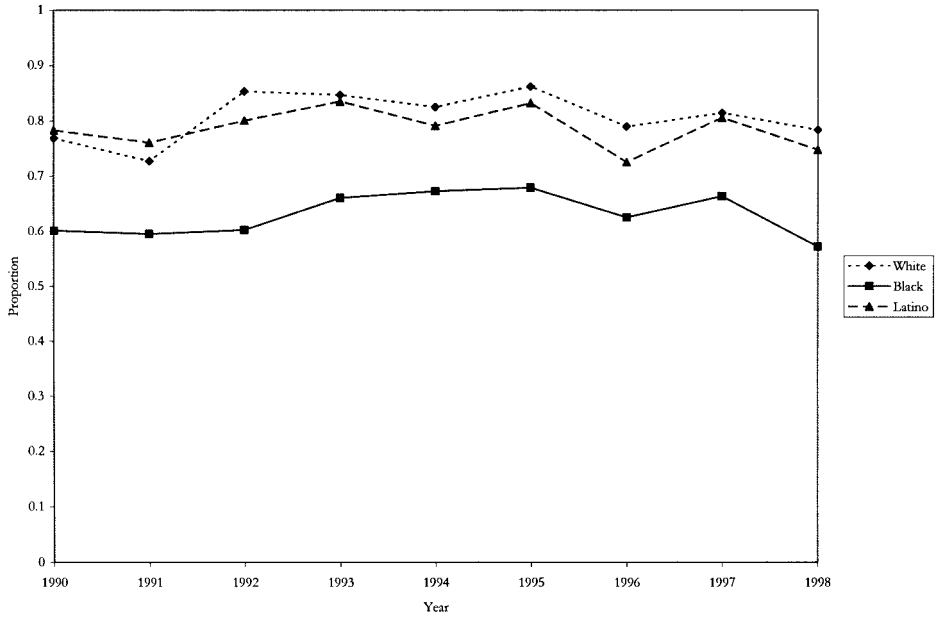

FIGURE 4. Proportion of overdose deaths with opiates detected by race/ethnicity, New York City, 1990–1998.

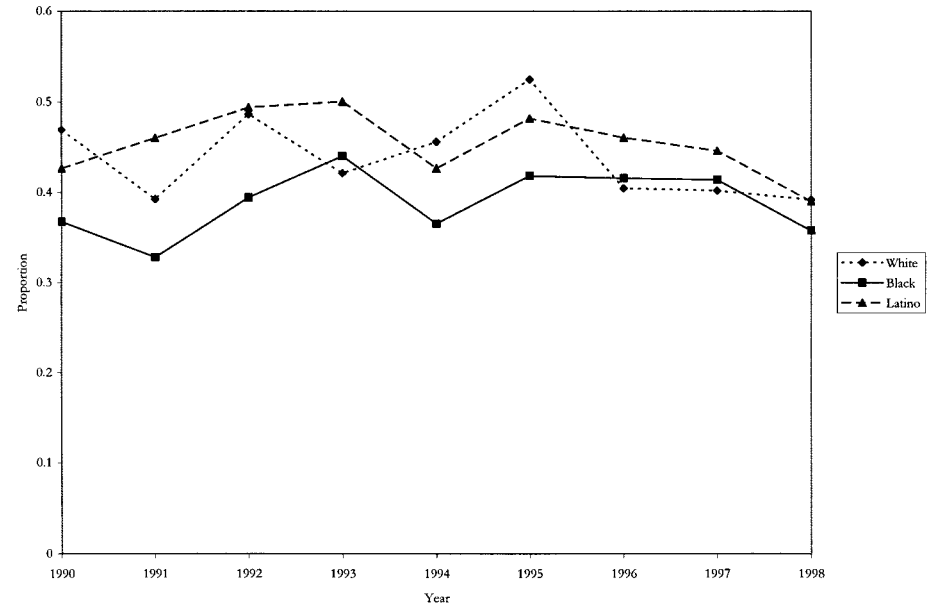

FIGURE 5. Proportion of overdose deaths with alcohol detected by race/ethnicity, New York City, 1990–1998.

black overdose death rate was still approximately 1.5 times higher than that among whites in 1998. These persistent disparities mirror racial/ethnic differences in other health outcomes studied in the United States throughout the 1990s. For example, HIV/AIDS (acquired immunodeficiency syndrome) continues to have a disproportionate impact on minority populations. Blacks and Latinos accounted for 47% and 20%, respectively, of persons diagnosed with AIDS throughout the United States in 1997, a substantial disproportionate burden of the infection in these minority groups compared to national demographics.[23] Similarly, blacks have a higher burden of cancer mortality than whites.[24]

Behavioral differences between racial/ethnic groups have been shown to account, in part, for the observed health disparities for some, but not for other, diseases. Among blacks, 56% of new HIV infections are a result of injection drug use, while only 20% of new HIV infection results from injection drug use among Latinos.[23] In contrast, there are few consistent links between differences in individual behavior between racial/ethnic groups and the observed differences in cancer mortality.[25,26]

Observed disparities in overdose mortality may reflect both different drug use behavior among the different racial/ethnic groups and the contribution of other determinants to overdose mortality.[27] Although drug overdose in part reflects individual drug use behavior, national surveys have failed to demonstrate consistently different drug use behaviors between racial/ethnic groups.[28] In addition, most reports suggest that differences observed in the prevalence of drug abuse between racial/ethnic groups likely reflect socioeconomic differences between groups.[29,30] This suggests that factors other than differences in drug use alone may account for some of the observed disparities in overdose mortality rates.

We demonstrated a higher proportion of deaths with cocaine present among black decedents than among whites or Latinos and a higher proportion of deaths with opiates and alcohol present among the last two groups. There are three principal drug-related or user-related explanations for this observation. First, these differences may reflect different patterns of use of drugs between these populations throughout the decade. The crack cocaine epidemic that started in the 1980s resulted in substantial cocaine use, particularly in disadvantaged communities in US urban areas. Anthropologic research provides some evidence for the changing popularity, and use, of crack cocaine during the decade in New York City.[31] However, one study that grouped respondents into neighborhood clusters found that, given similar social and environmental conditions, crack use did not strongly link to individual race.[32] This suggests that the prevalence of drug use in individual racial/ethnic groups is only a small part of the explanation for differential drug use.

Second, these differences may reflect different lethality of the drugs used by different groups. Cocaine and opiates taken in isolation may both result in overdose deaths. However, research has demonstrated that most fatal drug overdoses are attributable to the simultaneous use of multiple drugs rather than to the ingestion of single drugs.[12,17] It is possible that differential purity of drugs available to different groups or differences in the addictive properties of drugs used (and attendant differences in rates of drug dependence/abuse in New York City) could explain some of the racial/ethnic differences observed here. However, the only study that has convincingly explored the relation between drug purity and likelihood of overdose found only modest relations between the two.[33]

Third, the observed differences may be related to differences in underlying physical health or different biologic factors that make fatality more likely in specific

racial/ethnic groups when individuals from these groups ingest particular drugs. For example, the higher rate of cardiac disease among blacks overall nationally[24] may suggest that blacks are more likely to die of cocaine-related overdose than individuals in other racial/ethnic groups. The relatively young age of most overdose decedents argues against this possibility.

The absence of clear drug-related or user-related explanations for the observed racial/ethnic disparities in overdose mortality during the decade suggests that factors other than individual drug-related or user-related risks contributed, at least in part, to the differences in drug overdose mortality rates observed in this study. Important considerations in this regard may be factors related to the immediate circumstance of drugs used at the time of overdose (e.g., injection alone or with others present) and the emergency response to the overdose that may prevent the overdose from becoming fatal. For example, the observation of persistent racial/ethnic differences in overdose mortality may reflect differences in willingness of witnesses to activate emergency medical services (e.g., for fear of criminal prosecution) or differential prevalence of persons using drugs alone instead of in the company of others.[20]

It is worth noting that we found higher rates of overdose death among men compared to women throughout the period studied. This is consistent with the higher prevalence of drug abuse among men compared to women documented in national surveys.[28] Greater male opportunities to use drugs in adolescence and societal norms surrounding gender roles may contribute to this gender difference.[34,35] We also observed racial/ethnic disparities in overdose mortality rates among women, with overdose mortality rates among black women consistently higher than those among Latina or white women throughout the decade. This suggests that the etiology of the observed differences in overdose mortality applied among groups with both high and low prevalence of drug abuse.

There were several limitations to this study. We only studied overdose decedents. To explore fully the racial/ethnic differences in drug overdose over time, it is necessary to compare rates of drug use, nonfatal overdoses, and fatal drug overdose deaths over time in a particular locality. Such an analysis would shed greater light on the relative role of behavioral and situational factors in determining temporal trends in drug overdose. This analysis focused on drugs detected by toxicologic analysis among overdose decedents. It is possible that an analysis of the drugs that were determined to be the causes of death in different racial ethnic groups could suggest different explanations for some of the observed disparities in overdose mortality. Also, it is not possible to distinguish between different forms of some of the drugs discussed using the available toxicologic analysis. For example, we were unable to distinguish between crack cocaine and other forms of cocaine. Understanding differences in trends of crack cocaine could help explain some of the patterns of changing drug toxicology in fatal overdose observed here. Ultimately, we were limited by OCME reports on each of the overdose decedents. It is possible that changing OCME classification of deaths may have been partly responsible for some of the trends observed here. This is unlikely given the consistent, monitored standards used by the New York City OCME during the decade. This data set also did not include other factors related to the drug user (e.g., income) that may also contribute to some of the racial/ethnic differences in overdose mortality over time that we observed.

Notwithstanding these limitations, our study showed persistent racial/ethnic disparities in drug overdose mortality in New York City throughout the last decade.

In addition, we found that different drugs were more common in decedents of different racial/ethnic groups. Overdose prevention interventions are almost all focused on the individual drug user.[36,37] Both educational interventions and harm reduction approaches focus on drug users' cognitive and behavioral processes. Although these factors are undoubtedly important, the disparities in overdose mortality rates in New York City suggest that other factors beyond the individual user or drug used may be important determinants of fatal overdose. Further study is warranted to determine the full range of individual and contextual factors that explain these observed disparities in overdose death. Identification of these factors can guide effective interventions aimed at reducing racial/ethnic disparities in overdose death.

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