SPECIAL ARTICLE

EXCESS MORTALITY IN HARLEM

COLIN McCORD, M.D., AND HAROLD P. FREEMAN, M.D.

Abstract In recent decades mortality rates have declined for both white and nonwhite Americans, but national averages obscure the extremely high mortality rates in many inner-city communities. Using data from the 1980 census and from death certificates in 1979, 1980, and 1981, we examined mortality rates in New York City's Central Harlem health district, where 96 percent of the inhabitants are black and 41 percent live below the poverty line.

For Harlem, the age-adjusted rate of mortality from all causes was the highest in New York City, more than double that of U.S. whites and 50 percent higher than that of U.S. blacks. Almost all the excess mortality was among those less than 65 years old. With rates for the white population as the basis for comparison, the standardized (adjusted for age) mortality ratios (SMRs) for deaths under the age of 65 in Harlem were 2.91 for male residents and 2.70 for female residents. The highest ratios were for women 25 to 34 years old (SMR, 6.13) and men 35 to 44 years old (SMR, 5.98). The chief causes of this excess mortality were cardiovascular disease (23.5 percent of the excess deaths; SMR, 2.23), cirrhosis (17.9 percent; SMR, 10.5), homicide (14.9 percent; SMR, 14.2), and neoplasms (12.6 percent; SMR, 1.77). Survival analysis showed that black men in Harlem were less likely to reach the age of 65 than men in Bangladesh. Of the 353 health areas in New York, 54 (with a total population of 650,000) had mortality rates for persons under 65 years old that were at least twice the expected rate. All but one of these areas of high mortality were predominantly black or Hispanic.

We conclude that Harlem and probably other inner-city areas with largely black populations have extremely high mortality rates that justify special consideration analogous to that given to natural-disaster areas. (N Engl J Med 1990; 322:173-7.)

MORTALITY rates for white and nonwhite Americans have fallen steadily and in parallel since 1930 (Fig. 1). Lower rates for nonwhites have been associated with an improved living standard, better education, and better access to health care.[1,2] These improvements, however, have not been evenly distributed. Most health indicators, including mortality rates, are worse in the impoverished areas of this country.[3-9] It is not widely recognized just how much certain inner-city areas lag behind the rest of the United States. We used census data and data from the Bureau of Health Statistics and Analysis of the New York City Health Department to estimate the amount, distribution, and causes of excess mortality in the New York City community of Harlem.

THE COMMUNITY

Harlem is a neighborhood in upper Manhattan just north of Central Park. Its population is 96 percent black and has been predominantly black since before World War I. It was the center of the Harlem Renaissance of black culture in the 1920s, and it continues to be a cultural center for black Americans. The median family income in Harlem, according to the 1980 census, was $6,497, as compared with $16,818 in all New York City, $21,023 in the United States, and $12,674 among all blacks in the United States. The families of 40.8 percent of the people of Harlem had incomes below the government-defined poverty line in 1980. The total population of Harlem fell from 233,000 in 1960 to 121,905 in 1980. In the same 20-year period the death rate from homicide rose from 25.3 to 90.8 per 100,000.

The neighborhood is not economically homogeneous. There is a middle-to-upper-class community of about 25,000 people living in new, private apartment complexes or houses, a less affluent group of 25,000 living in public housing projects, and a third group of about 75,000 who live in substandard housing. Most of the population loss has been in the group living in substandard housing, much of it abandoned or partially occupied buildings.

The pattern of medical care in Harlem is similar to that reported for other poor and black communities.[10,11] As compared with the per capita averages for New York City, the rate of hospital admissions is 26 percent higher, the use of emergency rooms is 73 percent higher, the use of hospital outpatient departments is 134 percent higher, and the number of primary care physicians per 1000 people is 74 percent lower.[12]

METHODS

Age-adjusted death rates for whites and nonwhites were taken from *Vital Statistics of the United States, 1980*.[13] Age-adjusted rates for nonwhites rather than blacks were used in Figure 1 because the deaths of blacks were not reported separately before 1970. Age-adjusted mortality rates for blacks in the United States have been slightly higher in recent years than those for all nonwhites (8.4 per 1000 for blacks and 7.7 per 1000 for all nonwhites in 1980). The age-adjusted mortality rates for Harlem in 1960, 1970, and 1980, as well as certain disease-specific death rates, were calculated from data supplied by the New York City Health Department. The U.S. population in 1940 was used as the reference for all the age-adjusted rates in Figure 1.

Tapes were provided by the New York City Health Department containing everything but personal identifying information from all death certificates in 1979, 1980, and 1981. Deaths were recorded by age, sex, underlying cause, health-center district, and health area. The Central Harlem Health Center District corresponds to the usu-

From the Departments of Surgery, Columbia University and Harlem Hospital, New York. Address reprint requests to Dr. McCord at the Department of Surgery, Harlem Hospital, 136th St. and Lenox Ave., New York, NY 10037.

al definition of the Harlem community. For our analysis, we calculated age-, sex-, and cause-specific death rates for Harlem using the recorded deaths for 1979, 1980, and 1981 and population data from the 1980 census. New York City determines the underlying cause of death by the methods proposed by the National Center for Health Statistics.[14] We used the diagnostic categories of the ninth revision of the *International Classification of Diseases*.[15] They were generally but not always grouped in the way that the New York City Bureau of Health Statistics and Analysis groups diagnoses in its annual reports of vital statistics according to health areas and health-center districts. For example, "cardiovascular disease" refers to diagnostic categories 390 through 448 in the *International Classification of Diseases*, and "ill defined" refers to categories 780 through 789.

The reference death rates we used to calculate the standardized mortality ratios (SMRs) are those of the white population of the United States, as published in *Vital Statistics of the United States, 1980*.[13] To calculate the SMRs, the total number of observed deaths in 1979, 1980, and 1981 for each age group, sex, and cause was divided by the expected number of deaths, based on the population of each sex and age group and the reference death rate. Using the same methods, we calculated the SMR for deaths under the age of 65 for each health area in the city with a population of more than 3000. New York City has 353 health areas, with an average population of 21,000. Only 11 have a population of less than 3000.

The survival curves in Figure 2 were constructed with the use of life tables. The tables for Bangladesh were from a report of the Matlab study area of the International Center for Diarrheal Disease Research,[9] modified from 5-year to 10-year age intervals. Life tables for Harlem were calculated with the same formulas and for the same 10-year intervals. Life tables for the United States are from *Vital Statistics of the United States, 1980*.[13]

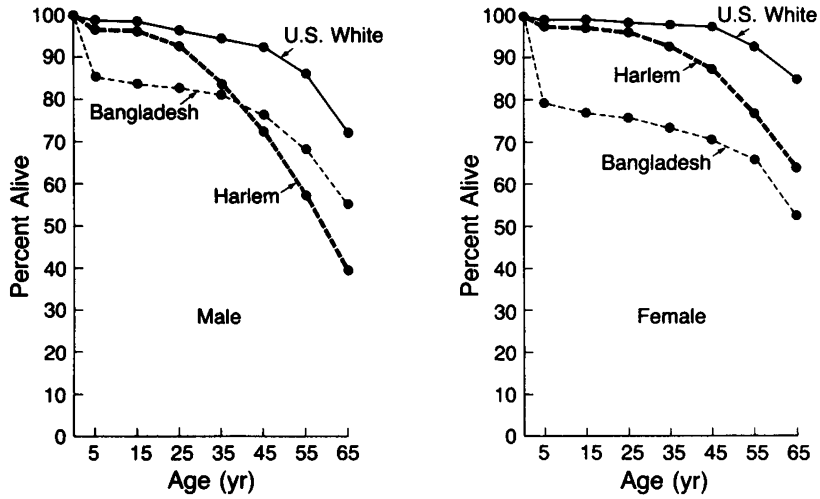

Figure 2. Survival to the Age of 65 in Harlem, Bangladesh, and among U.S. Whites in 1980.

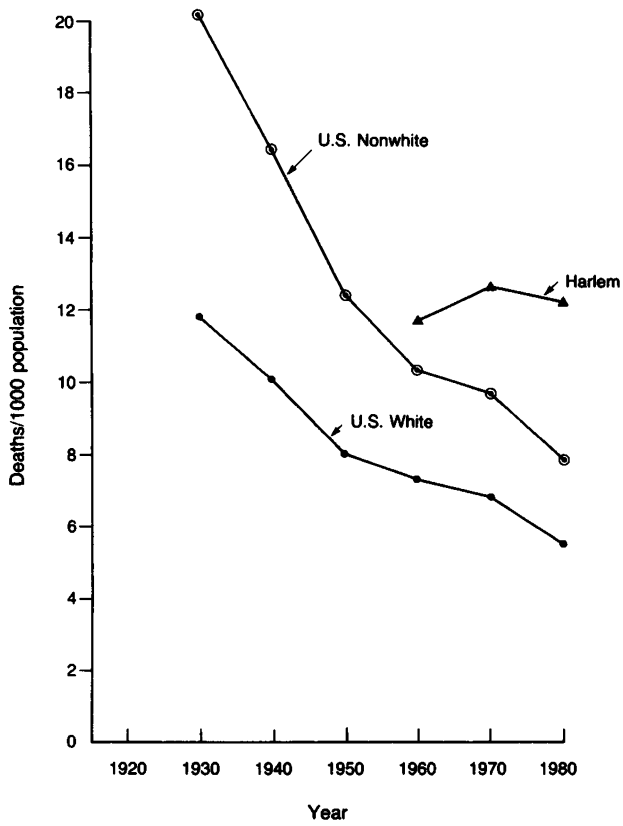

Figure 1. Age-Adjusted Death Rates in Harlem (1960–1980) and the United States (1930–1980).

Results

Since 1950, when the New York City Health Department began to keep death records according to health-center district, Central Harlem has consistently had the highest infant mortality rate and one of the highest crude death rates in the city. In 1970 and 1980, age-adjusted mortality rates for Harlem residents were the highest in New York City, much worse than the rates for nonwhites in the United States as a whole, and they had changed little since 1960 (Fig. 1). This lack of improvement in the age-adjusted death rate reflected worsening mortality rates for persons between the ages of 15 and 65 that more than offset the drop in mortality among infants and young children (Fig. 3).

Figure 2 shows the survival curves for male and female residents of Harlem, as compared with those for whites in the United States and those for the residents of an area in rural Bangladesh. Bangladesh is categorized by the World Bank as one of the lowest-income countries in the world. The Matlab demographic-study area is thought to have somewhat lower death rates than Bangladesh as a whole, but the rates are typical for the region. Life expectancy at birth in Matlab was 56.5 years in 1980, as compared with an estimated 49 years for Bangladesh and 57 years for India in 1986.[9,16] For men, the rate of survival beyond the age of 40 is lower in Harlem than Bangladesh. For women, overall survival to the age of 65 is somewhat better in Harlem, but only because the death rate among girls under 5 is very high in Bangladesh.

The SMRs for Harlem (Table 1) were high for those of all ages below 75, but they were particularly high for those between 25 and 64 years old and for children under 4. In the three years 1979 to 1981, there were

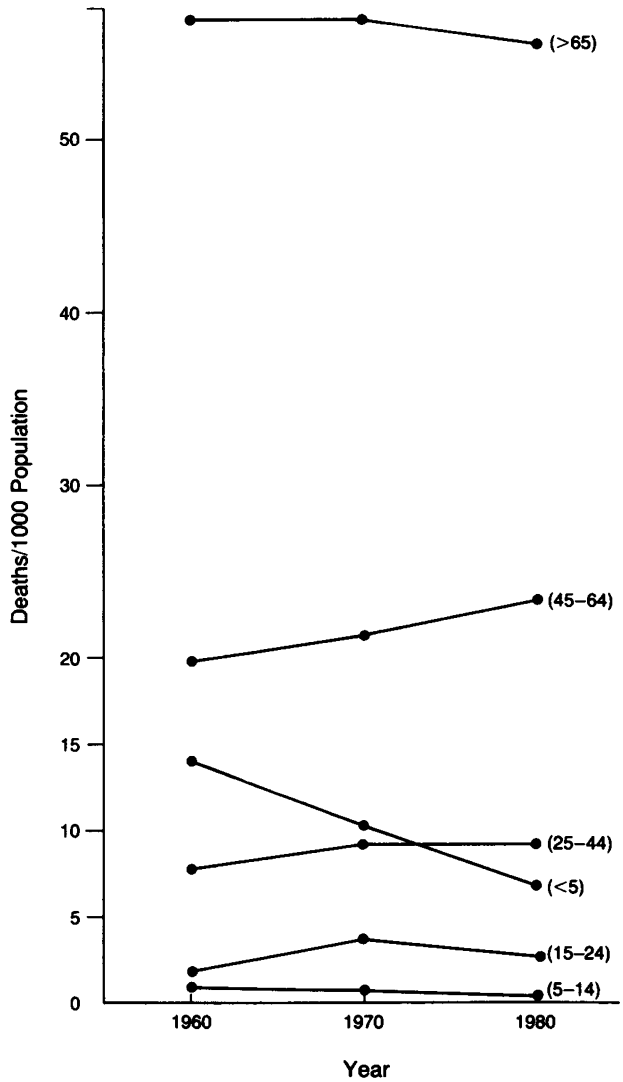

Figure 3. Age-Specific Death Rates in Harlem from 1960 to 1980. Age groups are shown in parentheses.

6415 deaths in Harlem. If the death rate among U.S. whites had applied to this community, there would have been 3994 deaths. Eighty-seven percent of the 2421 excess deaths were of persons under 65.

Table 2 compares the numbers of observed and expected deaths among persons under 65, according to the chief underlying causes. A large proportion of the observed excess was directly due to violence and substance abuse, but these causes did not account for most of the excess. Cirrhosis, homicide, accidents, drug dependency, and alcohol use were considered the most important underlying causes of death in 35 percent of all deaths among people under 65, and in 45 percent of the excess deaths.

For people between the ages of 65 and 74 the SMRs in Harlem were much lower than those for people younger than 65. For residents of Harlem 75 years old or older, overall death rates were essentially the same as those for U.S. whites (Table 1). Disease-specific SMRs for people over the age of 65 were below those of younger age groups in almost every category. In several categories (notably cardiovascular disease in Harlem residents 75 or older), they were lower than in whites. This may represent the survival of the fittest in this area of excess mortality.

To estimate the number of people in New York City whose mortality rates were similar to those of people in Harlem, SMRs for persons under the age of 65 were calculated for each of New York's 342 health areas with populations over 3000. There were 54 areas with SMRs of 2.0 or higher for persons under the age of 65. This means that these 54 health areas had at least twice the expected number of deaths (Fig. 4). The total population of these high-risk areas was 650,000. In 53 of them more than half the population was black or Hispanic. There was much more variation in the SMRs of the health areas predominantly inhabited by members of minority groups than in the areas that were less than half nonwhite (Fig. 4). White areas were relatively narrowly clustered around a mean SMR of 0.97. The SMRs for predominantly black or Hispanic health areas ranged from 0.59 to 3.95, with a mean of 1.77. The SMRs for the 10 health areas in Harlem ranged from 2.16 to 3.95.

It is believed that recent U.S. censuses have undercounted blacks and other minority groups, particularly young men. This would lead to an increase in the age-specific mortality rates used to calculate life tables and SMRs. The Bureau of the Census has estimated the scale of undercounting in various ways — the highest figure is 19 percent for black men in the 25-to-34-year-old group.[17] Because the absolute amount of the observed excess mortality in Harlem is so great, recalculation has little effect on the data presented

Table 1. Standardized Mortality Ratios for Harlem, 1979 to 1981.*

Age (Yr)	Observed Deaths (No.)	Standardized Mortality Ratio	Annual Excess Deaths†
Male			
0–4	81	2.45	462
5–14	10	1.10	4
15–24	105	2.28	214
25–34	248	5.77	911
35–44	347	5.98	1401
45–54	521	3.28	1824
55–64	783	2.10	2026
65–74	727	1.23	945
≥75	747	1.001	14
Total	3569	1.72	878
Total <65	2095	2.91	948
Female			
0–4	57	2.19	291
5–14	9	1.80	17
15–24	32	1.88	48
25–34	98	6.13	330
35–44	148	4.63	510
45–54	303	3.40	927
55–64	508	2.09	973
65–74	699	1.47	968
≥75	992	0.96	−315
Total	2846	1.47	449
Total <65	1155	2.70	445

*Reference death rates are those for U.S. whites in 1980.
†Per 100,000 population in each age group.

here, but for the calculations required for Figure 3 and Tables 1 and 2 we increased the 1980 census population in each sex and age group by an amount conforming to the largest Census Bureau estimate of the undercounting. This produced a slight increase in the percentage shown to be still living at the age of 65 in Figure 2 and a slight reduction in the SMRs in Tables 1 and 2. (With this correction the SMR for male residents under the age of 65 was 2.91 rather than 3.15.)

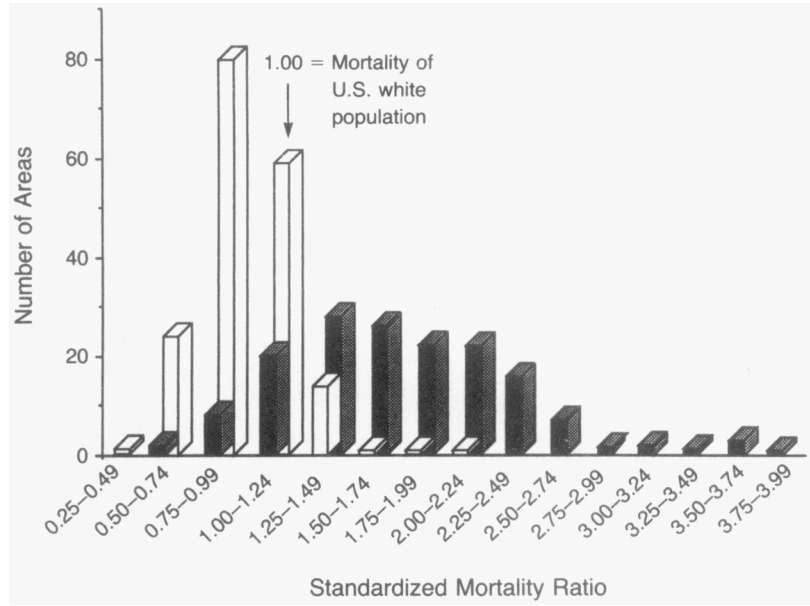

Figure 4. Standardized Mortality Ratios for Persons under 65 in 342 Health Areas in New York City, 1979 to 1981.

The shaded bars denote communities more than half of whose residents are nonwhite, and the open bars communities that are half or more white. Bars to the right of the arrow represent communities in which the mortality of persons under the age of 65 was higher than that of U.S. whites.

Discussion

An improvement in child mortality in Harlem between 1960 and 1980 was accompanied by rising mortality rates for persons between the ages of 25 and 65. There was therefore no improvement in overall age-adjusted mortality. Death rates for those between the ages of 5 and 65 were worse in Harlem than in Bangladesh.

We have not attempted to calculate SMRs since 1981, because the 1980 census is the most recent reliable estimate of the population of New York City, but all available evidence indicates that there has been very little change since then. The total number of deaths in Harlem from 1985 through 1987 was 1.6 percent higher than from 1979 through 1981. According to the New York City Planning Department, the decline in Harlem's population stopped in 1980 and the total population has been growing at the rate of 1 percent per year since then.[18] If this estimate is accepted, there has been a slight drop in the crude death rate for Harlem since 1980, but not large enough to affect any of our conclusions. Since 1980 the number of deaths of persons 25 to 44 years of age has increased considerably (31 percent), and the acquired immunodeficiency syndrome (AIDS) has become the most common cause of death in this age group in Harlem and in all New York City. The number of deaths from AIDS is expected to continue to rise.

Table 2. Causes of Excess Mortality in Harlem, 1979 to 1981.*

Cause	Observed Deaths (No.)	Standardized Mortality Ratio	Annual Excess Deaths per 100,000	% of Excess Deaths
Cardiovascular disease	880	2.23	157.5	23.5
Cirrhosis	410	10.49	120.4	17.9
Homicide	332	14.24	100.2	14.9
Neoplasm	604	1.77	84.9	12.6
Drug dependency	153	283.1	49.5	7.4
Diabetes	94	5.43	24.9	3.7
Alcohol use	73	11.33	21.6	3.2
Pneumonia and influenza	78	5.07	20.3	3.0
Disorders in newborns	64	7.24	17.9	2.7
Infection	65	5.60	17.3	2.6
Accident	155	1.17	7.2	1.1
Ill defined	44	2.07	7.4	1.1
Renal	26	4.54	6.6	0.9
Chronic obstructive pulmonary disease	35	1.29	2.6	0.4
Congenital anomalies	23	1.21	1.3	0.2
Suicide	33	0.81	−2.5	—
All other	181	3.13	40.0	6.0
All causes	3250	2.75	671.2	100.0

*The calculations are based on the deaths of all persons — male and female — under the age of 65. The reference death rates are those for U.S. whites in 1980.

The situation in Harlem is extreme, but it is not an isolated phenomenon. We identified 54 health areas (of 353) in New York City, with a total population of 650,000, in which there were more than twice as many deaths among people under the age of 65 as would be expected if the death rates of U.S. whites applied. All but one of these health areas have populations more than half composed of minority members. These are areas that were left behind when the minority population of the city as a whole experienced the same improvement in life expectancy that was seen in the rest of the United States.[19] Similar pockets of high mortality have been described in other U.S. cities.[3,20] Jenkins et al. calculated SMRs for all deaths in Roxbury and adjacent areas of Boston that were almost as high in 1972–1973 as those reported here.[20] This area of highest mortality in Boston was the area with the highest proportion of minority groups.

It will be useful to know more about the circumstances surrounding premature deaths in high-risk communities to determine the relative importance of contributing factors such as poverty, inadequate housing, psychological stress, substance abuse, mal-

nutrition, and inadequate access to medical care. But action to correct the appalling health conditions reflected in these statistics need not wait for more research. The essential first steps are to identify these pockets of high mortality and to recognize the urgent severity of the problem. Widespread poverty and inadequate housing are obvious in Harlem and demand a direct attack wherever they are present. The most important health investigations will be those designed to evaluate the effectiveness of measures to prevent and treat the causes of death already identified. The SMR for persons under 65 years of age may be a useful tool both to identify the high-mortality areas and to monitor the effect of measures to reduce mortality. This ratio is simpler to calculate than the years of productive life lost,[6] and the information obtained is similar.

Those responsible for implementing health programs must face the reality of high death rates in Harlem and the enormous burden of disease that requires treatment in the existing facilities. The health care system is overloaded with such treatment and is poorly structured to support preventive measures, detect disease early, and care for adults with chronic problems. At the same time, the population at highest risk has limited contact with the health care system except in emergencies. Brudny and Dobkyn reported that 83 percent of 181 patients discharged from Harlem Hospital with tuberculosis in 1988 were lost to follow-up and did not continue treatment.[21] New approaches must be developed to take preventive and therapeutic measures out of the hospitals, clinics, and emergency rooms and deliver them to the population at highest risk.

Intensive educational campaigns to improve nutrition and reduce the use of alcohol, drugs, and tobacco are needed and should be directed at children and adolescents, since habits are formed early and the death rates begin to rise immediately after adolescence. Education will have little effect unless it is combined with access to adequate incomes, useful employment, and decent housing for these children and their parents. Education can help in controlling epidemic drug use and associated crime only if it is combined with effective and coordinated police and public action. AIDS in Harlem is largely related to intravenous drug use and is not likely to be controlled until drugs are controlled, but effective education about this disease is also urgently needed.

Knowledge of the history of previous efforts to improve health in Harlem does not lead to optimism about the future. The Harlem Health Task Force was formed in 1976 because Harlem and the Carter administration recognized that death rates were high. An improved system of clinics, more drug-treatment centers, and active community-outreach programs were recommended. The recommendations have been implemented to varying degrees, but funding has been limited. The preventive and curative health care system is essentially unchanged today. Drug use has increased, and the proportion of the population receiving public assistance has increased. There has been no decrease in the death rates.

In 1977 Jenkins et al. pointed out that the number of excess deaths recorded each year in the areas of worst health in Boston was considerably larger than the number of deaths in places that the U.S. government had designated as natural-disaster areas. They suggested that these zones of excess mortality be declared disaster areas and that measures be implemented on this basis.[20] No such action was taken then or is planned now. If the high-mortality zones of New York City were designated a disaster area today, 650,000 people would be living in it. A major political and financial commitment will be needed to eradicate the root causes of this high mortality: vicious poverty and inadequate access to the basic health care that is the right of all Americans.

We are indebted to Meril Silverstein, Chih Hwa, John Ross, and Elmer Struerning for advice and assistance. The authors alone are responsible for the calculations and conclusions.

References

1. Manton KG, Patrick CH, Johnson KW. Health differentials between blacks and whites: recent trends in mortality and morbidity. Milbank Q 1987; 65:Suppl 1:125-99.
2. Davis K, Lillie-Blanton M, Lyons B, Mullan F, Powe N, Rowland D. Health care for black Americans: the public sector role. Milbank Q 1987; 65:Suppl 1:213-47.
3. Kitagawa EM, Hauser PM. Differential mortality in the United States: a study in socioeconomic epidemiology. Cambridge, Mass.: Harvard University Press, 1973.
4. Woolhandler S, Himmelstein DU, Silber R, Bader M, Harnly M, Jones A. Medical care and mortality: racial differences in preventable deaths. Int J Health Serv 1985; 15:1-22.
5. Savage D, Lindenbaum J, Van Ryzin J, Struening E, Garrett TJ. Race, poverty, and survival in multiple myeloma. Cancer 1984; 54:3085-94.
6. Black/white comparisons of premature mortality for public health program planning — District of Columbia. MMWR 1989; 38:33-7.
7. Freeman HP, Wasfie TJ. Cancer of the breast in poor black women. Cancer 1989; 63:2562-9.
8. Cancer in the economically disadvantaged: a special report prepared by the subcommittee on cancer in the economically disadvantaged. New York: American Cancer Society, 1986.
9. Demographic surveillance system — Matlab. Vital events and migration tables, 1980. Scientific report no. 58. Dhaka, Bangladesh: International Centre for Diarrheal Disease Research, 1982.
10. Davis K, Schoen C. Health and the war on poverty: a ten-year appraisal. Washington, D.C.: Brookings Institution, 1978.
11. Blendon RJ, Aiken LH, Freeman HE, Corey CR. Access to medical care for black and white Americans: a matter of continuing concern. JAMA 1989; 261:278-81.
12. Community health atlas of New York. New York: United Hospital Fund, 1986.
13. Vital statistics of the United States 1980. Hyattsville, Md.: National Center for Health Statistics, 1985. (DHHS publication no. (PHS) 85-1101.)
14. Vital statistics: instructions for classifying the underlying cause of death, 1980. Hyattsville, Md.: National Center for Health Statistics, 1980.
15. The international classification of diseases, 9th revision, clinical modification: ICD-9-CM. 2nd ed. Washington, D.C.: Department of Health and Human Services, 1980. (DHHS publication no. (PHS) 80-1260.)
16. The state of the world's children 1988 (UNICEF). New York: Oxford University Press, 1988.
17. Fay RE, Passel JS, Robinson JG. Coverage of population in the 1980 census. Washington, D.C.: Bureau of the Census, 1988. (Publication no. PHC 80-E4.)
18. Community district needs, 1989. New York: Department of City Planning, 1987. (DCP publication no. 87-10.)
19. Summary of vital statistics, 1986. New York: Bureau of Health Statistics and Analysis, 1986.
20. Jenkins CD, Tuthill RW, Tannenbaum SI, Kirby CR. Zones of excess mortality in Massachusetts. N Engl J Med 1977; 296:1354-6.
21. Brudny K, Dobkyn J. Poor compliance is the major obstacle in controlling the HIV-associated tuberculosis outbreak. Presented at the Fifth International Conference on Acquired Immune Deficiency Syndrome, Montreal, June 8, 1989.