BLACK-WHITE DIFFERENCES IN SENTINEL CAUSES OF DEATH: COUNTIES IN LARGE METROPOLITAN AREAS

ANTHONY P. POLEDNAK, PHD

ABSTRACT The black/white ratio of death rates (before 65 years of age) in 1994–1996 for a group of "sentinel" causes, regarded as preventable by medical treatment and as useful in assessing overall quality of health care, was examined for 60 US counties located in large metropolitan areas. Counties with the highest black/white death rate ratios (>3.5) and the highest death rates for blacks included the District of Columbia; Essex (Newark), New Jersey; Cook (Chicago), Illinois; Wayne (Detroit), Michigan; and Dade (Miami), Florida. In these five counties, in contrast to the US, the death rate from the sentinel causes for blacks had not declined from 1979–1981 to 1994–1996. The findings suggest that racial inequities in health care may be unusually great in certain counties in large metropolitan areas, and that further studies are needed to explain the variation among counties in the black-white ratio of mortality from the sentinel causes.

KEY WORDS African-Americans, Blacks, Causes of Death, Death Rates, Mortality, Urban Health.

Mortality from "sentinel" causes preventable by medical intervention or treatment has been proposed as an indicator of overall quality of health care.[1] Rates for several of these causes declined from 1956 to 1978 in six countries, including the US.[2] In the US, however, rates from a group of causes regarded as preventable by medical intervention were higher for blacks than whites in 1980–1986, and the black-white differences were even larger in Washington, DC.[3] Death rates from sentinel causes in other US urban areas apparently have not been examined. Temporal trends in US black-white differences (by geographic area) are of interest in view of concerns that the growth of managed care may perpetuate or exacerbate

Dr. Polednak is with the Connecticut Department of Public Health, 410 Capitol Avenue, P.O. Box 340308, Hartford CT 06134.

racial inequities in health care quality in urban areas.[4] The present study examined geographic and temporal variation in the black/white ratio of mortality from a group of sentinel causes, including counties that had large black populations and were located in large metropolitan areas.

MATERIALS AND METHODS

The group of causes of death selected were "clear-cut" indicators of health care quality, regarded as preventable by medical treatment,[1] and included tuberculosis (International Classification of Diseases, Ninth Revision [ICD-9] codes 010–019.9); asthma (493–493.9); acute respiratory infections, pneumonia, and bronchitis (460–466, 480–486, 490); rheumatic heart disease (393–398); appendicitis (540–540.9); hernia (550–553.9); and cholelithiasis and/or cholecystitis (574–575.1); influenza (487) was excluded due to small numbers of cases. As recommended by Rutstein et al.[1] and other investigators,[2,3] only deaths prior to 65 years of age were included to maximize the probability that deaths were preventable (by medical intervention).

For blacks and whites in selected counties, average annual age-standardized mortality rates were obtained using the Centers for Disease Control and Prevention's Wonder program,[5] which involves the direct method of standardization (10-year age intervals, using the 1970 total US population as the standard). In metropolitan statistical areas (MSAs) with more than 1 million total population (in 1995), the majority (i.e., 60) of the 85 counties with a black population of at least 45,000 in 1995 also had statistically reliable[5] black and white death rates (aged < 65 years) in 1994–1996 for the group of sentinel causes (listed above) regarded as preventable by medical treatment. Another clear-cut indicator,[1] cervical cancer (females only), was analyzed separately, but results are not presented because death rates (1994–1996) were unreliable statistically[5] for blacks for the majority of the counties examined.

Along with all of the cause-of-death categories used in the present study, Schwartz et al.[3] also included Hodgkin's disease (but only deaths prior to 35 years of age) and hypertensive heart disease as preventable by medical intervention. The last causes, however, were regarded as "limited use" quality-of-care indicators[1] because factors other than health care quality, such as prevalence of risk factors, affect mortality. Other clear-cut indicators of "unnecessary untimely death" due to lack of adequate treatment (e.g., cholera, diphtheria, various other infectious-parasitic diseases, rare childhood cancers, bacterial meningitis, otitis media, and osteomyelitis)[1] involve very small numbers of deaths in the US and also were excluded.

The 60 counties were ranked in order of increasing black/white ratio of age-

standardized death rates (aged < 65 years) for the sentinel group of causes, and the highest and lowest quintiles were identified. Correlation coefficients (Pearson *r*) were calculated between the black/white ratio of death rates and the black/white ratio of poverty rates (i.e., proportion of persons with incomes below the federal poverty level, 1990 census). Poverty rate was used, rather than other (correlated) measures (such as median household income), because household size is taken into account.

RESULTS

Only 1 of the 60 counties had a black/white ratio of age-standardized death rates (aged < 65 years) from the sentinel group of causes that was less than 1.00 (i.e., Bronx, NY, 16.7/18.1 or 0.92); this was due largely to a high rate for whites. Of the 13 counties in the highest quintile for the black/white ratio of sentinel death rates, 5 were due to relatively high death rates for blacks (i.e., at least 21/100,000 per year or about 2 deviations from the mean for blacks): the District of Columbia; Essex (Newark), New Jersey; Cook (Chicago), Illinois; Wayne (Detroit), Michigan; and Dade (Miami), Florida (Table). Only two other counties (i.e., Baltimore City, Maryland, and San Francisco, California) had black rates greater than 20 in 1994–1996, but both also had high rates for whites (data not shown). Of the 12 counties in the lowest quintile for the black/white ratio of sentinel death rates (i.e., <2.0; data not shown), only two involved low black death rates: San Diego, California (9.4/5.8 or 1.6) and Hillsborough (Tampa–St. Petersburg), Florida (9.8/5.7 or 1.7).

The death rate for the group of sentinel causes for blacks had not declined from 1979–1981 to 1994–1996 in the 5 counties with high black/white ratios and highest black rates. Rates in these 5 counties increased slightly over time, and only the District of Columbia had a black rate greater than 20 in 1979–1981 (Figure). In contrast, rates had declined slightly for whites in these 5 counties (not shown) and for US whites (Figure). For US blacks (Figure), the sentinel death rate also declined from 1979–1981 to 1994–1996, but the black/white death rate ratio increased slightly (i.e., from 2.6 to 2.8).

The black/white ratio of poverty rates (1990 census) was higher than average for some counties in the Table (including Cook and Wayne counties), but not for the 3 counties with the highest black/white death rate ratios for the group of sentinel causes. The Pearson *r* between the black/white ratio of poverty rates and the black/white ratio of death rates by county (60 counties) was .308, which statistically was significantly different from zero ($P = .008$), but the R^2 was only 0.095.

TABLE Counties* with the Highest Black/White Ratio of Death Rates (per 100,000 per year, 1994–1996) at Age Less than 65 Years for a Group of Sentinel Causes Preventable by Medical Intervention†

	Sentinel Group of Causes			Poverty Rates (1990 Census)		
County (MSA)	Black	White	Black/ White	Black	White	Black/ White
Essex, NJ (Newark)	22.9	5.3	4.3	22.0	6.9	3.2
Dade, FL (Miami)	20.8	5.0	4.2	30.3	14.2	2.1
District of Columbia	20.8	4.9	4.2	20.2	8.2	2.5
Cook, IL (Chicago)	20.8	5.7	3.7	30.2	6.6	4.6
Wayne, MI (Detroit)	20.5	5.4	3.8	34.8	9.5	3.7
Forsyth, NC (Greensboro)	18.6	4.6	4.0	23.9	5.9	4.1
Fulton, GA (Atlanta)	16.7	4.2	4.0	29.6	6.4	4.6
Union, NJ (Newark)	16.6	4.3	3.9	14.5	4.9	3.0
Erie, NY (Buffalo)	14.3	4.0	3.6	37.4	8.2	4.6
Pinellas, FL (Tampa)	14.1	3.7	3.8	32.4	7.4	4.4
Suffolk, NY (Nassau-Suffolk)	13.3	3.7	3.6	14.3	4.0	3.6
Dekalb, GA (Atlanta)	12.7	3.5	3.6	15.2	5.3	2.9
King, WA (Seattle)	11.4	3.1	3.7	22.3	6.1	3.7
60 counties						
Mean	14.1	5.7	2.7	25.4	8.0	3.4
(Standard deviation)	(3.6)	(2.5)	(0.8)	(8.2)	(3.2)	(1.1)
US	13.7	4.9	2.8	31.9	10.7	3.4

Note: Counties are listed in order of the death rate for blacks.

*Among 60 counties (of 85) selected for study (see text).

†Tuberculosis, asthma, acute respiratory diseases, pneumonia and bronchitis, rheumatic heart disease, appendicitis, hernia, and cholelithiasis and/or cholecystitis; see text for cause of death codes involved.

DISCUSSION

The high black/white ratio of death rates from a group of causes regarded as preventable by medical intervention in the District of Columbia (Table) is consistent with a previous report, which used a slightly different group of causes of death.[3] However, the present study found that several other counties had death rates from sentinel causes in blacks that were about as high as the rate for Washington, DC (Table).

The list of clear-cut or sentinel indicators of health care quality was published in first 1976,[1] prior to the onset of the AIDS epidemic. Therefore, the high death rates in 1994–1996 for the group of sentinel causes (aged < 65 years) might be affected by the AIDS epidemic, especially for blacks in certain urban areas, rather than overall health care quality (although some deaths from AIDS are now

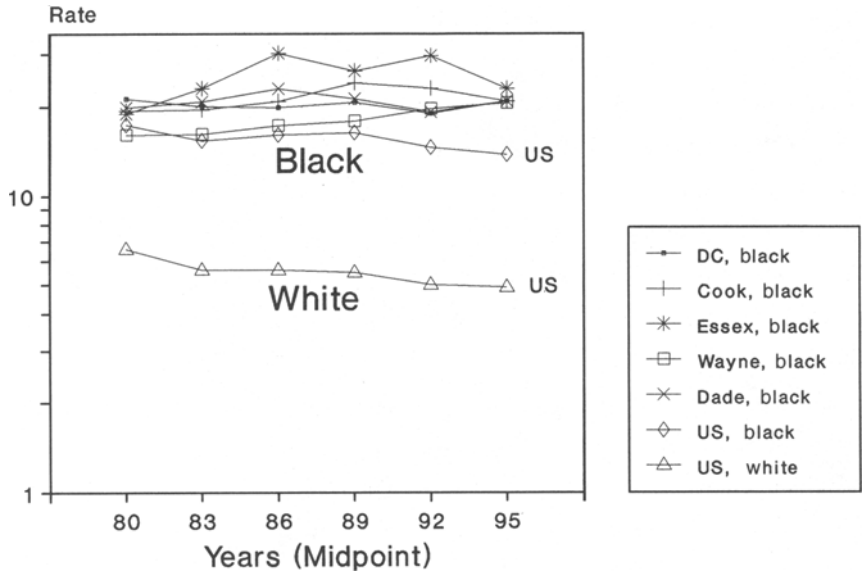

FIGURE Age-standardized death rates (per 100,000 per year) for those less than 65 years old for 1979–1981, 1982–1984, 1985–1987, 1988–1990, 1991–1993, and 1994–1996 for a group of sentinel causes in selected counties for blacks and in the US for blacks and whites.

preventable, or at least can be postponed, by medical treatment with drugs). However, high death rates for the group of sentinel causes in blacks were already evident in 1979–1981 (i.e., at the very start of the AIDS epidemic) in the 5 counties examined in detail (Figure). Also, the age-standardized death rate from tuberculosis and acute respiratory diseases (data not shown), most likely to be affected by any miscoding of underlying causes of death as a result of the AIDS epidemic, actually declined from 1979–1981 to 1994–1996 in US blacks (2.3 to 1.0 per 100,000 per year) and whites (0.5 to 0.1), as well as in blacks in 4 of the 5 counties shown in the Figure; for the other county (Essex, NJ), the death rate was unreliable statistically in 1979–1981. In contrast, the age-standardized death rate (aged < 65 years) from asthma increased from 1979–1981 to 1994–1996 for blacks in the US (i.e., from 1.8 to 3.2 per 100,000 per year) and in the 5 counties (data not shown).

For the US and for the 5 counties with the highest black/white ratios of death rates (due to high black death rates) from the sentinel group of causes (aged < 65 years) in 1994–1996, the temporal trends (Figure) suggested that there may have been no decline in the black-white disparity in overall health care quality in the US and in the 5 counties. However, this interpretation is complicated by the differing trends for specific cause-of-death categories within the group of sentinel causes studied. A study limitation is that geographic and temporal

variation in death rates from causes regarded as preventable by medical intervention may reflect variation in incidence and/or prevalence rates (rather than in health care quality).[1,6] High asthma mortality rates in large cities (such as Chicago, Philadelphia, and New York) are well known, but the explanation for the rising asthma mortality rate from 1979 to 1991 in Philadelphia (mainly among nonwhites), despite declines in air pollution levels, is uncertain.[7] An increasing rate of outcomes among hospitalized children with asthma in California has suggested a possible decline in health care access or quality; trends were not examined by race.[8]

Other study limitations involve inaccuracies in population estimates (especially for young adult urban blacks), inability to assess selective migration of healthier persons from specific urban areas, and lack of data[5] on Hispanics within each race. Finally, the causes of death examined are intended only as sentinels and not as a complete measure of the impact of inadequate access and/or poor quality of health care on mortality.

Within these limitations, the positive correlation between the black/white sentinel death rate ratio and the black/white poverty rate ratio by county is not unexpected because poverty is related strongly to health insurance coverage and Medicaid enrollment, which affect risk of avoidable hospitalization.[9] However, the low R^2 value indicates that only a limited proportion of the variation in the black/white ratio of sentinel death rates among the counties was "explained" (statistically) by variation in the black/white poverty rate ratio. This could suggest that other (regional) factors are involved. In this regard, higher total mortality rates (and rates for infectious diseases) have been reported in young adult and middle-aged black men in certain northern areas (including Chicago and Detroit) than in certain parts of the rural South, despite similarly high poverty rates.[10]

Black-white differences in rates of potential hospitalizations (with pneumonia and asthma being common) under 65 years of age in the US in 1990 were found even within groups defined by income.[11] It was suggested that this finding might reflect social conditions for blacks in certain "older industrial cities."[11] Some support for this idea was obtained in the present study in view of high death rates from the sentinel group of causes in certain counties located in northern and north central areas (i.e., in Newark, NJ; Chicago, IL; and Detroit, MI) (Table).

Studies are needed to delineate the factors in the health care system responsible for the variation in black/white mortality ratios for sentinel causes of death by county in the large metropolitan areas examined. Inclusion of data on avoidable hospitalizations (although not as readily available as mortality data) would provide larger samples than in studies restricted to deaths. Such studies may be

viewed as part of the role of public health agencies in surveillance of quality of (and equity in) primary care during the expansion of managed care.[12] The need for such studies is emphasized by recent increases in rates of uninsured among minorities and in the northeastern and north central areas.[13,14]

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