History of Black Mortality and Health before 1940

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THE LEVEL OF MORTALITY IS A BASIC MEASURE of the standard of living. Since mortality is determined by the quality of available medical care, income, nutritional status, environmental quality (including quality of water and air), and cultural habits, it incorporates many elements of the standard of living. In the United States, the study of racial differences in mortality provides one of the best approaches to measuring historical trends in the relative standards of living of blacks and whites. These studies also provide important information on the determinants of mortality rates in historic populations. Comparisons of socioeconomic differences and differences in health care practices among blacks and whites help to elucidate the factors that determined mortality levels and trends during different historical periods.

This article reviews the trends in the mortality of American blacks between 1800 and 1940 and compares those trends with the trends among American whites. It then proceeds to examine the trends in several subpopulations focusing on differences between blacks in cities and rural areas and in northern and southern states. Finally, it includes a discussion of some of the factors underlying the black-white differences and the trends in black mortality. This discussion of the determinants of black mortality is an attempt to place the history of black mortality into the context of the broader history of the mortality decline in the United States. (A few of the statistics discussed below actually refer

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to "nonwhites" and therefore include some American Indians, Chinese, Japanese and other minority groups. In all of these cases, however, virtually all of the persons covered by the statistic are black.)

The discussion begins with a review of estimates of mortality among blacks for various periods. This review is based on the results of recent analysis of new data on child mortality during the period of 1880 to 1930 and a reanalysis of the data on adult mortality. As a result of this research, this review presents a substantial revision of trends in mortality among blacks. In particular, it proposes much lower estimates of child mortality among blacks in the nineteenth century and much higher adult mortality during that period. It also suggests that there was little change between 1850 and 1880 and no change during the period of 1880 to 1900. This view of black mortality trends focuses attention on the first decades of the twentieth century when mortality rates of blacks began a sustained decline. The second section of the article elucidates the factors responsible for this rapid decline in child mortality with an examination of trends in New York and North and South Carolina between 1900 and 1940. These states were chosen because they reflect quite different black populations (urban and rural, northern and southern) and because they provide relatively reliable data for the whole period. This discussion includes some examination of data on cause of death for the period of 1910 to 1920.

Documenting the levels and trends in mortality among blacks and whites is only the first step in learning what we really want to know. The more interesting questions concern the reasons for racial differences in mortality and the factors that caused the decline in mortality. The final section reviews information on health practices and the effects of economic differentials on health care and mortality. This discussion includes a review of several studies of infant and child care carried out by the U.S. Children's Bureau around 1920. It also includes a discussion of trends in mortality due to typhoid fever between 1900 and 1920. Since typhoid mortality rates responded rapidly to changes in water and sanitation, it provides a useful marker of the effectiveness of basic public health services among different population groups during various periods.

Trends in Black Mortality before 1940

There are several reasons why it is difficult to document mortality trends among American blacks. First, registration of deaths did not begin in the United States until late in the nineteenth century and even then it was limited to a few states. It was not until 1933 that the whole of the continental United States was included in the national Death Registration Area (DRA). Second, the states which started registration systems first were northeastern states. The data on the white population in these states has often been used as a rough approximation of the whole country, but the blacks in these states are not representative of all blacks. In 1900 the death registration area included 26 percent of the total population, but only 4.4 percent of the black population. More than 90 percent of the blacks in the DRA lived in urban areas while only 23 percent of all blacks were urban. Third, although blacks and whites were theoretically covered by the same data collection systems after the Civil War, the data for blacks were generally less reliable than those for whites.

Despite these problems, there are several ways in which mortality can be estimated. One important source on infant and child mortality among blacks in the early nineteenth century is slave records. A second source is census data on the proportion of deceased children born to women of various ages. Estimates of adult mortality are generally derived from census age distributions by calculating the ratio of the number of persons recorded as aged x in one census to the number aged $x + 10$ at a census ten years later. By comparing all of these bits and pieces of information, it is possible to get a relatively good picture of the levels and trends of mortality for blacks and whites starting about 1850.

The following discussion examines mortality for three periods: 1800 to 1880, 1880 to 1910, and 1910 to 1940. These periods are defined in terms of the type of data that are available and therefore do not reflect standard historical eras. For each period, the estimates for blacks are compared with estimates for a comparable white population.

Because the data sources often provide estimates of only some age groups, much of the discussion is limited to either child mortality or adult mortality. The main index of child mortality is the proportion of all live births that survive to their fifth birthday. This rate is generally termed q(5). Some of the discussion is based on estimates

of the infant mortality rate, which is the number of deaths under the age of one year in a given period divided by the number of live births in that period. The infant mortality rate is an approximation of the proportion of live-born children surviving to their first birthday. Both q(5) and the infant mortality rate are expressed per 1,000 live births. The index of adult mortality used here is the expectation of life at age 10, which is expressed in years. Whenever possible, the data on child and adult mortality are combined to provide an estimate of the life expectancy at birth.

Estimates of Mortality for 1800 to 1880

The best source of information on child mortality rates among blacks in rural areas before 1860 is collections of plantation records of births and deaths among slaves. Steckel (1979) has analyzed plantation lists from eleven plantations for which the reporting of mortality appears to be relatively complete. His estimates have all of the advantages and disadvantages of family reconstitution studies: on the one hand, they provide the most reliable estimates for any black population during this time period; on the other hand, there are serious questions about generalizability.

Steckel's analysis covers 1786 to 1863, although most of the recorded births were concentrated toward the end of the period. (The data cover about 200 births per decade during the period of 1786 to 1839, while there were 415 births in the 1840s and 878 between 1850 and 1863.) He estimated that q(5) was 379 for the entire period. His estimates for various decades fluctuate slightly. The estimate for the period of 1850 to 1863 is 353. He has also analyzed the data on the survival of individuals to estimate differentials. He found higher rates in rice areas and on larger plantations (those with over 100 slaves). Since large plantations and rice areas are overrepresented in this sample, the mortality rates for this population probably overstate the rates for all slaves, possibly by more than 20 percent. Reducing the estimate from Steckel's sample leads to an estimated range for q(5) of about 280 to 320 for all slaves.

A second approach to estimating mortality for this period relies on the reported census age distributions. By examining the proportion surviving between censuses, it is possible to select a life table from a set of standard model tables. These estimates provide more reliable

estimates of adult mortality than child mortality. Applications of census survival techniques to blacks for the nineteenth century generally produce estimates of life expectancy at age 10 of about 41 to 42 years for black females. The estimates for black males are generally much higher (Farley 1970, 67; Eblen 1974). It is likely that these estimates are severely biased upward because of exaggeration of age among older blacks. Given estimates for the end of the nineteenth century (discussed below) and Steckel's data on child mortality, it is likely that the life expectancy at age 10 was closer to 35 years and life expectancy at birth was probably close to 30 years.

We do not have mortality estimates for the white populations in the deep South before 1860, so it is not possible to compare the mortality rates of the slaves with those of their owners or other southern whites. Given that most blacks lived in rural areas at this time, it is preferable to compare the rates for blacks with rates for rural whites. Haines (1977) has analyzed child survival data for seven counties of upstate New York from the state census of 1865 to estimate infant and child mortality for the period of 1850 to 1865. Although this population was in many ways quite different from the rural South, these estimates have the advantage of providing reliable estimates of child mortality for a rural white population. Haines estimates that q(5) in rural areas was 192, and the rate for urban areas was 229.

Another source of mortality data for whites during this period is the death registration data from Massachusetts. There has been extensive discussion of the reliability of these data; Vinovskis's estimate of q(5) for 1850, 210, however, is very similar to Haines's (1977) estimates for New York in the period of 1850 to 1865.

Although few blacks lived in northern states, those that did probably had higher mortality rates than southern slaves. Most northern blacks lived in large cities and therefore suffered from the excessive mortality rates common in cities (Davis 1973). Because of discrimination and their poverty, blacks sometimes lived in the worst sections of many cities and generally had poor housing; consequently, they had higher mortality rates than urban whites. For example, Rosenberg (1962, 59–60) reports that in the cholera epidemic of 1832, blacks in Philadelphia suffered a case rate almost twice as great as that of whites, and he suggests that this is "probably a reliable, if informal, index to the poverty in which the North's free Negroes lived."

Despite the sparsity of data, we can conclude several things about

TABLE 1
Estimates of Child Mortality, Life Expectancy at Age 10, and Life Expectancy at Birth, U.S. Blacks, 1850–1940

		Life expectancy at age 10					
			Census survival		DRA estimate		Life expectancy at birth
	q(5)	From e(10)	Male	Female	Male	Female	
1850	280–320	37					
1880	264	39					35.5
			36	36			
1890	264	39					35.5
			40	42			
1900	264	39					36.5
			39	39			
1910	235–255	40					
			39	39			
1920	186	45					
1930	126				44.3	45.3	48.5
1940	90				48.3	50.8	53.8

the level of mortality during this period. First, it is likely that around 1850 to 1860 about 280 to 320 black children per 1,000 died before their 5th birthday. Second, the life expectancy at age 10 among blacks was probably about 37 years in the middle quarters of the century. Third, the mortality of blacks was substantially higher than that of whites at all ages. Child mortality was probably more than 50 percent above the rate for rural whites.

Estimates for 1880 to 1910

The best source of information about adult mortality during this period is census survival methods. Table 1 presents estimates of life expectancy at age 10—e(10)—for the periods 1880 to 1890, 1890 to 1900, 1900 to 1910, and 1910 to 1920 for blacks by sex. These estimates are based on a new age pattern of mortality which is similar to the United Nations Far East pattern (United Nations 1982). The levels were selected to be consistent with the reported sizes of the cohort aged 0 to 39 at the first census and 10 to 49 at the second. These estimates show much higher mortality than most previous estimates (Farley

1970, 67; Eblen 1974) but are completely consistent with the estimates of child mortality discussed below. It appears that adult mortality was relatively constant between 1880 and 1910 with life expectancy at age 10 at about 38 to 39 years. Adult mortality probably started declining about 1910, since the estimate of e(10) for 1910 to 1920 is understated because of the large undercount in the 1920 census.

The censuses of 1900 and 1910 provide reports of women on the number of children they had ever borne and the number that are surviving. None of the child-survival data were ever tabulated by the census bureau. Recently, computerized public use samples have been produced from the original census forms which provide the first tabulations of child survival. The sample from the 1900 census is discussed in Graham (1980). The sample of 0.4 percent of the households in the 1910 census has recently been completed at the University of Pennsylvania. In addition, there is an extra sample of persons living in households headed by blacks in a large number of counties.

I have recently completed an analysis of these child-survival data from the 1900 and 1910 censuses. By comparing the child-survival reports of older and younger women, I estimate that among blacks the proportion dying by age 5 was constant at about 264 per 1,000 live births for the period of 1880 to 1900. Combining this estimate of child mortality with the estimates of adult mortality leads to an estimate of expectation of life at birth for blacks of 35 years in 1900.

This estimate of child mortality among blacks is substantially higher than Preston and Haines's (1984) estimate of 161 for whites in 1900, which is based on data from the public use sample of the 1900 census. (The data from the 1910 census on child survival among whites have not yet been analyzed.) In addition, while child mortality among blacks was generally constant during the period of 1880 to 1900, Preston and Haines's estimates suggest that among whites q(5) declined by about 28 points (14 percent) between 1885 and 1896. Data for the states in the death registration area between 1900 and 1910, which were mostly northern states with a high proportion of whites, shows a similar decline (15 percent). The child-survival data for blacks actually show some suggestion that child mortality may have increased during the 1890s in some states.

This analysis shows a very different picture of trends in childhood mortality among blacks than previously estimated. For example, in their reconstruction of demographic trends in mortality among blacks,

Coale and Rives (1973) used several estimates of mortality at the turn of the century. They relied heavily on data from the DRA states where blacks had a q(5) of 338, and their final estimates were even higher. Eblen's estimates of mortality are consistent with a q(5) of about 320 in 1880 to 1890—closer to the new estimates, but still much too high. These elevated estimates resulted from an overreliance on the DRA data and from assumed age patterns of mortality that are now seen to have greatly overstated the level of child mortality in comparison with adult mortality. (Other authors who overestimated child mortality among blacks include Demeny and Gingrich [1967], Farley [1970], and Meeker [1976].)

Analysis of the data from the 1900 and 1910 censuses also provide the first estimates of child mortality for blacks for regions. In southern states the estimates of q(5) for 1900 are generally in the range of 240 to 270 while in the North they are closer to 300. This difference is largely due to the fact that blacks in the North were far more apt to be urban and were, therefore, subjected to all of the health risks associated with urban areas.

In the nineteenth century, mortality in urban areas was generally much higher than in rural areas (Davis 1973). This urban disadvantage in mortality resulted from high mortality from infectious diseases spread through poor water and sanitation systems, and diseases such as tuberculosis and respiratory diseases which are associated with poverty and crowded, inadequate housing. Because of their low incomes and poor living conditions, urban blacks were doubly disadvantaged. The registration data in cities in 1880 reflect this situation. For example, in Baltimore, Washington, Charleston, and New Orleans the life expectancy at birth for blacks was about 25 while the values for whites averaged about 39. It is possible that about half of all black children died before their 5th birthday. These extremely high levels of mortality reflect the fact that blacks suffered more from most of the peculiarly urban ills because of their poverty. This was probably true throughout the nineteenth century.

Detailed vital statistics reports for Baltimore show that the crude death rate (total deaths per 1,000 population) for whites was basically constant with an average of 20 and 22 deaths per 1,000 population during the period of 1876 to 1895. After 1895 it began to decline at a steady pace down to 15.7 for the period of 1911 to 1915. In contrast, the rate for blacks fluctuated between 31.5 and 32.5 during

the period of 1886 to 1905 before beginning a decline. It is clear from these figures that in Baltimore the decline of mortality among blacks began about 10 years after the decline among whites. Although it is not clear what was responsible for these declines, it is instructive to note that for the two races combined, 40 percent of the decline in mortality between 1891 and 1915 was due to a decline in deaths from diarrhea (among both children and adults), dysentery, cholera, and typhoid fever (Howard 1924, 235, 513).

Estimates of Black Mortality for 1910 to 1940

The establishment of the death registration area in 1900 and the start of the birth registration area in 1915 provided the first useful vital statistics for a large section of the country. It was not until 1933, however, that vital statistics were available for all 48 states and even after that date the data were affected by underreporting of births and deaths. Since most blacks lived in states that did not enter the national registration systems until the period of 1925 to 1930, we can only examine detailed trends for the period of 1910 to 1930 in a few states. In addition, the registration data for rural areas of the South and for blacks in general were especially prone to underenumeration of events throughout this period. (For a discussion of the difficulties in estimating child mortality for blacks for this period, see Farley 1970, 67–69.)

By 1940 the data on infant and child mortality were reasonably reliable. Between 1900 and 1940, q(5) declined from 264 per 1,000 to 90 in 1940, a decline of 66 percent. During this same period the rate for whites continued the decline experienced between 1880 and 1900, dropping 67 percent from 161 in 1900 to 53 in 1940 (mortality estimates for 1929 to 1931 and 1939 to 1941 from Greville 1947). Therefore, between 1900 and 1940 the child mortality rate among blacks remained about 70 percent above that of whites. Despite substantial declines in infant and child mortality, blacks did not succeed in reducing their risks relative to whites.

I have recently completed an analysis of data on the survival of the older siblings of children born in 1928, 1930, and 1933. This analysis fills the gap between the estimates for 1900 and 1940 by providing the first reliable estimates of child mortality among blacks for the period of 1915 to 1930. These data suggest that by 1915 q(5) had

declined to about 218, a drop of 17 percent below the rate for 1880 to 1900. The extent of this decline suggests that the starting date of the decline must have been early in the century, perhaps about 1905. The declines in child mortality between 1900 and 1940 proceeded at a constant rate throughout the period. By 1920, q(5) had declined to about 180, and by 1930 it was down to 127. This new estimate for 1930 is substantially higher than the value of 107 used in the official life tables for 1929 to 1931 (Greville 1947, 11). These estimates suggest that child mortality fell at a rate of 3.4 percent per year between 1920 and 1940. Among whites, the rate of decline in q(5) was 2.5 percent per year between 1900 and 1930, while between 1930 and 1940 the rate of decline was 3.6 percent per year.

The trends in adult mortality during this period are not as clear. Farley (1970, 71–72) summarizes several studies that lead to conflicting conclusions. In the absence of complete registration of death until 1933, we must rely on the survival of cohorts between censuses and registration data for the few states that had reliable registration. Table 1 presents estimates of life expectancy at age 10 for various periods based on different types of data. The first set of estimates is based on the child mortality estimates and an assumed age pattern of mortality. The second set is based on the survival rates between censuses. For 1930 and 1940 the table includes the estimates from the death registration data.

It is certain that adult mortality decreased between 1900 and 1940, but it is possible that there were periods when mortality rates remained constant or even increased. The DRA life tables for 1929 to 1931 and 1939 to 1941 show that life expectancy at age 10 increased from 44.8 years to 49.5, an increase of almost 5 years in 10 years (Greville 1947, 11, 38). Life tables for North Carolina, Tennessee, and Virginia for 1920 and 1940 show an increase in life expectancy at age 10 of only about 4 years in 20 years.

One of the unusual features of black mortality during this period is that female adult mortality exceeded that of males. For example, the DRA life tables for 1919 to 1920 for areas at least 5 percent black show that life expectancy at age 12 was 43.8 for black males and only 41.4 for black females (U.S. Bureau of the Census 1923, 24–27). Data for Tennessee for the years 1917 and 1919 to 1921 (to exclude the influenza epidemic of 1918) show that this excess was limited to rural areas (Sibley 1969, 138, 150). In the rural areas of

Tennessee, life expectancy at age 10 among black males exceeded that of females by 3.2 years (44.5 for males and 41.3 for females); in urban areas, however, the situation was reversed (33.4 for males and 34.8 for females). This excessive mortality among females was generally limited to the childbearing ages.

This pattern was probably a long-standing characteristic of mortality among blacks. For example, the age-specific sex ratios of deaths reported among blacks in the censuses of 1870, 1880, and 1900 all show an excess of female deaths between ages 10 and 44 (Suliman 1983, 21). A similar situation was still found in some areas in 1939 to 1940. In Mississippi, black females had higher mortality than males during the reproductive ages. Among females who survived to age 15, 283 per 1,000 died by age 50, while among males the proportion was only 271 per 1,000 (based on life tables created using the mortality rates given in U.S. Census Bureau 1943, 56). Data are available for urban and rural areas of Texas by sex and race in the period of 1939 to 1940 (Molyneaux 1945). They show that among black females in rural areas surviving to age 15, the proportion dying by age 50 was 232 per 1,000 compared to only 221 per 1,000 for males. The situation was reversed in urban areas of Texas, where the proportion dying between ages 15 and 50 was substantially higher for males.

This excessive female mortality is very unusual. It was clearly related to problems of childbearing and probably involved complicating factors such as tuberculosis and possibly malaria. For example, in urban areas of Tennessee in the years 1917 and 1919 to 1921, there were only small sex differences in the age-standardized death rate due to pulmonary tuberculosis for both races. In contrast, in rural areas the age-standardized rate for white females was substantially higher than the rate for males (141 compared to 91), and the same was true for blacks (310 for females and 251 for males) (Sibley 1969, 40).

Mortality Trends in Three States between 1900 and 1940

Data on mortality in the states that entered the death registration area relatively early provide an opportunity to examine in more detail the trends between 1910 and 1940. In particular, the data for individual states provide an opportunity to elucidate differences between the trends in different parts of the country. The data from North Carolina,

TABLE 2
Life Expectancy at Birth by Race, New York, North and South Carolina, 1920 and 1939–1940.

	1920		1939–40	
	White	Black	White	Black
New York	53.4	38.3	64.4	54.2
N. Carolina	56.7	46.6	64.4	54.4
S. Carolina	55.5	44.4	63.6	51.2

South Carolina, and New York illustrate the trends in northern and southern states among urban and rural blacks.

North Carolina entered the death registration area in 1916 and the birth registration area in 1917. South Carolina entered the death registration area in 1916 and the birth registration area in 1919; it dropped out of the birth registration area, however, between 1925 and 1927. Although North and South Carolina cannot be considered typical of all southern states, their mortality data provide some details about what was probably happening to the majority of blacks.

New York was included in the original death registration area in 1900. Its blacks were heavily concentrated in cities: 88 percent in urban areas, 75 percent in New York City alone. Although its black population is clearly not typical of all blacks, it provides a useful comparison for the Carolinas and helps to clarify the urban-rural differences in mortality trends over the period. It is also an example of the northern industrial areas to which blacks began to move in large numbers after World War I.

Table 2 presents the life expectancies at birth for blacks and whites in these three states in 1920 and 1939 to 1940. There were substantial declines in mortality for both races in all three states; the declines were larger in New York state, however, than in the Carolinas. In 1920 blacks in New York had a life expectancy that was about 7 years below the values in the Carolinas; by 1940 the life expectancy was very similar to the value in North Carolina and slightly higher than the value in South Carolina. A similar change occurred among whites. This change was due to the virtual elimination of the excessive mortality in urban areas.

A second conclusion that can be drawn from table 2 is that, despite substantial declines in mortality, the life expectancies among blacks in 1940 were very similar to the values for whites living in the same areas 20 years earlier. Although an examination of rates for smaller areas might show smaller differences between the races, it is clear that among blacks and whites living in the same states blacks were about 20 years behind whites in terms of their mortality risks.

An examination of the reported causes of death among blacks and whites in North Carolina and New York in 1916 to 1920 shows that blacks suffered higher mortality from virtually all causes, with relative risks for most causes being in the range of 1.3 to 1.5. The few causes for which whites showed higher rates (e.g., cancer and cerebral hemorrhage) were probably underreported for blacks, since the data on cause of death among blacks were probably even less accurate than the data for whites. One cause shows unusually high rates for blacks—tuberculosis. In New York blacks had an age-standardized mortality rate from respiratory tuberculosis that was about three times as large as the rate for whites. In North Carolina, the rate for blacks was about 40 percent higher than the rate for whites. Since respiratory tuberculosis was responsible for a large proportion of all deaths (about 11 percent of the overall age-standardized crude death rate in North Carolina), this difference in respiratory tuberculosis mortality is responsible for 20 percent of the racial difference in the age-standarized crude death rate in North Carolina and 39 percent of the difference in New York.

Death registration data are available for Maryland in 1910, so it is possible to examine the trends in cause of death over the decade 1910 to 1920. Because of changes in the quality of the data on causes, these comparisons must be made carefully. Despite this caution, two changes are quite clear. First, there was a substantial drop in mortality due to respiratory tuberculosis. Between 1910 and 1920, the age-standardized death rate from this cause dropped 39 percent for whites and 26 percent for blacks. These declines were responsible for 23 percent of the total decline in mortality among whites and 50 percent of the decline for blacks. The second important change was the drop in mortality due to typhoid fever. The decline in typhoid was responsible for about 22 percent of the total decline in mortality for both races. Although the use of data from Maryland may exaggerate the importance of these two causes in urban areas, tuberculosis and typhoid were

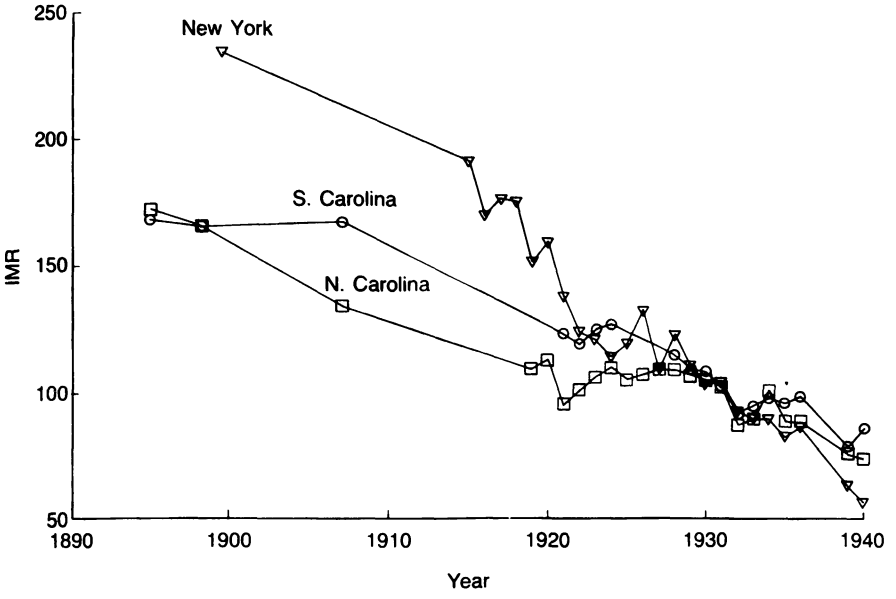

FIG. 1. Trends in infant mortality, 1895–1940 (blacks in North and South Carolina and New York)

significant overall causes of death and important to the declines of mortality during the first decades of the century.

Figure 1 shows the estimated trends in the infant mortality rate for North and South Carolina and New York for the period 1895 to 1940. The estimates for the period before 1910 are based on the child-survival data from the 1900 and 1910 censuses. The data after 1915 compare the registered infant deaths with the registered live births.

The data for blacks in New York show a rapid decline in infant mortality from a very high level in 1900 (about 235) to much more moderate levels in 1922. After 1922, the decline continues but at a slower pace. In North and South Carolina, infant mortality among blacks was about 165 in 1900, equal to the national average for blacks. In South Carolina the rate was probably constant or declining very slowly over the period of 1895 to 1910, while in North Carolina it was apparently declining. Between 1910 and 1920 the rate was

dropping in both North and South Carolina. By the late 1920s the infant mortality rates in all three states were virtually identical, ranging from 102 to 107. By 1940 the blacks in New York had an infant mortality rate of only 56, well below the rates of 74 and 86 in North and South Carolina. Although the data for the Carolinas were still not based on completely accurate vital registration, the differentials were large enough to suggest the direction of the differences among these states.

In summary, although there were substantial declines in infant mortality among blacks living in these three states between 1900 and 1940, the average rate of decline in New York State (3.6 percent per year) was more than twice as fast as in South Carolina (1.6 percent per year). (Nationally, the average rate of decline in q(5) between these two dates was 2.7 percent.) As a consequence, New York went from having an infant mortality rate that was about 40 percent higher than in the other two states to having a rate 35 percent below South Carolina and 25 percent below North Carolina. This decline is even more spectacular when we note that it is likely that the infant mortality rate among blacks in New York had already declined by roughly 20 percent between 1880 and 1900.

The decline in mortality among blacks in New York reflects the elimination of the urban disadvantage in mortality. Between 1920 and 1940 a similar phenomenon occurred in North and South Carolina. Over this period the infant mortality rate among blacks in the 6 cities with populations over 100,000 (Asheville, Charlotte, Wilmington, and Winston-Salem, North Carolina and Charlotte and Columbia, South Carolina) declined by approximately the same percentage as did the rate among blacks in urban New York. This was not sufficient, however, to eliminate the urban disadvantage within North and South Carolina. From 1920 to 1923 blacks living in these 6 cities had infant mortality rates that were about 90 percent above the rate for the rural areas of those states. (In North Carolina, blacks in the large cities had a rate of 172 compared to 92 in rural areas. In South Carolina, the rates were 226 and 116, respectively.) From 1939 to 1940, the rates in these large cities were still 35 to 45 percent above the rates in rural areas. (In North Carolina, the rate in large cities was 98 compared to 67 in rural areas. In South Carolina the rates were 105 and 77, respectively. The rates for rural areas were less accurate than those for urban areas, but the comparison is probably still valid.)

Therefore, although infant mortality rates among blacks in large cities of North and South Carolina declined faster than in rural areas, they failed to eliminate completely the urban disadvantage. This is in contrast to the comparison with New York State where the urban disadvantage was turned into a northern-urban advantage.

Factors Affecting Health and Mortality

The preceding discussion documented differences by race as well as differences between blacks living in the North and the South and between urban and rural blacks. It also documented trends in mortality, especially the decline in infant and child mortality between 1900 and 1940. These differentials and trends were the result of differences in socioeconomic status, health care, and possibly environment.

Research on the causes of the general decline of mortality in the United States focuses on several diseases and several different kinds of evidence. As is true of most historical research, the list of topics that have been investigated reflects the nature of the available data as much as the relative importance of the diseases involved. For example, we know little about the factors that were responsible for the decline of tuberculosis mortality even though this was a major factor in the decline of adult mortality. The reason for this is that tuberculosis is a chronic disease the prevalence of which is closely related to the general standard of living and the general health of the population. Because of the long-term nature of the disease and the nonspecific nature of the factors related to its prevalence, it is very difficult to document the precise changes that were responsible for the substantial reduction in mortality from tuberculosis long before a cure was discovered.

The discussion that follows reviews some of the factors related to racial and regional differentials in mortality. It begins the process of examining for blacks all of the factors that have been studied more extensively for the general population. The first topic considered is evidence of the relation between income and child mortality. Despite its importance, this is a topic that is just beginning to be investigated in detail. The second topic concerns differences in child rearing and child feeding practices. The third concerns the use of health services. Although we know little about the effectiveness of health care at the

turn of the century, by 1940 there were definite advantages to hospital deliveries and to treatment of many diseases by physicians. The fourth topic is the prevalence of typhoid fever. The mortality rate from typhoid is an important marker of the quality of water and sanitation. The decline of typhoid as a major cause of death was responsible for much of the decline in mortality in cities during this period. The study of the decline in typhoid is, therefore, a useful way to examine the effect of one of the major public health measures.

Economic Status and Child Mortality

It is clear that during all of the periods studied mortality rates were substantially higher for blacks than for whites. The question arises as to how much of this difference can be explained by differences in income, education, and other social and economic differences between the races. Although we cannot sort out the complex interactions among these factors, it is possible to document some differentials in infant and child mortality rates by social and economic characteristics.

In a study of differentials in infant and child mortality reported by women over the age of 65 at the time of the 1900 census, Daniel Scott Smith (1983) found that even after controlling for region and urban-rural residence, occupational status, and literacy, the single largest determinant of the proportion deceased was race. Since the children of these women were born on average about 40 years before the census date, these results apply to a period around 1860 to 1870. Black mothers reported a proportion of deceased children that was about 33 percent higher than the overall mean. Preston, Haines, and Pamuk (1981) report similar findings based on the reports of younger women in the 1900 census. After controlling for city size, husband's occupation, and a number of other indicators of economic status, they find that in the 1890s blacks still had a child mortality rate about 50 percent above whites (1981, 244–245). (The full list of control variables is as follows: city size, occupation of husband [13 categories including unknown and no husband present], husband's employment status, ownership of dwelling, wife's employment status, and migrant status.)

The occupation categories used in both studies of the 1900 census data are insufficient controls for the effect of income on child mortality. Birth registration data for 1928 on the survival of previous children show substantial differences by father's occupation within major cat-

egories. For example, I estimate that within the category of service workers, the proportion of children of servants deceased by age 5 was 158 per 1,000 (regardless of race) compared to about 120 among the children of guards, marshals, and policemen. Similarly, the children of farm laborers had a q(5) of 150 compared to 128 for farmers. Therefore, within the large occupation classifications used in the studies by Smith and by Preston, Haines, and Pamuk, there were differences of 20 to 30 percent among specific occupations. Since blacks in most industries were probably concentrated in the lower income categories, it is likely that the occupation categories used in these studies are not sufficient controls for income.

In a review of studies of infant mortality in eight cities carried out by the U.S. Children's Bureau between 1911 and 1915, Robert Woodbury (1926, 139) presented data on infant mortality rates by income of father, race, and nativity. (The cities were Johnstown, Pennsylvania; Manchester, New Hampshire; Saginaw, Michigan; Brockton and New Bedford, Massachusetts; New Waterbury, Connecticut; Akron, Ohio; and Baltimore, Maryland.) Most of the blacks in these studies lived in Baltimore. Woodbury's results lead to a different impression of the importance of economic differences between the races. The data show that in these cities there were very large differences in infant mortality by income among blacks: those with incomes under $550 had an infant mortality rate about 60 percent higher than those with an income of $650 to $849. Within income groups, blacks living in the eight cities had infant mortality rates about 10 percent higher than native whites and 5 percent higher than foreign-born whites. This excessive black infant mortality within the low-income group is apparently due to differences in the proportion of mothers who work away from home. An examination of infants of mothers not employed away from home classified by father's income shows that black infants had mortality rates slightly lower than whites (Woodbury 1926, 83). These findings suggest that a large part of the differences in infant mortality between blacks and whites in urban areas is accounted for by the relatively low incomes among blacks.

Child Rearing and Feeding Practices

Toward the end of the nineteenth century there was an increasing awareness of problems associated with infant feeding practices and contamination of milk supplies. During the first decades of this century

this was reflected in increasing regulation of milk supplies in cities and in the founding of the U.S. Children's Bureau. The bureau began its work with a series of studies of infant mortality in cities and of infant and child care in rural areas. In a series of studies in eight cities, they documented the devastating effect of mixed feeding (that is, a combination of breast milk and supplementary foods) and early weaning.

The Children's Bureau study in Baltimore in 1915 found large differences in infant mortality by type of feeding. For example, during the fourth month of life, children who were completely breast-fed had a mortality rate of 2.3 per 1,000. Those who received mixed feeding at this age had a mortality rate 2.3 times as high, and those who were completely weaned had a rate 7.2 times that of the fully breast-fed. The largest part of this difference was due to gastric and intestinal diseases (Rochester 1923, 70–72).

In the Children's Bureau study of child care practices in a rural area of northern Mississippi in 1918, Dart (1921, 42) commented that "the often-repeated criticism of the feeding customs of rural mothers that they feed their babies from the table at too early an age and delay weaning too long held true in the case of the mothers included in this study." Although she found that children were breast-fed for quite long (63 percent of the black and 41 percent of the white babies were fed for at least 18 months), most were given solid foods quite early. By the fourth month 60 percent of the black and 35 percent of the white babies were receiving solid foods. In a related study in a rural lowland area of North Carolina in 1916, Bradley and Williamson (1918) documented a similar pattern. Breast feeding was long, but 35 percent of the black and 18 percent of the white babies were given supplementary foods by the fourth month. The differences in feeding practices of whites and blacks were certainly responsible for some of the differences in infant mortality in rural areas during the period around 1915.

Despite the importance of feeding practices in Baltimore, racial differences in feeding practices do not explain the differences in infant mortality rates. In terms of the proportion weaned or on mixed feeding, the feeding practices of blacks were marginally better than those of the native whites. The large difference in infant mortality between native whites and blacks (96 as compared to 159) was largely due to differences in father's income, employment of mothers, and

shorter birth intervals (Rochester 1923, 81–85). It is possible, however, that some of the difference in mortality is due to the kinds of supplementary foods given to infants. For example, we do not know if the wealthier families were more apt to rely on pasteurized or certified milk.

Given the fact that there were no large differences in child feeding practices by race in Baltimore, it is difficult to explain the substantial differences in mortality under the age of 2 due to diarrhea and enteritis. In Baltimore in 1910 to 1920 the death rate from this cause was about 19 per 1,000 children under the age of 2 for whites and 28 for blacks. (These and all other rates for 1910 to 1920 are based on smoothed estimates for 1915 to adjust for year-to-year fluctuations [U.S. Bureau of the Census 1923].) Much of this is certainly due to large differences in the second year of life since the Children's Bureau documented little difference in gastric and intestinal deaths by race during the first year of life (Rochester 1923, 85).

Most of the cities in the death registration area had similar differences by race during this period and many had rapid declines in mortality due to childhood diarrhea between 1910 and 1920. Declines of about 60 to 70 percent over the decade occurred in such cities as Richmond, Virginia, New Orleans, and Atlanta for both whites and blacks. Slightly smaller declines (closer to 50 percent) were recorded in Philadelphia, New York, and Nashville. Some of these changes may have been due to improvements in milk supplies through pasteurization and related measures (Shaftel 1978). Another possible explanation is that childhood diarrhea rates were affected by the changes in sanitation and water that occurred in many cities during this period.

Sanitation and the Elimination of Typhoid Fever

In cities, the effect of improving sanitation and water supplies was often evident in rapid declines in mortality due to typhoid fever (Condran, Williams, and Cheney 1985; Sydenstricker 1933, 182–83). Figure 2 shows the decline in the age-standardized crude death rate from typhoid in five large cities between 1900 and 1920. All five experienced very rapid declines over the period. Most of the cities experienced a very sharp drop sometime during this period. For example, New Orleans experienced a sharp drop in 1908. These sharp changes were generally due to the start of new systems of water or sanitation.

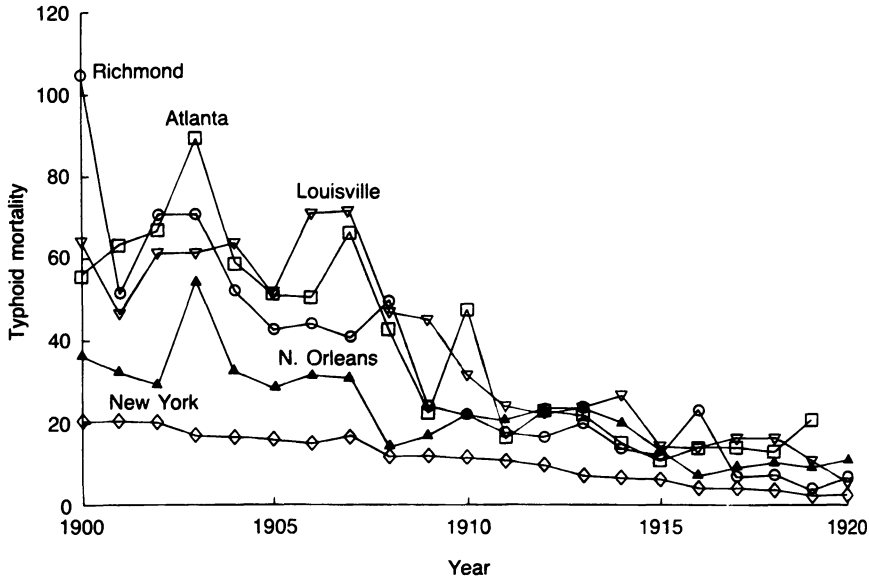

FIG. 2. Typhoid mortality in five cities, 1900–1920 (per 100,000 population)

In a few cities the sharp decline among blacks was delayed until several years after the decline for whites. For example, figure 3 records that in Washington the drop in the typhoid mortality rate came about six years later among blacks than among whites. A similar lag seems to have occurred in Richmond, Virginia, and there appears to have been a smaller lag in Birmingham, Alabama. These delays probably reflect delays in receiving basic sewer or water services.

An examination of data from cities in the death registration area in 1920 shows that southern cities were generally not as successful in controlling typhoid. In northern cities there is no variation in the typhoid rate by city size; the average rates are all in the range of 4 to 7 deaths per 100,000 total population. The southern cities with populations over 200,000 have an average rate very similar to the northern cities (7 per 100,000), but the smaller southern cities have rates about twice as large. Even higher rates were recorded in the DRA cities in Mississippi (34) and in the DRA cities of Louisiana outside New Orleans (27). Although the typhoid rates were probably declining in all cities, it is clear that the smaller southern cities lagged

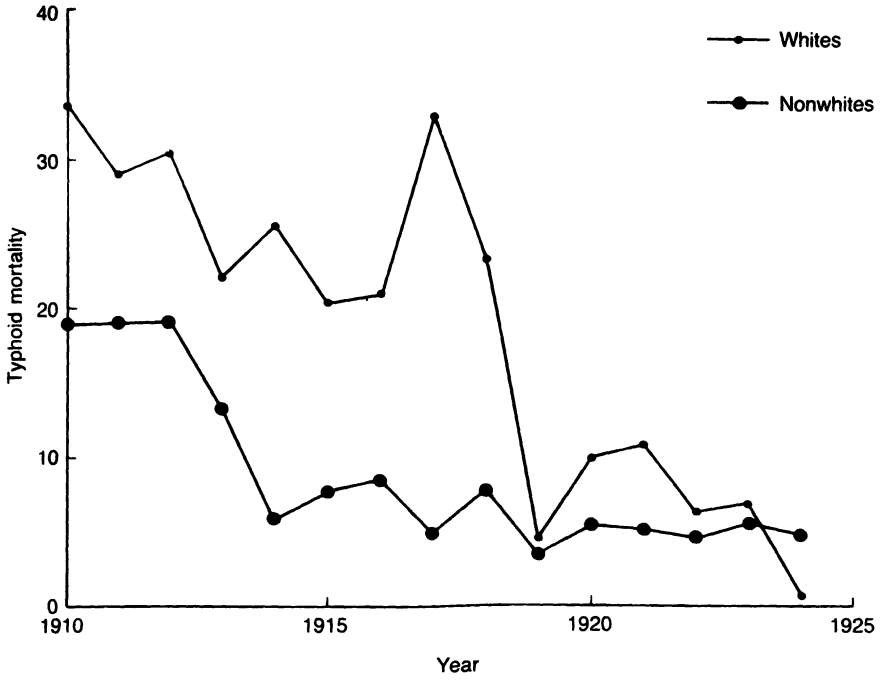

FIG. 3. Typhoid mortality in Washington, D.C., by race, 1910–1924 (per 100,000 population)

behind other urban areas in their control of water-borne diseases (Sydenstricker 1933, 65).

Although the decline in typhoid mortality explains only a small part of the overall mortality decline, changes in sanitation and water supply were probably responsible for declines in other causes of death. The Children's Bureau study in Baltimore provides evidence of the relation between infant mortality due to intestinal causes and the availability of sanitation facilities. Table 3 presents a summary of the data on infant mortality by race, father's income, and adequacy of sanitation facilities. The table excludes all children who died in the first two weeks of life for whom sanitation would not have affected survival. For the purpose of this analysis, adequate sanitation is defined as having a toilet connected to a sewer for the exclusive use of the household, and having a bathtub.

TABLE 3
Infant Mortality by Sanitary Facilities and Income, Baltimore, 1915

	Overall IMR		IMR to gastric and intestinal		Live births	
Sanitation:	Full*	Lacking	Full*	Lacking	Full*	Lacking
Father's income			WHITES			
All children	39	80	14	40	4089	5024
<$550	77	92	26	53	417	1619
$550–849	50	70	19	31	1257	2178
$850 and over	26	58	9	26	2287	1066
			BLACKS			
All children	93	114	18	35	397	826
<$550	101	115	26	38	227	581
$550 and over	61	110	8	16	132	182

* Full sanitation includes a toilet connected with a sewer, a toilet for the exclusive use of the baby's household, and a bathtub. Households lacking one or more of these items are considered incompleted facilities.

Of the babies that survived at least two weeks, the whites were far more apt to live in houses with adequate sanitation facilities (45 percent of the whites and 32 percent of the blacks). In each race-income group, infants in households with inadequate sanitation facilities suffered elevated risks of infant death. The table shows that most of these excessive deaths were caused by gastric and intestinal diseases. In the case of blacks in the lowest income group, children in households with adequate sanitation had an infant mortality rate after the first two weeks of life of 101 per 1,000 compared to 115 for infants in other households. More than 80 percent of this excessive mortality is attributable to gastric and intestinal causes. Although this analysis does not control for differences in feeding and other child care practices, it strongly suggests that proper sanitation facilities did reduce infant mortality rates in urban areas.

Data from several southern cities in the death registration area suggest that declines in childhood diarrhea mortality rates may have been related to declines in typhoid during this period. Virginia provides one example of this. Diarrhea mortality among black children under the age of two dropped substantially in Richmond and Norfolk right after the drop in typhoid mortality, completely eliminating the urban

excess mortality ascribed to childhood diarrhea. There are two likely explanations for this association between typhoid and diarrhea mortality rates. The first is that some of the diarrhea deaths under the age of two were actually due to typhoid. A second alternative is that improvements in water and sanitation might have reduced the risks or the severity of other types of childhood diarrhea.

Use of Health Services

During the first decades of this century a number of other medical and public health measures were becoming important and whites were in a better position to take advantage of these changes than blacks. For example, in the Children's Bureau study in rural Mississippi, 79 percent of the white women were delivered by a physician but the proportion among blacks was only 8 percent. Similarly, one-third of white women received some prenatal care, while the proportion among black women was only 12 percent (Dart 1921; 24, 27). A similar difference was found in the study in the lowland area of North Carolina (Bradley and Williamson 1918, 30). Most of the prenatal care documented in these studies was considered inadequate at the time, however, as improvements in medical care reached rural areas, the women treated by doctors were in a better position to benefit from these innovations.

Two factors probably affected the relative proportions of black and white women in rural areas delivered by physicians and receiving prenatal care. The first is the cost of physician-assisted deliveries. Dart mentions this as an important element in the decision to rely on a midwife rather than a physician. She noted that "the percentage of mothers, both white and colored, who were attended by a physician at confinement was much higher among those families living on farms of their own than among farm tenants, and was lowest among the half-share tenants" (Dart 1921, 27–28; see also Bradley and Williamson 1918, 30). The second possible factor was social custom. Given the shortage of black doctors and nurses and the prevailing racial attitudes, black women did not have equal access to physician care. They may also have felt more comfortable with black midwives.

These racial differences in prenatal care and delivery were not found in Baltimore where the percentage delivered by a doctor was virtually the same for native whites as for blacks (72 percent and 74 percent).

The proportions receiving prenatal care were 58 percent for native whites and 57 percent for blacks. The difference between the two rural areas and Baltimore is the presence in the city of several clinics that began providing prenatal care and infant welfare work in the period of 1914 to 1916. Most native whites received prenatal care from a private physician (53 percent) whereas only 19 percent of blacks did so. On the other hand, 38 percent of blacks but only 5.6 percent of whites went to clinics for prenatal care. Although the Baltimore study did not provide data on infant mortality by place of delivery or use of prenatal care, it is clear that the provision of welfare clinics had not yet had a substantial impact on racial differences in infant mortality.

Between 1915 and 1940 there were substantial changes in delivery practices. One reflection of these changes was the increase in the proportion of births that occurred in hospitals. In 1940, 52 percent of all babies were born in hospitals; the proportion among white births, however, 56 percent, was more than twice the proportion among black births, 22 percent. There were substantial regional variations. In the mid-Atlantic states, the proportions delivered in hospitals were quite high for both whites and blacks (74 percent and 73 percent, respectively). In the south Atlantic states, however, only 36 percent of the white and 12 percent of the black births were in hospital. The proportion of black births that occurred in hospital was lower partly because blacks were more apt to live in rural areas (55 percent of black births as compared with only 35 percent of white births) and in regions that had low proportions delivered in hospital (38 percent of black births were in the south Atlantic region as opposed to only 13 percent of white births) (U.S. Public Health Service 1954, 116–17). In most areas, however, blacks were much less likely to be delivered in a hospital than whites.

Racial differences in health care utilization were not limited to prenatal care and deliveries. The National Health Survey of 1935-1936 showed that blacks in rural counties of Georgia were far less apt to receive essential medical services when they were sick. For example, among those with an illness that disabled them for one week or more, 54 percent of the whites but only 39 percent of the blacks were treated by a physician. Similarly, 5.8 percent of the whites but only 1.0 percent of the blacks received hospitalization (Mott and Roemer 1948, 305). Mott and Roemer (1948, 306) point

out that blacks had greater health care needs and conclude that "it cannot be stressed too much that the inequitable share of available rural health services received by Negroes is an expression of their greater poverty rather than their smaller need or desire for these services."

Summary and Conclusions

This article documents the history of black mortality between 1850 and 1940 and begins the process of placing that history into the context of the more general history of mortality decline in the United States. One aspect of this process has been to discuss the trends in mortality among blacks and whites living in the same general geographic areas—for example, comparing southern rural blacks with southern rural whites. A second part has been to relate black mortality to many of the factors that have been discussed as determinants of general mortality trends—such as water and sanitation, the urban disadvantage in mortality, and child care and feeding practices.

During the second half of the nineteenth century, black mortality declined only slightly or not at all. Between 1850 and 1880 there may have been some decline in child mortality, but the trends in adult mortality are indeterminate. Between 1880 and 1900 both child and adult mortality rates were constant. Sometime between 1900 and 1910 mortality rates among blacks began to decline at all ages, especially in urban areas. During the first four decades of this century mortality rates among American blacks declined substantially. Expectation of life at birth increased from about 35 years to about 54 years, which represents a significant improvement in health and living standards. The life expectancy among blacks in 1940, however, was still two years below the value for whites in the death registration area in 1920. (This may exaggerate the difference slightly since the mortality rates for 1919 and 1920 were artificially low following the pandemic of influenza in 1918. In addition, the mortality rates in the DRA may not have been representative of the whole white population.)

Throughout the period studied, blacks had substantially higher mortality rates than whites living in the same area. Although the amount of excessive mortality among blacks differed from place to place and period to period, we did not find a single area or time

when black mortality rates were close to those of whites. The examination of causes of death among whites and blacks in 1920 showed that racial differences in the amount of tuberculosis explained a substantial part of the mortality differences in New York and North Carolina, but blacks probably had excessive mortality due to all causes.

Between 1920 and 1940 the mortality reductions among blacks living in northern states not only eliminated the excessive mortality of northern urban blacks, but reversed the differential. By 1940 the life expectancy of blacks in New York State was three years above the value in South Carolina. In the South, the excessive mortality rates among blacks living in cities was greatly reduced during the same period, but in the South rural blacks maintained an advantage over urban blacks. During the first decades of the century, mortality declines in cities were partly due to improvements in water and sanitation and possibly to improvements in the quality of milk supplies, both of which reduced deaths due to typhoid fever and general diarrhea. There were other factors affecting urban and rural mortality rates during this period, but like the changes that caused the reduction in tuberculosis mortality, they are even more difficult to document.

It is not possible at this point to explain all of the reasons for higher mortality rates among blacks. We have evidence that income differentials were responsible for some of the differences in infant and child mortality. We have some evidence that income levels were related to access to medical care (prenatal care and delivery by physicians), to adequate sanitation facilities, and to adequate housing. When dealing with racial differences in mortality in the United States, however, it is not sufficient to stop with income and education as ultimate determinants. Although it is difficult to document statistically the pathways through which racial discrimination affected mortality differentials, it is clear that discrimination limited the access blacks had to better incomes, better health care, better housing, and better education. It is also clear that these amenities are necessary to the achievement of modern levels of health and mortality.

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