# PATTERNS IN NEGRO-WHITE DIFFERENTIAL MORTALITY, 1930–1957

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THIS is a study of patterns in Negro-white differential mortality in the years 1930 through 1957. Two questions are posed: (1) What are the extent and characteristics of the generally downward trends in Negro male and female mortality relative to that for white males and females? (2) To what extent has there been color convergence—a lessening of the differentials—in the age-adjusted age-specific, and specific-cause mortality experience of the two color populations? The mortality experience of the Industrial policyholders of the Metropolitan Life Insurance Company will be used to supplement the official data.

The quarter century 1930–1957, especially the years since the beginning of World War II, have been years of radical change for the American Negro, unmatched in demographic, sociological, and economic import since Reconstruction. But unlike the post-Civil War years, the years since 1940 have witnessed improvement in the life changes and socio-economic status of Negroes. Consider the lessening of the statistical gaps between Negro and white in income, education, labor force distribution, and other measures of socio-economic well-being.[2]

As a result a closing of the statistical gap would be expected in the general mortality experience of the two color populations. And so it is. But as soon as we go beyond age-adjusted mortality trends into age-specific trends and trends for the specific causes of death (to say nothing of age-specific specific-cause trends), we no longer have the simple convergence characteristic of overall mortality experience.

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[2] *See* Ginzberg, Eli: THE NEGRO POTENTIAL. New York, Columbia University Press, 1956, *passim. See also* recent numbers of United States Bureau of the Census, *Current Population Reports,* Series P-20 and P-60.

## Mortality from All Causes

Crude rates are poor comparative measures for determining the extent of Negro mortality decline in relation to white decline. This is because the Negro population has always been younger than the white population with smaller proportions in the upper age categories where mortality is high.[3] Even though the Negro population has larger proportions in the younger age categories where mortality is also high, the white age structure "disadvantage" remains: crude death rates tend to understate Negro mortality relative to white. For example, the 1957 nonwhite crude death rate of 1,044 per 100,000 population is only 11 per cent higher than the white crude death rate of 949. By contrast, the Negro age-adjusted rate of 1,133 for the same year is a full 50 per cent higher than the corresponding white rate of 754.[4]

Table 1 shows United States age-adjusted rates for the four sex-color populations for the years 1900 through 1957 standardized to the age distribution of the total United States population as enumerated in 1940. These are graphically presented in Figure 1. It is necessary to stress that nonwhite rates for years prior to about 1920 are very disproportionately rates for northern urban Negroes and must not be regarded as representative of the mortality experience of American Negroes. Only about 5 per cent of all nonwhites were included in the death-registration area of 1900, and only 12 per cent in 1910.[5] By 1920, however, 34 States were included containing 66 per cent of the total nonwhite population.[6]

From Figure 1 note that for each of the sex-color categories there is a substantial decrease in age-adjusted death rates. This decline has been both relatively and absolutely greater for non-

[3] For example, in 1920 4.8 per cent of the white population and 3.2 per cent of the nonwhite population was over 65. For 1930 the percentages are 5.7 and 3.2; for 1940 7.1 and 4.8; and 1950 8.1 and 5.7. Estimates for mid-year 1958 are 9.1 and 5.3.

[4] United States National Office of Vital Statistics: *Vital Statistics—Special Reports,* November 30, 1959, 50, No. 20, pp. cxix, cxxi.

[5] Gover, M.: A Survey of Negro Mortality. *Journal of Negro Education,* Summer, 1949, 18, p. 215.

[6] *Ibid.*

whites than for whites and for females than for males. Note also that there is a long-term lessening of the color differentials —both relative and absolute—for males and females after 1930. A year-by-year analysis of the decline in mortality indicates that only after 1931 do nonwhite male and female rates begin dropping at a generally more rapid rate than the corresponding white rates. This shrinking of the color differential, however, is proceeding far more rapidly among the male than among the female populations.

From Table 1 note something which is not so obvious: after 1925 the ratio of nonwhite to white death rates tends to decrease in the first half of intercensal decades and to increase in the second half of such decades. This is characteristic of both males and females. For males the nonwhite/white ratio increases from 1.63 to 1.65 between 1925 and 1930, decreases from 1.65 to 1.50 between 1930 and 1935, increases from 1.50 to 1.53 between 1935 and 1940, then decreases from 1.53 to 1.35 between 1940 and 1945, and so on. Precisely the same

Table 1. Age-adjusted death rates,[a] by sex and color: Death-Registration States, 1900–1957, per 100,000 population.

| Year | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | White | Nonwhite | Nonwhite / White | White | Nonwhite | Nonwhite / White |
| 1900 | 1,843.7 | 2,866.9[b] | 1.55 | 1,675.7 | 2,714.4[b] | 1.62 |
| 1910 | 1,671.3 | 2,483.1[b] | 1.49 | 1,437.2 | 2,324.3[b] | 1.62 |
| 1920 | 1,420.6 | 2,042.4 | 1.44 | 1,313.9 | 2,098.4 | 1.60 |
| 1925 | 1,313.6 | 2,143.2 | 1.63 | 1,141.0 | 2,036.3 | 1.78 |
| 1930 | 1,275.9 | 2,099.9 | 1.65 | 1,057.9 | 1,920.7 | 1.82 |
| 1935 | 1,228.2 | 1,846.6 | 1.50 | 980.0 | 1,605.1 | 1.64 |
| 1940 | 1,155.1 | 1,764.4 | 1.53 | 879.0 | 1,540.7 | 1.71 |
| 1945 | 1,070.4 | 1,446.2 | 1.35 | 752.2 | 1,193.1 | 1.59 |
| 1950 | 963.1 | 1,358.5 | 1.41 | 645.0 | 1,095.7 | 1.70 |
| 1955 | 916.3 | 1,230.1 | 1.34 | 579.7 | 945.9 | 1.63 |
| 1957 | 939.4 | 1,297.3 | 1.38 | 584.7 | 981.1 | 1.68 |

[a] Computed by the direct method using as the standard population the age distribution of the 1940 enumerated population of the United States.

[b] Rates are not representative of total nonwhite population.

Sources: United States National Office of Vital Statistics: *Vital Statistics—Special Reports*, Jan. 9, 1956, 43, No. 1, p. 9; May 6, 1957, 46, No. 5, p. 113; and Nov. 30, 1959, 50, No. 20, p. cxix.

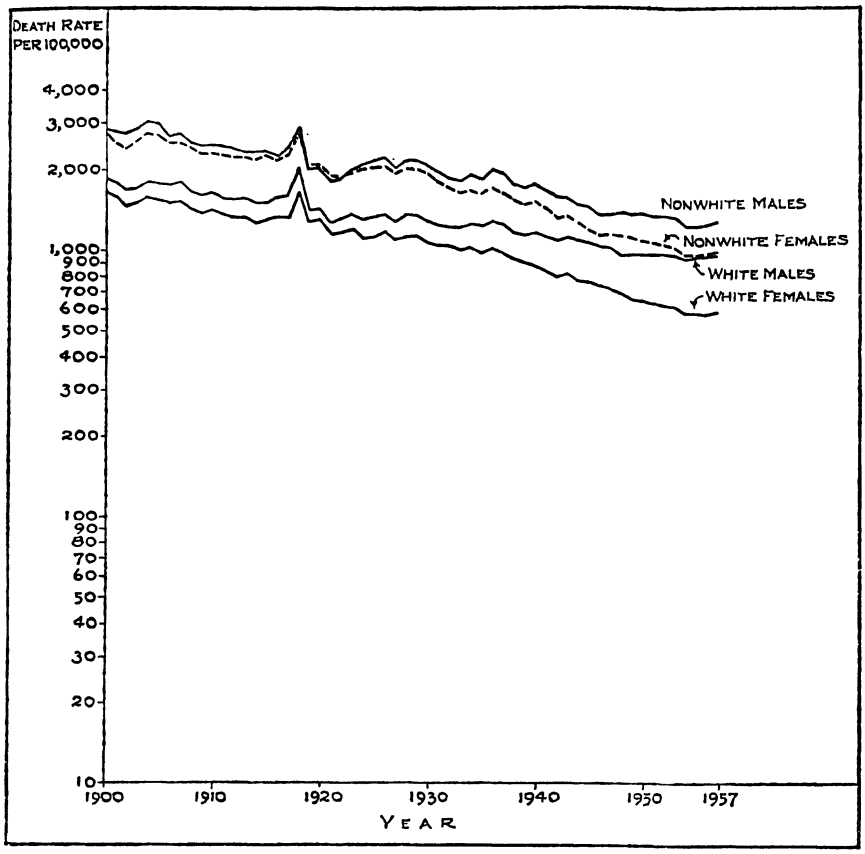


Fig. 1. Age-adjusted death rates, by sex and color, per 100,000 population: Death-Registration States, 1900–1957.

phenomenon is present among females. Unlike the earlier periods, the years 1955–1957 saw an increase in mortality for all populations, but in accordancce with this curious pattern the increase was greater for nonwhite males and females vis-à-vis white males and females, i.e., the less favorable change is for nonwhites compared with whites in the latter halves of intercensal decades. There is no exception to this pattern after 1925 for either males or females.

The extent of this alternating pattern is shown more sharply in Table 2 which gives the absolute and percentage changes in death rates for the four sex-color populations for five-year intervals from 1925 to 1955 and for the period 1955 to 1957.

| Years | Male | | | | Female | | | |
|---|---|---|---|---|---|---|---|---|
| | Absolute Change | | Percentage Change | | Absolute Change | | Percentage Change | |
| | White | Nonwhite | White | Nonwhite | White | Nonwhite | White | Nonwhite |
| 1925–30 | −37.7 | −43.3 | −2.9 | −2.0 | −83.1 | −115.6 | −7.3 | −5.7 |
| 1930–35 | −47.7 | −253.3 | −3.7 | −12.1 | −77.9 | −315.6 | −7.4 | −16.4 |
| 1935–40 | −73.1 | −82.2 | −6.0 | −4.5 | −101.0 | −100.4 | −10.3 | −6.3 |
| 1940–45 | −84.7 | −318.2 | −7.3 | −18.0 | −126.8 | −311.6 | −14.4 | −20.7 |
| 1945–50 | −107.3 | −87.7 | −10.0 | −6.1 | −107.2 | −97.4 | −14.3 | −8.2 |
| 1950–55 | −46.8 | −128.4 | −4.9 | −9.5 | −65.3 | −149.8 | −10.1 | −13.7 |
| 1955–57 | 23.1 | 67.2 | 2.5 | 5.5 | 5.0 | 35.2 | 0.9 | 3.7 |

Source: Table 1.

Table 2. Absolute and percentage changes in United States age-adjusted death rates, by sex and color, 1925–1957.

Note that the pattern of death rate decline fluctuates less for the white population than for the nonwhite population in both sexes. In the two full intercensal decades 1930–1940 and 1940–1950 the declines in the first half of each decade are about three times as great as in the second half of each decade for both nonwhite males and females. No comparable fluctuations exist for white males and females.

Unless we assume conditions in the first half of these intercensal decades to be particularly favorable for nonwhite mortality decline and conditions in the second half of such decades to be particularly favorable for white mortality decline, the presence of some kind of systematic error would be suspected. The source of this error might be in the numerator (number of deaths) or the denominator (population) used in calculating death rates; or, it might be in both. As I have indicated in another paper, the most plausible explanation of this phenomenon appears to be in the intercensal estimates of the nonwhite population made by the Bureau of the Census.[7] These estimates are used by the National Office of Vital Statistics for the computation of death rates and other statistics such as birth rates.

The belief that this alternating pattern is a statistical artifact is further strengthened by considering the data accumulated

[7] This paper will be published in a forthcoming issue of the *Journal of the American Statistical Association.*

for the Industrial policyholders of the Metropolitan Life Insurance Company. But before presenting these data, I would like to evaluate this Metropolitan series as a supplementary source for the study of Negro-white differential mortality.

## A Supplementary Source of Mortality Data: The Industrial Policyholders of the Metropolitan Life Insurance Company[8]

Rates for these insured lives by age, sex, and race are available from 1911. These represent a valuable and relatively untapped source for the investigation of the mortality of a large segment of the United States population.

Even though we cannot regard these insured lives as being representative of either the total Negro or white populations, the Metropolitan data suffer less from at least four of the shortcomings which plague the official data, particularly for nonwhites: (1) We can assume virtual completeness in the registration of deaths. Certainly it is a rare beneficiary who fails to notify the life insurance company of the death of an insured person. (2) There is no problem of underenumeration because the population for whom death rates are computed is the Industrial policyholders. (3) The problem of inaccuracies in the reporting of age is of slight importance since some documentary support of age is required. (4) The problem of ill-defined causes of death is less serious than in official sources.[9]

While the reliability, validity, and completeness of the data

[8] The discussion of the Metropolitan data is based largely on the following sources: Dublin, L. I. and Lotka, A. J.: Twenty-Five Years of Health Progress. 1911 to 1935. New York, Metropolitan Life Insurance Company, 1937; Dublin, L. I.: Health Progress, 1936 to 1945. New York, Metropolitan Life Insurance Company, 1948; Dublin, L. I. and Spiegelman, M.: Health Progress among Industrial Policyholders, 1946 to 1950. *Transactions of the Society of Actuaries,* September, 1951, 3, No. 7, pp. 294–328; and Lew, E. A. and Spiegelman, M.: The Mortality Experience of Industrial Policyholders, 1950 to 1955. *Transactions of the Society of Actuaries,* May, 1957, 9, No. 24, pp. 148–187. Several points here were contributed in communication with Mr. M. Spiegelman, Associate Statistician of the Company.

[9] In 1947 Dublin wrote: "No effort has been spared to obtain as complete and as accurate information as possible on causes of death through supplementary inquiries to physicians, hospitals, and coroners, and through information available from death claim forms in addition to that recorded on the official death certificate. Altogether, this statistical series, with respect to completeness, comparability and accuracy is

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from which these Metropolitan death rates are calculated are superior to the official data, there are other special problems. Who are these Industrial policyholders, and how representative—or, rather, unrepresentative—are these insured lives, of the total Negro and white populations?

First, who are the Industrial policyholders? They are, for the most part, urban wage workers and their families. Not all are Americans, over 8 per cent are Canadians of whom very few are Negroes. There is a large concentration in the industrialized northeastern section of the United States, particularly among the Negroes. Relatively few of the male Industrial policyholders are farmers or professionals. On the other hand, those engaged in urban blue-collar occupations are overrepresented. The Metropolitan Industrial population includes a large proportion of the millions of Americans and Canadians who pay weekly and monthly premiums on relatively small life insurance policies. The number of Industrial policyholders increased from about 8,000,000 in 1911 to a maximum of about 19,000,000 in the immediate post-war years and then declined to around 18,000,000 in the middle 1950's. From 1911 through 1957 these insured persons comprised between 8 and 12 per cent of the combined population of the continental United States and Canada. The proportion of Negroes has generally varied between 11 and 13 per cent. A relatively small number of nonwhites, other than Negroes, are classified as white in this series.

Our second question is how representative of the total white and Negro populations are the Industrial policyholders? That there is a degree of underwriting selection on the part of these insured lives cannot be denied, but it is slight and much less rigid than the selection standards for ordinary insurance which has a very strong selection and would be quite inappropriate for analysis.[10]

without counterpart in the annals of American vital statistics." *See* Dublin, L. I.: Mortality Experience of the Metropolitan Life Insurance Company, 1911–1946. PROCEEDINGS OF THE INTERNATIONAL STATISTICAL CONFERENCES, Vol. III, Part B. Washington, D. C., September 6–18, 1947.

[10] Concerning selection of Industrial and Ordinary policyholders, Lew and Spiegel-

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In the 1930's Metropolitan mortality was higher for white males and females than the United States mortality, for nonwhite males mortality was very similar in both populations, and for nonwhite females Metropolitan mortality was lower. By the 1950's Metropolitan mortality was still somewhat higher for white males in the United States series, and about the same as the United States series for white females, and appreciably lower for nonwhite males and females.

Certain discontinuities are contained in the industrial series resulting from inclusions of several different categories of small policyholders in the industrial group in 1945, 1955, and 1956.[11] I assume that these discontinuities are not great because there are no sizable changes in death rates for any of the four sex-color populations after these new categories were added.

One advantage of this mortality series is that it provides a kind of partial standardization of the elusive Negro-white economic and occupational differentials. These are difficult factors to equate when we are concerned with determining what for lack of a better name we might term the *inherent* differentials. These are the residual differences that exist when the basic demographic variables have been controlled. These are differentials that remain to be explained in terms of social, psychological, and cultural factors and in terms of differential biology.

Table 3 gives age-adjusted death rates for the Industrial policyholders at ages 1 through 74 for 1911 to 1957 for the four sex-color populations. These are graphically presented in Figure 2. The standard population adopted by the Metropolitan

man have written: "Since the standards of selection for Industrial insurance are considerably less stringent than those for Ordinary insurance, their effect upon mortality is not long-lasting, with the result that the aggregate experience of Industrial policyholders differs little from the ultimate experience." *Op. cit.*, p. 152.

[11] Monthly premium-paying policyholders were included in 1946 resulting in a slight lowering of the total Industrial mortality experience. In 1949, 80 per cent of the Industrial policyholders were weekly premium-payers and the balance were monthly premium-payers. Beginning with 1955, ordinary monthly premium-paying policyholders whose policies were less than $1,000 were included, and beginning with 1956 this experience also includes a classification known as Debit Book Ordinary policies for $2,000 and less. The effects of these two inclusions appear to be negligible. By the end of 1958, weekly premium-payers included only 55 per cent of the total exposure used in computing the death rates for Industrial policyholders.

was the "Standard Million" based on the actual age distribution of the total population of England and Wales as enumerated in 1901. The very young are excluded because of the small number of insured lives under age 1; the old because Industrial policyholders are put on a paid-up basis at age 75.

The same basic trends are evident here as in the United States data: there has been a substantial decrease in death rates for each of the four sex-color populations with Negro rates declining more rapidly than white rates and female rates declining more rapidly than male rates. Note the appreciably greater convergence that has occurred between white and Negro males compared with white and Negro females after 1930. A year-by-year analysis of the Metropolitan series indicates that it is only after 1931 that Negro male and female age-adjusted rates begin dropping faster than white male and female rates. This is the same year after which this occurs in the official data.

There are two differences, however, between these two series

Table 3. Age-adjusted death rates, for ages 1–74,[a] by sex and color: Industrial policyholders of the Metropolitan Life Insurance Company, 1911–1957, per 100,000 policyholders.

| Year | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | White | Nonwhite | Nonwhite / White | White | Nonwhite | Nonwhite / White |
| 1911 | 1,498.5 | 1,897.7 | 1.27 | 1,131.9 | 1,814.0 | 1.60 |
| 1920 | 1,060.2 | 1,490.9 | 1.41 | 940.6 | 1,531.5 | 1.63 |
| 1925 | 971.0 | 1,437.2 | 1.48 | 767.3 | 1,344.9 | 1.75 |
| 1930 | 925.4 | 1,474.1 | 1.59 | 697.3 | 1,304.6 | 1.87 |
| 1935 | 838.6 | 1,273.9 | 1.52 | 617.7 | 1,090.9 | 1.77 |
| 1940 | 725.9 | 1,036.7 | 1.43 | 507.6 | 905.1 | 1.78 |
| 1945 | 684.8 | 849.3 | 1.24 | 418.9 | 723.3 | 1.73 |
| 1950 | 569.1 | 695.8 | 1.22 | 334.0 | 572.5 | 1.71 |
| 1955 | 545.0 | 603.4 | 1.11 | 286.7 | 451.2 | 1.57 |
| 1957 | 545.4 | 641.7 | 1.18 | 278.0 | 472.2 | 1.70 |

[a] Standard population used is the Standard Million.

Sources: Rates for 1911 through 1930 are from Dublin, L. I., and Lotka, A. J.: Twenty-Five Years of Health Progress, 1911–1935. New York, Metropolitan Life Insurance Co., 1937, pp. 541–544. Rates for 1940 and 1945 from Dublin, L. I.: Health Progress, 1936 to 1945. New York, Metropolitan Life Insurance Co., 1948, pp. 128–129. Rates for 1950 and 1955 from Lew, E. A., and Spiegelman, M.: The Mortality Experience of Industrial Policyholders. *Transactions of the Society of Actuaries*, May, 1957, 19, No. 24, p. 151. White rates for 1957 adjusted from rates given in the Metropolitan Life Insurance Co., *Statistical Bulletin*, January, 1958, 39, p. 2. Nonwhite rates for 1957 supplied by the Metropolitan.

of data: (1) There is not even a hint of the alternating pattern of decline in the Metropolitan series characteristic of the United States series. This is clearly indicated by Table 4 which gives absolute and percentage changes similar to Table 2 for the United States series. (2) Metropolitan male color differentials are of increasingly lesser magnitude than the United States differentials from around 1940 on. For females, on the other hand, United States color differentials appear to be erratically larger than the Metropolitan differentials until around 1950, after which they appear to be slightly smaller.

The meaning of the first disparity between these two series is clear: the alternating pattern in the official data appears to be a statistical artifact. A thorough explanation of this curious pattern, however, awaits further study. The meaning of the latter disparity, the changes in the relative magnitude of the color differentials between these two series, also awaits further investigation. Its explanation, however, involves three factors difficult of measure: (1) the differential increase in the completeness of registration of white and Negro deaths in the United States series; (2) changes in the formal categories of the industrial population together with more subtle changes in the demographic characteristics of these policyholders themselves on which no data are available; and (3) different downward trends

Table 4. Absolute and percentage changes in age-adjusted death rates, for ages 1–74, by sex and color: Industrial policyholders of the Metropolitan Life Insurance Company, 1925–1957.

| Years | Male | | | | Female | | | |
|---|---|---|---|---|---|---|---|---|
| | Absolute Change | | Percentage Change | | Absolute Change | | Percentage Change | |
| | White | Nonwhite | White | Nonwhite | White | Nonwhite | White | Nonwhite |
| 1925–30 | −45.6 | 36.9 | −4.7 | 2.6 | −70.0 | −40.3 | −9.1 | −3.0 |
| 1930–35 | −86.8 | −200.2 | −9.4 | −13.6 | −79.6 | −213.7 | −11.4 | −16.4 |
| 1935–40 | −112.7 | −237.2 | −13.4 | −18.6 | −110.1 | −185.8 | −17.8 | −17.0 |
| 1940–45 | −41.1 | −187.4 | −5.7 | −18.1 | −88.7 | −181.8 | −17.5 | −20.1 |
| 1945–50 | −115.7 | −153.5 | −16.9 | −18.1 | −84.9 | −150.8 | −20.3 | −20.8 |
| 1950–55 | −24.1 | −92.4 | −4.2 | −13.3 | −47.3 | −121.3 | −14.2 | −21.2 |
| 1955–57 | 0.4 | 38.3 | 0.1 | 6.3 | −8.7 | 21.0 | −3.0 | 4.7 |

Source: Table 3.

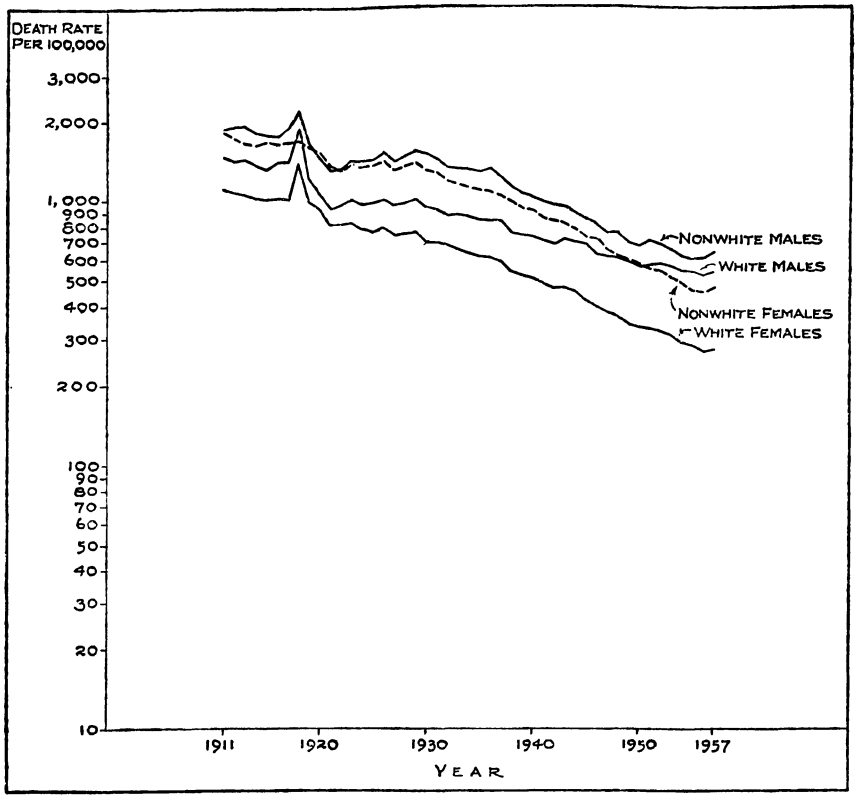


Fig. 2. Age-adjusted death rates for ages 1–74, by sex and color, per 100,000 policyholders: Industrial Policyholders of the Metropolitan Life Insurance Company, 1911–1957.

among the four United States sex-color populations, on the one hand, and the urban industrial segments of these sex-color populations, on the other.

## Age-Specific Mortality

Figures 2–6 show the trend of mortality by age for the four color-sex populations for both the United States and Metropolitan series. For all populations in both series of data, rates are lower in 1957 than in 1930. In addition, there has been near universal convergence in the magnitude of the color differentials in both series. In general, the rate of mortality decline has varied inversely with age in each of the four populations in both series.

Table 5 shows percentage changes in white-nonwhite relative differentials for age-specific death rates for both series for the intercensal decade prior to World War II, 1930 and 1940, and for the eleven-year post-war period, 1946 and 1957. These percentage changes were calculated by dividing the ratio expressing the white-nonwhite differential for one year by such a ratio for the preceding specified year, i.e., for 1940 and 1930, and 1957 and 1946. The ratios used to express the white-nonwhite differential were calculated by dividing the larger rate by the smaller rate. (The larger rate is generally the nonwhite rate except at the upper ages in the United States series where the larger rate is generally the white rate.) Dividing the larger by the smaller rate rather than the nonwhite by the white rate was done so that a minus sign always represents convergence and a plus sign divergence. There has not been the overall convergence of the relative color differentials that there has been for

Table 5. Percentage changes[a] of white–nonwhite relative differentials for age–specific death rates for United States and Metropolitan Life Insurance Company series, by sex, 1930 and 1940, 1946 and 1957.

| Age | 1930–1940 | | | | 1946–1957 | | | |
|---|---|---|---|---|---|---|---|---|
| | Male | | Female | | Male | | Female | |
| | U.S. | Met. | U.S. | Met. | U.S. | Met. | U.S. | Met. |
| Under 1 | +5 | No Data | +1 | No Data | +29 | No Data | +31 | No Data |
| 1–4 | +4 | −12[b] | +1 | −25[b] | +13 | +15[b] | +17 | −2[b] |
| 5–14 | −1 | −23[b] | −3 | −27[b] | +7 | −10[b] | −3 | −39[b] |
| 15–24 | −3 | −10 | +12 | +19 | −24 | −39 | −31 | −33 |
| 25–34 | +2 | −10 | +11 | 0 | 0 | +3 | −5 | −1 |
| 35–44 | 0 | −10 | +8 | −6 | 0 | −7 | +2 | −1 |
| 45–54 | 0 | −9 | +4 | +4 | −11 | −8 | +1 | +2 |
| 55–64 | −7 | −2 | −5 | +4 | +14 | −17 | +24 | −3 |
| 65–74 | −5 | −2 | −3 | +2 | +29 | −12 | +42 | −4 |
| 75–84 | +11 | No Data | +6 | No Data | −9 | No Data | −12 | No Data |
| 85+ | +21 | No Data | +23 | No Data | +31 | No Data | +18 | No Data |

[a] These percentage changes were calculated by dividing the ratio expressing the white-nonwhite differential for one year by such a ratio for the preceding specified year. i.e., for 1940 and 1930, and 1957 and 1946. The ratios used to express the white-nonwhite differential were calculated by dividing the larger rate by the smaller rate. (The larger rate is generally the nonwhite rate except at the upper ages in the United States series where the larger rate is generally the white rate.) Dividing the larger by the smaller rate rather than the nonwhite by the white rate was done so that a minus sign always represents convergence and a plus sign divergence.

[b] Rates have low reliability because of year-to-year fluctuations resulting from relatively small frequencies.

Sources: *See* Tables 1 and 3.

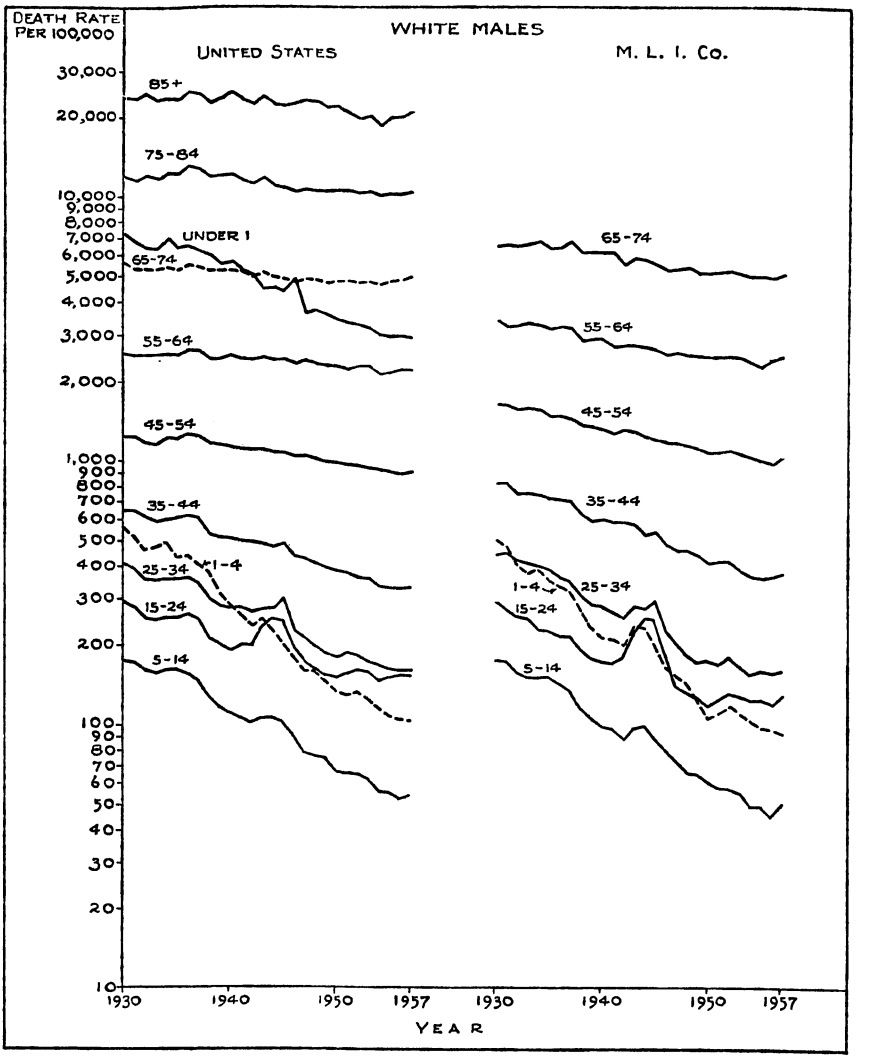


Fig. 3. Age-specific death rates for white males, United States and the Metropolitan Life Insurance Company series, 1930–1957.

the absolute color differentials. Note the following trends:

*Males, 1930–1940.* The United States series shows negligible relative convergence of rates at ages 5–24 and more substantial convergence at ages 55–74. At all other ages there has been divergence or no trend at all. Note that the only sizable divergence is at ages over 75 where nonwhite rates are consistently lower than white rates. The Metropolitan data show across-

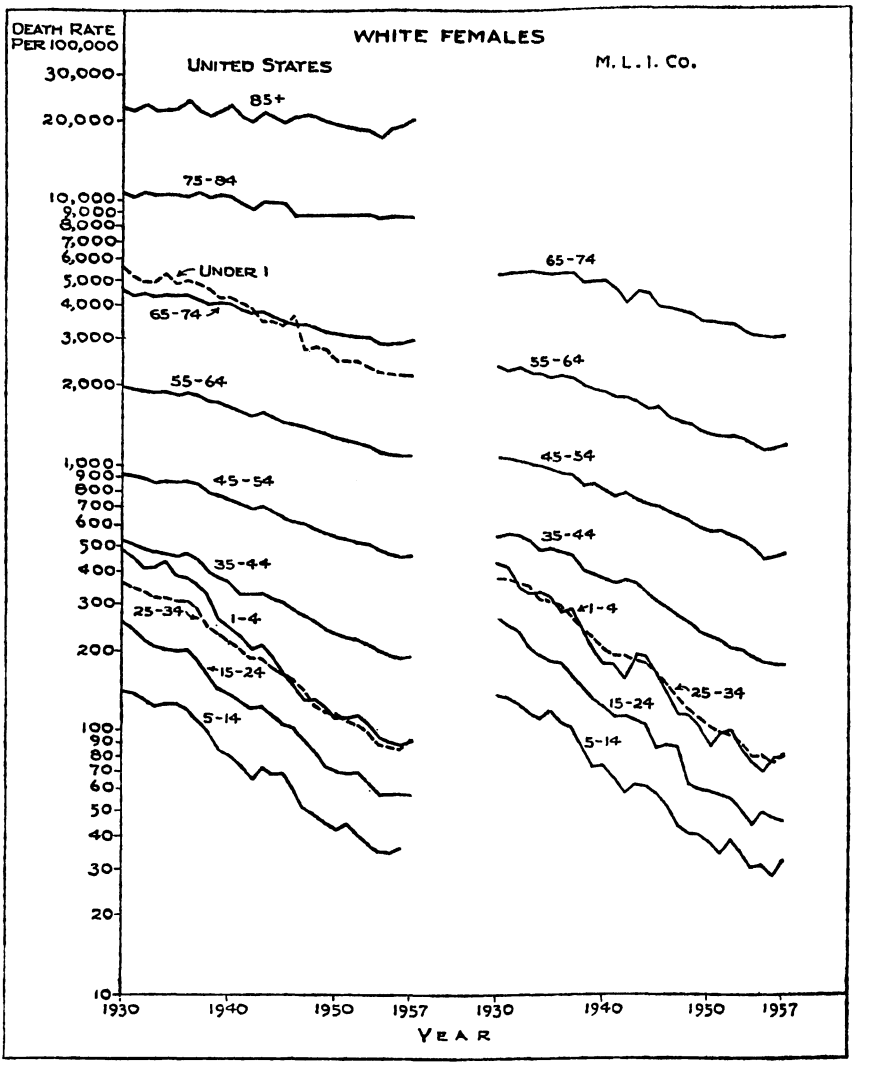


Fig. 4. Age-specific death rates for white females, United States and the Metropolitan Life Insurance Company series, 1930–1957.

the-board color convergence at all ages from 1 through 74, with substantial convergence at ages through 45–54.

*Females, 1930–1940.* There is even less relative convergence with United States females than with United States males in this period. At ages 5–14 and at ages 55–74 there is slight convergence. There is divergence at all other ages, and it is sub-

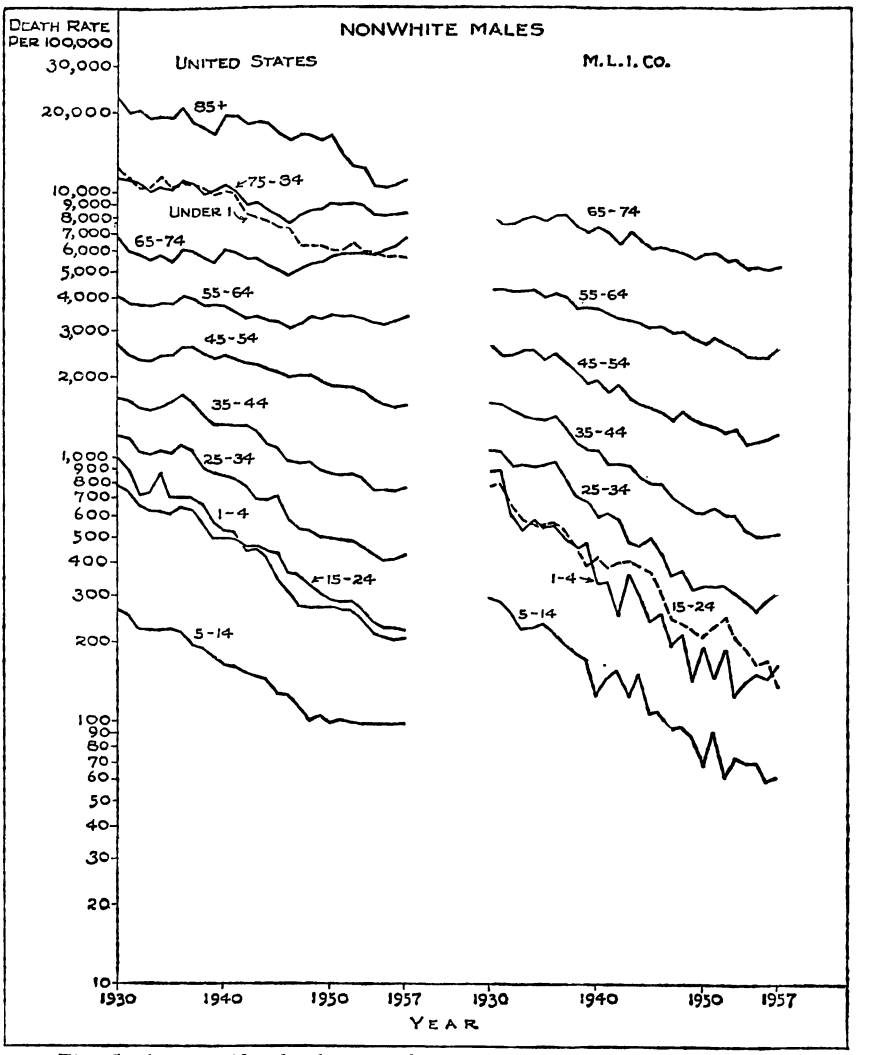


Fig. 5. Age-specific death rates for nonwhite males, United States and Metropolitan Life Insurance Company series, 1930–1957.

stantial at ages 15–44. The same divergence of higher white rates and lower nonwhite rates at ages over 75 occurs among the United States females as with the United States males. The Metropolitan series for females, unlike that for Metropolitan males, does not show extensive color convergence. Only at ages 1–14 and 35–44 is there convergence.

*Males, 1946–1957.* United States males show convergence

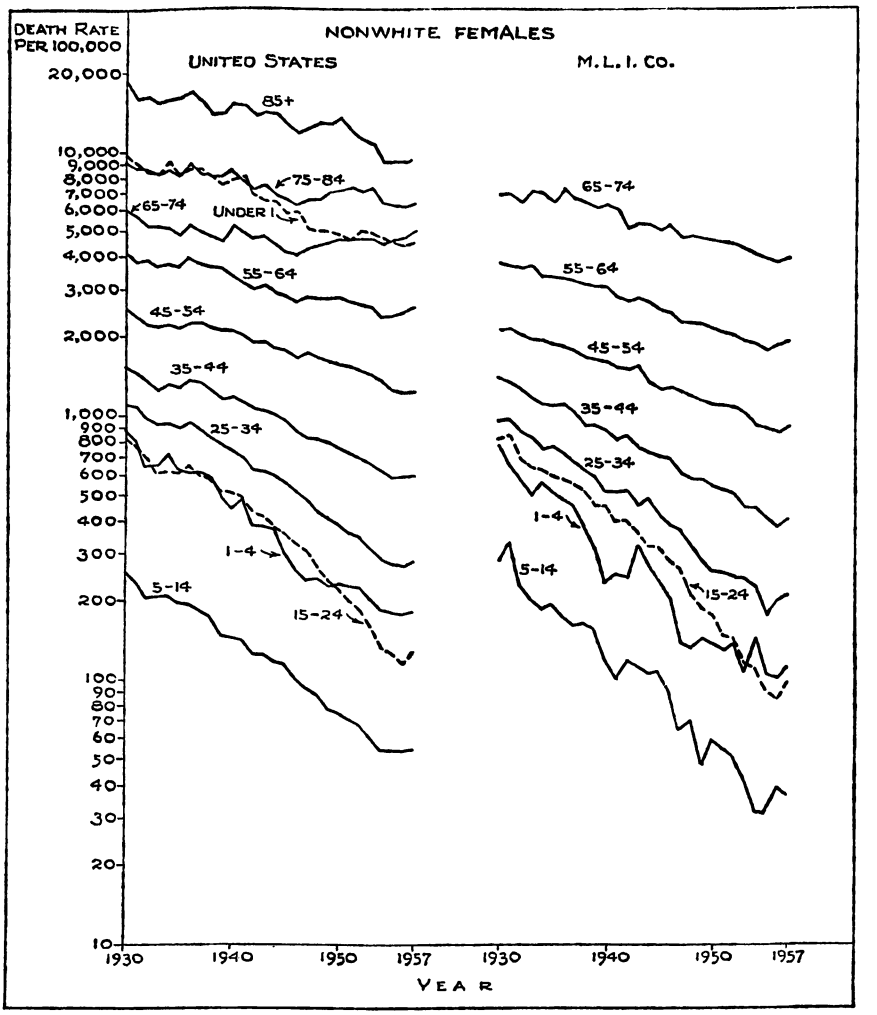


Fig. 6. Age-specific death rates for nonwhite females, United States and Metropolitan Life Insurance Company series, 1930–1957.

only at ages 15–24, 45–54, and 75–84. This latter represents a convergence of lower nonwhite rates with higher white rates. Unlike the United States series, the Metropolitan data show extensive and substantial convergence. Only at ages 1–4 and 25–34 is there divergence, and at ages 1–4 this series is unreliable.

*Females, 1946–1957.* There is convergence at ages 5–34 and 75–84 for United States females. For the Metropolitan females

there is almost across-the-board convergence; the exception is the negligible divergence at ages 45–54.

The United States series probably understates the extent and degree of age-specific color convergence. This is because there probably has been greater relative improvement in the completeness of registration of Negro over white deaths in recent decades. This contention is supported by the generally more extensive and substantial color convergence of the Metropolitan series which is not affected by changing Negro-white differentials in the completeness of death reporting.

The United States series for nonwhites at ages 75–84 and 85 and over are extraordinarily bad. The burden of proof for accepting white male and female rates that are about 30 per cent higher than for their nonwhite counterparts at ages 75–84 and more than 100 per cent higher at ages 85 and over in 1957 rests not with the challenger of such rates but with anyone who would attempt to defend them as having any resemblance to the mortality experience of the populations they purport to measure. The category 85 and over becomes even more suspect when it is seen that there has been an *increase* in the relative mortality advantage of both sexes of nonwhites between 1930 and 1940 and between 1946 and 1957. Part of the explanation of these low Negro death rates at the upper ages is probably a high frequency of overstatements of age by Negroes in census enumerations, not compensated for by overstatements of age on death certificates.

The curious alternating pattern which characterizes United States white-nonwhite age-adjusted death rate declines after 1925 is strongly reflected in the United States age-specific declines after 1930. During the two full intercensal decades 1930 to 1950, for males at ages 15–24 through 85 and over, 26 out of 32 of the percentage decline color comparisons are in accord with the alternating pattern of greater nonwhite percentage declines in the first half of intercensal decades, and greater white declines in the second half of such decades. For females 29 of 32 comparisons are in accord with the pattern. For the

Metropolitan series at ages 15–24 through 65–74, 15 of 24 comparisons are in accord with the pattern for males and 18 of 24 for females.[12] This is higher agreement than was expected, but not enough to make me doubt that the pattern is a statistical artifact in the United States nonwhite data.

## Infant Death Rates

Not until 1927, with the admission of Alabama, Arkansas, Louisiana, Missouri, and Tennessee, were enough of the Southern states included in the Birth-Registration Area for the nonwhite rates to approach representativeness of the total United States Negro population. The Birth-Registration Area came into being in 1915 and became coterminous with the continental United States in 1933. Table 6 gives the white and nonwhite infant death rates for 1915 through 1957.

While there has been a regular lessening of the size of the absolute color differentials, there has been a divergence in the magnitude of the relative color differential since the mid-40's, increasing from 1.60 in 1945 to 1.88 in 1957.

Table 6. Infant death rates, by color: Birth-Registration States, 1915–1957, per 1,000 live births.

| Year | White | Nonwhite | Nonwhite / White |
|---|---|---|---|
| 1915 | 98.6 | 181.2[a] | 1.84 |
| 1920 | 82.1 | 131.7[a] | 1.60 |
| 1925 | 68.3 | 110.8[a] | 1.62 |
| 1927 | 60.6 | 100.1 | 1.65 |
| 1930 | 60.1 | 99.9 | 1.66 |
| 1935 | 51.9 | 83.2 | 1.60 |
| 1940 | 43.2 | 73.8 | 1.71 |
| 1945 | 35.6 | 57.0 | 1.60 |
| 1950 | 26.8 | 44.5 | 1.66 |
| 1955 | 23.6 | 42.8 | 1.81 |
| 1957 | 23.3 | 43.7 | 1.88 |

[a] Rates not representative of total nonwhite population.
Sources: United States National Office of Vital Statistics: *Vital Statistics—Special Reports*, July 27, 1956, 45, No. 1, p. 7; and Nov. 30, 1959, 50, No. 20, p. cxxxiv.

[12] Age-specific categories with ages under 10 were not included in these computations because the denominators upon which these rates were computed were obtained wholly or partly from registration data.

Note the presence of an alternating pattern here between 1930 and 1950. Between 1930 and 1935, the relative differential declines from 1.66 to 1.60, between 1935 and 1940 there is an increase from 1.60 to 1.71, between 1940 and 1945 a decrease from 1.71 to 1.60, then between 1945 and 1950 an increase from 1.60 to 1.66. I believe this is accidental and not related to the alternating pattern characteristic of the United States age-adjusted and age-specific rates. This is because birth registration figures are used in computing infant death rates, not population estimates. And it is some systematic bias in the intercensal estimates of the nonwhite population which appears to form the only plausible explanation of this pattern. Unfortunately, there are no comparable Metropolitan data to verify this interpretation.

## Maternal Death Rates

No aspect of mortality decline has been more rapid than the mortality from maternity and its complications in recent decades, particularly in the period 1940 to 1957. In 1940 the white maternal mortality rate was around ten times that of 1957;

Table 7. Maternal death rates, by color: Birth-Registration States, 1915–1957, per 10,000 live births.

| Year | White | Nonwhite | Nonwhite / White |
|---|---|---|---|
| 1915 | 60.1 | 105.6[a] | 1.76 |
| 1920 | 76.0 | 128.1[a] | 1.69 |
| 1925 | 60.3 | 116.2[a] | 1.93 |
| 1927 | 59.4 | 113.3 | 1.91 |
| 1930 | 60.9 | 117.4 | 1.93 |
| 1935 | 53.1 | 94.6 | 1.78 |
| 1940 | 32.0 | 77.3 | 2.42 |
| 1945 | 17.2 | 45.5 | 2.65 |
| 1950[b] | 6.1 | 22.2 | 3.64 |
| 1955 | 3.3 | 13.0 | 3.94 |
| 1957 | 2.8 | 11.8 | 4.21 |

[a] Rates not representative of total nonwhite population.
[b] Some discontinuity is introduced resulting from change from Fifth to Sixth Revision of the International List in 1949. Rates for 1949 and after would be some 9 per cent higher if classified according to principles of the Fifth Revision.
Sources: United States National Office of Vital Statistics: *Vital Statistics—Special Reports*, September 23, 1957, 46, No. 17, pp. 439–440; and November 30, 1959, 50, No. 20, p. cxxxviii.

for nonwhite mothers it was almost seven times greater than in 1957. Table 7 shows maternal mortality rates for 1915 through 1957. These rates are based on the number of maternal deaths per 10,000 live births (multiple births being counted as one birth) and are for the same birth-registration states as the infant death rates.

There has been a sharp convergence in the magnitude of the *absolute* color differentials since about 1930, but there has been a sharp divergence in the magnitude of the *relative* differentials from the mid-30's.

## Specified-Cause Mortality

As there are some tenacious differences in the specific-cause death rates of men and women, so there are between American whites and Negroes. A substantial share of the excess mortality of Negroes is and has been the result of greater mortality from tuberculosis, influenza and pneumonia, diseases of the circulatory system (particularly nephritis and hypertension), and homicide, but most causes of death are characterized by persistent color differentials. For the large majority of causes these differentials are to the disadvantage of the Negro, but for a few the opposite is the case.

Let us look at the United States data to see where there is convergence and divergence among the leading causes of death.[13] A "leading cause of death" is arbitrarily defined as any category or meaningful combination of categories of death which accounted for at least one per cent of all deaths in any one of the four United States sex-color populations in 1957.[14] Table 8 lists these causes with age-adjusted rates for 1949 and 1957 with percentage changes in the magnitude of the relative differentials.

Comparing 1957 rates with rates for a year as recent as 1949 was done because of the radical nature of the discontinuities

[13] Metropolitan specific-cause rates are not given here because they are available only for the years 1950 through 1955 at present. In addition, frequencies are quite small for many causes making single year comparisons unreliable.

[14] The category "Certain diseases of early infancy" was excluded because it contains such a mixture of infectious, organic, and external causes of death.

Table 8. Specific-cause age-adjusted[a] death rates for the leading causes of death with percentage changes in relative differentials:[b] United States, 1949 and 1957.

| Diseases | Male | | | | | Female | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1949 | | 1957 | | Per Cent Dif'l Change | 1949 | | 1957 | | Per Cent Dif'l Change |
| | White | Nonwhite | White | Nonwhite | | White | Nonwhite | White | Nonwhite | |
| *Infectious Diseases* | | | | | | | | | | |
| Tuberculosis, All Forms | 26.7 | 95.4 | 9.0 | 28.8 | −10 | 12.5 | 62.2 | 2.9 | 13.1 | −9 |
| Influenza and Pneumonia | 26.5 | 60.4 | 31.0 | 67.5 | −4 | 18.0 | 46.5 | 19.7 | 48.2 | −5 |
| *Organic Diseases* | | | | | | | | | | |
| Malignant Neoplasms, Including Neoplasms of Lymphatic and Hematopoietic Tissues | 130.1 | 117.7 | 142.4 | 158.4 | 0 | 120.6 | 126.7 | 113.7 | 130.8 | +10 |
| Diabetes Mellitus | 11.7 | 11.0 | 11.1 | 13.3 | +13 | 17.6 | 23.0 | 14.5 | 24.9 | +31 |
| Major Cardiovascular-Renal Diseases | 508.3 | 615.0 | 506.0 | 621.9 | +2 | 338.9 | 568.8 | 311.3 | 530.9 | +2 |
| Vascular Lesions Affecting Central Nervous System | 85.0 | 137.4 | 86.1 | 148.6 | +7 | 78.5 | 152.9 | 74.8 | 150.6 | +3 |
| Diseases of Heart | 376.5 | 395.9 | 382.0 | 407.2 | +2 | 222.7 | 339.6 | 209.4 | 323.3 | +1 |
| Chronic Rheumatic Heart Disease | 13.1 | 15.6 | 10.7 | 10.1 | −11 | 12.2 | 13.8 | 10.5 | 10.0 | −7 |
| Arteriosclerotic Heart Disease, Including Coronary Disease | 248.2 | 150.4 | 301.9 | 225.1 | −19 | 114.6 | 105.5 | 140.8 | 149.8 | −3 |
| Nonrheumatic Chronic Endocarditis and Other Myocardial Degeneration | 56.5 | 80.8 | 29.4 | 48.3 | +15 | 43.5 | 69.3 | 22.9 | 40.3 | +11 |
| Other Diseases of Heart | 16.5 | 35.3 | 12.2 | 28.8 | +10 | 9.0 | 27.7 | 6.6 | 20.2 | −1 |
| Hypertension With Heart Disease | 42.2 | 113.8 | 27.7 | 94.8 | +27 | 43.4 | 123.4 | 28.6 | 103.0 | +27 |
| Hypertension Without Mention of Heart | 6.6 | 16.5 | 4.8 | 15.9 | +32 | 5.9 | 16.9 | 3.9 | 14.2 | +27 |
| General Arteriosclerosis | 18.6 | 18.5* | 15.0 | 15.7 | +4 | 14.8* | 14.4* | 12.3* | 13.6* | +8 |
| Chronic and Unspecified Nephritis and Other Renal Sclerosis | 15.2 | 38.1 | 7.8 | 20.8 | +6 | 12.2 | 36.4 | 5.5 | 19.1 | +16 |
| Cirrhosis of Liver | 11.8 | 8.6 | 14.6 | 13.9 | −23 | 5.8 | 5.0* | 6.6 | 8.5 | +11 |
| *External Causes* | | | | | | | | | | |
| Motor-Vehicle Accidents | 33.2 | 37.2 | 36.9 | 43.7 | +5 | 9.7 | 9.3 | 11.2 | 12.6 | +8 |
| Accidents, Except Motor-Vehicle | 47.7 | 65.6 | 39.5 | 63.7 | +17 | 21.5 | 25.8 | 16.0 | 26.5 | +38 |
| Suicide | 18.2 | 7.8 | 16.1 | 8.3 | +17 | 5.2 | 1.7* | 4.5 | 1.6 | −8 |
| Homicide | 4.1 | 48.9 | 3.5 | 43.3 | +4 | 1.4 | 11.7* | 1.4 | 10.3 | −12 |
| All Causes | 971.7 | 1,346.6 | 939.4 | 1,297.3 | 0 | 659.3 | 1,105.3 | 584.7 | 981.1 | 0 |

* Based on age-specific rates where more than half of the rates were based on frequencies less than 20.

[a] Computed by the direct method using as the standard population the age distribution of the total 1940 enumerated population of the United States.

[b] *See* Note a, Table 5.

Sources: Rates for 1949 from United States National Office of Vital Statistics: *Vital Statistics—Special Reports*, 1956, 43, *passim:* and from unpublished rates adjusted by NOVS. Rates for 1957 from NOVS: *Vital Statistics—Special Reports*, 1959, 50, p. cxix; and from unpublished rates adjusted by NOVS.

introduced by the Sixth Revision of the INTERNATIONAL LIST which took effect in 1949.[15] For many, perhaps most, causes of death there is a loss of comparability with specific-cause mortality differentials for earlier years because of a differential impact on the varying age, sex, color, and geographic categories. This is particularly true of diabetes, heart disease, hypertension, and nephritis. Most of the acute infectious diseases (none of which is dealt with here) and the larger segment of the external causes of death (motor-vehicle accidents, suicide, and homicide), however, were virtually unaffected by this Revision.

By 1957 nonwhite age-adjusted death rates remain higher than white rates for the great majority of the leading causes of death. Of the 20 categories listed in Table 8 white males have higher age-adjusted rates than nonwhite males only from arteriosclerotic heart disease, cirrhosis of the liver, and suicide. White females have greater rates than nonwhite females only for suicide. Differences are trivial in both sexes for chronic rheumatic heart disease and among males for general arteriosclerosis. Age-specific rates for these causes with similar age-adjusted rates manifest nonwhite excesses in the middle years and white excesses in the upper years.

From Table 8 note that there is color convergence among males between 1949 and 1957 for only five causes: tuberculosis, influenza and pneumonia, chronic rheumatic heart disease, arteriosclerotic heart disease, and cirrhosis of the liver. Malignant neoplasms shows no differential change over this eight-year period. The other 14 causes show varying amounts of color divergence, ranging from the slight divergence of the major

[15] For discussions of the effects of the changes introduced by the Sixth Revision see the following: Fales, W. T. and Moriyama, I. M.: International Adoption of Principles of Morbidity and Mortality Classification, *American Journal of Public Health,* January, 1949, 39, No. 1, pp. 31–36; Erhardt, C. L. and Weiner, L.: Changes in Statistics through Use of New International Statistical Classification, *American Journal of Public Health,* January, 1950, 40, No. 1, pp. 6–16; United States National Office of Vital Statistics: The Effect of the Sixth Revision of the International Lists of Diseases and Causes of Death Upon Comparability of Mortality Trends, *Vital Statistics—Special Reports,* 1951, 36, No. 9, pp. 153–168; Valois, A. B.: Changes Due to the Sixth Revision of International Statistical Classification of Diseases, Injuries and Causes of Death, *Canadian Journal of Public Health,* 43, October, 1952, pp. 434–441; and Lew and Spiegelman, *op. cit.*

cardiovascular-renal diseases to substantial divergence of hypertension—both with heart disease and without heart disease.

Among females, seven of the twenty categories show varying degrees of color convergence ranging from the certainly negligible convergence of other diseases of heart to the more substantial convergence of homicide and tuberculosis. Of the fourteen causes showing varying degrees of divergence, diabetes, hypertension with and without heart disease, and accidents, except motor-vehicle have shown major degrees of divergence.

Comparing relative change in specific cause differentials between 1949 and 1957 is particularly appropriate because of the similarity of the relative color differentials for both sexes in these two years. The color differential for both males and females is precisely the same for 1949 and 1957, i.e., the percentage differential change is less than half of one per cent. Table 8, then, can be viewed as showing the extent of changes in specific-cause differential mortality while overall mortality is constant.

How valid these death rates are as measures of Negro-white differential mortality is often difficult to assess, particularly for the organic conditions which involve many more problems of diagnoses than the infectious or external causes. The most difficult trends to interpret are probably for malignant neoplasms and the specific heart diseases.

Mortality trends for no leading specific cause of death misrepresent the reality more than those for malignant neoplasms. Nonwhite male rates are the lowest of the four sex-color populations in 1949, but the highest in 1957. Also, rates for white males and nonwhite males and females are higher in 1957 than in 1949, but rates for white females are lower. These are undoubtedly partly spurious changes. The principal reason for these changes is probably the greater relative improvement in diagnosis of cancer in males over females and in nonwhites over whites that has been occurring in recent years. The great increase in male cancer rates is largely the result of improved diagnosis of cancer in the more internal and less accessible regions, particularly of the digestive and respiratory systems,

where the greater share of male cancer and the smaller share of female cancer is located. The increase in nonwhite rates is undoubtedly partly the result of greater relative improvement of diagnoses.

Again, there are difficulties in determining the true differential mortality trends from the specific heart diseases because of the increasing practice of classifying heart disease under the arteriosclerotic rubric. This has resulted in a marked increase in arteriosclerotic heart disease death rates in all of the sex-color populations between 1949 and 1957, but a decrease for the other four heart disease categories in each of the four populations. In any case, one fundamental, unassailable fact regarding Negro-white differential mortality from the specific heart diseases remains: the occurrence of hypertension (with or without heart disease) is several times greater among Negro males and females than among white males and females and the magnitude of the relative differentials has increased sharply in recent years. A further generalization might be timidly ventured to the effect that the excess white male mortality from arteriosclerotic heart disease may be shown in the future to be largely a result of Negro-white differential diagnoses. This is because of the known relationship between a high level of medical care, i.e., treatment by heart specialists, and classification of heart deaths as arteriosclerotic heart disease.[16] Note the substantial convergence that has occurred here in the nine-year period 1949–1957.

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I hope four points have been made: (1) the presence and effects of a curious alternating pattern in the official United States age-adjusted and age-specific time series, (2) the usefulness of the Metropolitan series as an adjunct to the interpretation of the official United States series, (3) the complex of convergent and divergent age-specific and specific cause trends

[16] Lew, E. A.: Some Implications of Mortality Statistics Relating to Coronary Disease. *Journal of Chronic Diseases,* September, 1957, 6, No. 3, pp. 192–209.

that lay behind the simple convergence of Negro-white age-adjusted rates, and (4) the need to consider problems of differential diagnoses in interpreting Negro-white differential mortality from the organic conditions.