

PRELIMINARY OBSERVATIONS ON RECENT MORTALITY TREND

Iwao M. Moriyama, Ph.D.

AFTER a period of rapidly declining mortality, the crude death rate for the United States appears to have leveled off, starting about 1954. In the 50-year period 1900-1949 the crude death rate decreased by more than 40 percent. The rate of decline has not been uniform; between 1900 and 1917 the rate of change was almost three times greater than in the period 1921-37. Starting in 1938 there was an acceleration in the decline of mortality; from 1938 to 1950 the crude death rate dropped almost twice as fast as during the preceding period. Since 1954 the movement of the crude death rate has not been appreciably downward, and there is even a hint of a slight upturn (fig. 1).

Age-adjusted death rates which take into account the changing age composition of the population do not eliminate the divergence of the crude death rate from its previous trend line. If anything, the change in trend is accentuated by the age-adjusted rates because the rate of decline prior to the leveling off of mortality is somewhat greater for the age-adjusted rates as compared with that for the crude death rates.

Both the crude death rate and the age-adjusted death rate are composite measures weighted heavily by the population in the older age groups. Age-specific death rates are not subject to the same kind of weighting. However, examination of death rates by age shows the same phenomenon, but not in all age groups.

In an earlier report (1) it was observed that there was a marked deceleration in the rate of decline in infant mortality, beginning about 1950. The same kind of change in trend ap-

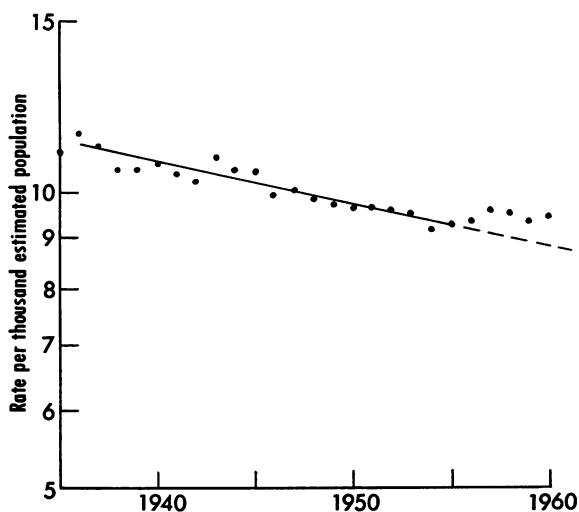
pears to be taking place in the death rates for other ages. For the white population, a change in death rates is clearly observable for each age group up to 45 years for females, and up to 15 and possibly 35 years for males. In the older age groups up to 75 years, the change is less marked, but there is a tendency for the death rates to level off or to increase slightly. For nonwhites, the mortality trends for males and females definitely tend to flatten out in each age group up to 55 years. After this point, there does not appear to be a break in trend. Changes in trend in the death rates for the older ages may be obscured because the rate of decline prior to the recent change has been relatively small.

The change in mortality trend is not limited to the United States (fig. 2). It has occurred in the Scandinavian countries (Norway, Sweden, and Denmark), Finland, and the Netherlands, where the level of mortality is low. It has also occurred in other European countries such as England and Wales, Czechoslovakia, and probably East and West Germany. On the other hand, there seems to be no obvious change in trend in France, Belgium, Austria, Switzerland, and Italy. In other areas of low mortality, the change in trend is evident in data for Japan and New Zealand, but not for Australia. The crude death rates for Canada are not clearly changing, but there seems to be a hint of a slight break. However, the age-adjusted death rates for Canada show a definite change in trend. In Latin America, the crude death rates for Chile, Argentina, Venezuela, and possibly Uruguay are definitely leveling off.

The death rates by age for England and Wales show, as do the mortality rates for nonwhites in the United States, that the trend for every age group up to age 45 years is affected.

Dr. Moriyama is chief, Office of Health Statistics Analysis, National Center for Health Statistics, Public Health Service.

Figure 1. Death rates per 1,000 estimated population, United States, 1935-60



There also appears to be some change in the trend for the group aged 65-74 years, but the character of the change is somewhat different from the other ages in terms of time.

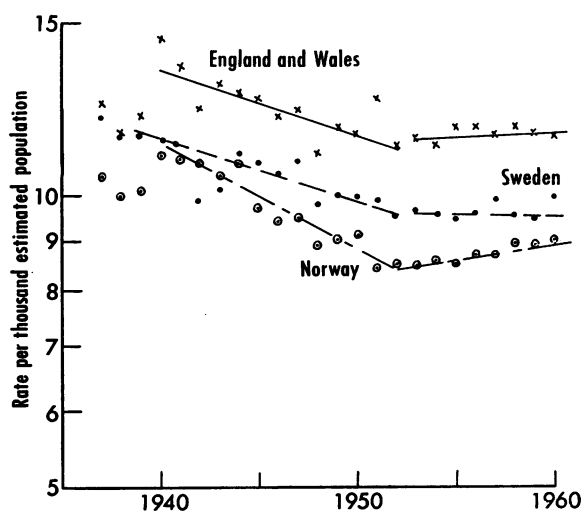
Some qualifications are needed in reference to "recent mortality trends." The term has been used loosely because changes in mortality over a period of 4 or 5 years may be only transient without having any significance in terms of a trend. General mortality rates do not usually increase or decrease in a continuous fashion. The occurrence or absence of epidemics during a particular year, as well as the nature of the epidemic disease involved, has considerable impact on the level of the death rate. The influenza pandemic of 1918 is an outstanding, although unique, example of the effect of an epidemic on mortality rates. Lesser epidemics of influenza and other diseases occur quite frequently. Therefore, it is not unusual to find that in the past 30 years death rates appear to level off for a period of 3 to 4 years but in the end continue the general trend downward. These movements of the death rate are not unusual and have no great long-term significance except for the excess mortality caused by the temporary change.

The apparent leveling off of the general death rate in recent years may very well be a transient phenomenon. In the United States there have been a number of temporary reversals in the past 20 years but none of these have lasted as

long as the recent change. It is estimated that if the downward trend of 1937-53 had continued, about 300,000 lives would have been saved during the past five years. Unless there is marked decline in mortality, there will be an excess of over 100,000 deaths in 1961 alone over what might have been experienced had the 1937-53 trend continued. The consequences of the failure of the general death rate to turn downward will increase with time, and will have important social and economic significance.

In an effort to ascertain the reasons for the break in the downward trend of the death rate, data for the five principal causes of death for each age group have been examined. As in the study of the infant mortality trend, there is no clear-cut explanation for the leveling off process. Of all the death rates examined by cause, only the trend of the rate for influenza and pneumonia appeared to have the same general pattern as the total death rate. However, the present frequency of influenza and pneumonia deaths appears to be too small to influence the total mortality to any significant extent. It is well known that influenza epidemics affect mortality data for other causes, usually cardiovascular diseases, but such effects are not apparent in cardiovascular disease mortality rates for recent years. On the other hand, the failure of the influenza and pneu-

Figure 2. Death rates per 1,000 estimated population, England and Wales, Sweden, and Norway, 1937-60



monia death rate to drop significantly in the nonepidemic years appears to be unusual and deserves further study.

One possible explanation for the leveling off of death rates is that mortality is reaching an irreducible minimum. While mortality rates cannot decline indefinitely, the hypothesis of an asymptote does not seem applicable to so many age, sex, and color groups over about the same period of time, to say nothing about the rates in so many geographically separated countries reaching an asymptote about the same time.

It is also possible to explain the observed phenomenon on a purely mechanical basis. When an aggregate is made of a number of curves of differing trend, it is possible to obtain a composite curve which levels off. In such instances, the change in trend would not necessarily have immediate public health significance. Insofar as mortality rates are concerned, the trend for some diseases is decreasing, for

some increasing, and for others essentially level or changing very slowly. However, the break in the trend for all causes of death appears to be too sharp to be explained on a mechanical basis.

The consistency in pattern by age, sex, and color, as well as its replication in different geographic areas, suggests a common underlying cause for the changing death rates. Further study will be made in an effort to determine the reasons for the failure of mortality rates to decline at the same pace as in the past.

It is hoped that these preliminary observations will stimulate others to study what appears to be a problem of significance to the public health and welfare of the people of many lands.

REFERENCE

- (1) Moriyama, I. M.: Recent change in infant mortality trend. *Pub. Health Rep.* 75: 391-405, May 1960.

Illegal Sale of Amphetamine Drugs

The illegal sale of amphetamine drugs has become a crime of major proportions, according to the Food and Drug Administration. About 63,000 pounds of amphetamines are produced annually, enough to provide about thirty-five 5-milligram tablets for every person in the United States. Because of the limited medical use of these drugs, which must be sold under prescription, many appear on the market through illicit channels.

Truck stops are a major black-market outlet for amphetamines. They are sold to drivers ostensibly to help them keep awake. The drugs, when misused, can produce excessive nervous stimulation, loss of desire for sleep, impairment of judgment, hallucinations, and mental derangement. Serious accidents have been attributed to these effects.

"While we have located and prosecuted some of the major underground outlets for the pills," said George P. Larrick, Commissioner of Food and Drugs, "it appears that there is a never-ending supply flowing into the black market." It is hoped that the imposition of stiff prison terms will deter would-be violators.