Socioeconomic Status and Mortality in the United States

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THE KNOWLEDGE that differences in socioeconomic status are related to differences in mortality rates has long been of concern to persons seeking to improve levels of health and well-being. Ever since 1833, when Corbaux first called attention to their existence (*1*), the study of mortality in different socioeconomic groups has occupied the attention of many scholars in a variety of fields.

In view of this long concern, it is somewhat surprising that there exists a gap in our knowledge pertaining to the precise influence of socioeconomic factors on mortality rates compared with the influence of other more general demographic characteristics. In contrast to an abundance of fairly reliable published material showing the relationship of such characteristics as sex, age, and race to mortality rates, studies relating mortality to socioeconomic status are relatively rare. Although people have long been aware of the generalization that mortality is inversely related to socioeconomic status, very few empirical studies have been undertaken for the specific purpose of examining this relationship more thoroughly. Thus, this is clearly an area in which the need for additional research is especially acute.

Occupation

The relative lack of studies pertaining to the relationship between socioeconomic status and mortality is due in part to the difficulty of obtaining the necessary data. Aside from occupation, no information is provided by the death certificate currently in use that would place the deceased directly in one or another socioeconomic class. However, a man's occupation is an extremely crucial factor in determining his socioeconomic status, and it has long been recognized that people in the higher social classes, as indicated by occupation, have an appreciably lower death rate than those at the other end of the social scale. As one group of authors (*2*) has noted, "The work a man does, the conditions under which his work is done, and the wages he receives for it determine in great measure the circumstances of his life, the house he lives in, the clothes he wears, the food he eats, and his recreation. A man's occupation is, therefore, one of the potent factors deciding the state of his health and fixing the length of his life."

For these reasons, several studies, both in this country and abroad, have been undertaken in an effort to understand more clearly the relationship between occupation and mortality. Daric (*3*) has made a comprehensive review of the literature on occupational differences in mortality up to 1950. The longest and most complete coverage of the relationship between occupation and mortality is found in the publications of the Registrar General's Office of England and Wales, dating back as far as 1851. Logan (*4*) has summarized the work of this office up to and including the census of 1951. In the United States, the studies of Dublin and his collaborators in the Metropolitan Life Insurance Company (*5*) date back as far as the period 1911–13.

Prior to 1911, the Bureau of the Census had

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published tables reporting mortality by occupation for the years 1890 (*6*) and 1900 (*7*). These early studies, which were oriented toward an examination of the mortality levels characteristic of particular occupations, did not, however, purport to provide any information pertaining to the existence of mortality differentials by occupational "classes." Although it was generally accepted that mortality rates were highest among persons in the more menial occupations, it was not until 1934, when the classic study by Whitney was published by the National Tuberculosis Association (*8*) that data concerning occupational class differences in mortality became available in this country. Using the Edwards classification scheme (*9*), Whitney compared death rates by occupation for those States where it was felt that occupational returns on the death certificate were sufficiently complete to justify relating them to census population data. Her findings indicated the existence of a pronounced inverse relationship between occupational class and mortality, the death rate of 13.1 per 1,000 for unskilled persons being nearly twice the rate of 7.0 per 1,000 for persons in professional occupations (*8*).

More recently, a preliminary report of a study carried out in connection with the 1950 census indicated that the inverse relationship between occupational class and mortality still prevails in the United States, and that the level of mortality among lower occupational classes is still approximately twice as high as that characterizing the professional and managerial group (*10*).

Although the studies of Whitney (*8*) and Moriyama and Guralnick (*10*) clearly point to the existence of a marked inverse gradient when mortality is related to occupational class in the United States, there are certain difficulties associated with the way in which occupation has been used as an index of socioeconomic status. These difficulties stem from several limitations inherent in the available data, and any person who either attempts research in this area or uses materials on occupational mortality should keep these limitations in mind.

The most outstanding difficulty in relating mortality to occupation is the computation of death rates. In order to compute death rates by occupation, two figures are needed: the number of persons in each occupation dying during a given period, and the total number of persons enumerated in each occupation during the same period. At first glance these figures would appear to be readily available from death certificates and from published census sources. However, for a variety of reasons, the comparability of these two sets of data may be questioned. In the first place, the two sources do not follow the same procedures in recording occupation. On the one hand, the death certificate currently in use asks for the usual occupation of the deceased, and further specifies the "kind of work done during most of life." The census, on the other hand, prior to 1960, recorded the occupation in which a person was engaged at the time of enumeration. Since a sizable proportion of the aged in the labor force work in occupations radically different from those in which they were engaged during the major part of their working lives (*11*), it is quite possible that the occupation reported in the census will differ from that which is subsequently recorded on the death certificate.

Comparability between death certificate and census data may also be affected by the fact that death certificates record an occupation for all deceased persons—whether employed at the time of death, unemployed, or retired. On the other hand, prior to 1960, the census presented occupational data which referred only to those persons who were active members of the labor force, either employed or seeking employment in a particular occupation, at the time of enumeration. This means that when death rates are computed for occupational classes, the population base does not include all persons who were "exposed to the risk of dying," and any differences between occupations concerning the number enumerated as opposed to the number who, although not working at the time, belonged to a particular occupational class could seriously bias the resulting occupational death rates.

Socioeconomic Status

Although the preceding discussion does not exhaust the ways in which comparability be-

tween data from death certificates and census reports might be affected (*12*), it clearly indicates the limitations of using occupational data from census and vital registration sources in the analysis of socioeconomic differentials in mortality. In view of these limitations, it is not surprising to find that several alternative approaches have been used to study the relationship between socioeconomic factors and levels of mortality. In these endeavors, the house-to-house canvass or sample survey has played a leading role.

Although not specifically concerned with mortality, Sydenstricker's early study of Hagerstown (*13*) may be regarded as the forerunner of surveys in this country designed to assess the influence of the socioeconomic environment on health. This study, which was based on a survey of 1,800 families in Hagerstown, Md., beginning in the autumn of 1921, showed that levels of health, as determined by the occurrence of illness, became noticeably poorer as family income decreased. Furthermore, it was found that the amount of medical care received decreased with income status; only 43 percent of the illnesses among the "very poor" were attended by a physician in contrast to 70 percent among the "well-to-do" families. Although some variations between income groups were observed when specific ages and causes were examined, Sydenstricker concluded: "Two facts remain fairly clear, however—one is that the illness rate as observed was higher for the poor than for those economically better off; the other is that, in general, those families which were definitely above the average of this community in economic condition had medical attention to a considerably greater extent than the remainder of the population."

The relationship between health and socioeconomic status was again examined a few years later in the spring of 1933. At this time, a house-to-house canvas, carried out in 10 localities that were particularly hard hit by the depression, showed that there was a marked increase in the incidence of disabling illness as per capita family income declined (*14*). Similarly, the National Health Survey conducted between November 1935 and March 1936 showed a very pronounced association between health and economic status. To illustrate, the case rate for acute and infectious illnesses, which was 160 per 1,000 among persons on relief, declined consistently as income rose so that the rate for the group with an annual income of $5,000 or more was only 107 per 1,000 population (*15*). Moreover, the National Health Survey found that socioeconomic status also bore a strong inverse association to the frequency of disabling accidents (*16*), accidental death (*17*), incidence of chronic impairments (*18*), and receipt of medical attention (*19*).

In more recent times, the adverse effect of a low socioeconomic status on levels of health is demonstrated by findings such as the existence of a direct relationship between family income and the proportion of illness and injury cases that receive medical attention (*20*), and an inverse relationship between income and the number of workdays lost per person per year as a result of disabling illnesses or injuries (*21*).

Another methodological approach which has been used to examine the relationship between socioeconomic status and health involves the use of census data to divide the country into broad socioeconomic areas. Pennell has shown, for example, that the existence and use of hospital facilities was inversely correlated with economic status when the 48 States and the District of Columbia were ranked according to average annual per capita income (*22*). Similarly, Dorn, using data from the 1930 census to group the rural counties of Ohio into two broad categories, showed that the age-adjusted death rates in areas of "poor economic status," such as depressed agricultural and mining areas, were about 10 percent greater than the corresponding rates in the areas of "good economic status" (*23*). For males, the death rate in areas of good economic status was 8.3 per 1,000 as opposed to a rate of 9.3 in the poor areas; for females the corresponding rates were 7.9 and 8.7, respectively.

More recently, Altenderfer (*24*), using data on per capita income to rank 92 cities in the United States whose 1940 population exceeded 100,000, noted that the age-adjusted death rates showed a pronounced tendency to decline as the average income of a city rose. This inverse relationship was found to hold for all deaths from all causes, for infant deaths, for maternal deaths, and for deaths due to the major chronic

diseases as well as to the infectious causes. A subsequent study (*25*) based on 973 cities of 10,000 or more population ranked according to infant mortality rates yielded similar findings: in cities having the lowest infant mortality rates the average annual per capita income was $722 as opposed to $595 among those cities in which infant mortality was greatest.

A third approach, which is being used more extensively as the data become increasingly available, also involves the use of census data. Using information on the death certificate pertaining to the usual place of residence of the deceased, mortality is examined in relation to certain social and economic characteristics of census tracts, the small, relatively homogeneous geographic areas into which many of the larger cities and their environs have been divided for statistical purposes (*26*). However, as when death certificate occupational entries are used to classify decedents into broad socioeconomic groups, use of census tracts as analytical units has many limitations. The pros and cons of the census tract approach have been discussed extensively elsewhere in the literature and therefore will not be taken up here. A brief review of the problems, as well as a pertinent bibliography, has been presented by Coulter and Guralnick (*27*).

Using the value of owned homes or monthly rental, as reported by the Federal census, Allen (*28–30*) has made a careful study of the relation between socioeconomic status and mortality in Cincinnati, Ohio. In 1930, 1940, and again in 1950 the adverse effect of a poor socioeconomic environment on levels of mortality was found to be very pronounced. In the most recent study, for example, the infant mortality of the white population was nearly three times as high in the lowest economic area as it was in the remainder of the city (*30*). Similar studies carried out in a number of other cities and using a variety of indices have also found mortality levels to vary inversely with socioeconomic status. In Chicago in 1920–40 the expectation of life at birth for both males and females increased markedly with socioeconomic status when the census tracts of that city were grouped according to median monthly rent (*31*). Similarly, a study made in New Haven, Conn., in 1930 demonstrated clearly that mortality rates tended to rise as socioeconomic status decreased (*32*), as did studies of Buffalo, N.Y., in 1940 (*33*) and Houston, Tex., in 1950 (*34*).

All of the studies mentioned so far have pointed out the existence of a pronounced inverse relationship between mortality and socioeconomic status. However, not all studies substantiate this conclusion. For example, a followup study of the participants in Sydenstricker's survey of Hagerstown showed an erratic pattern when the extent of illness was related to economic status (*35*). Similarly, a survey of Butler County, Pa., during the summer of 1954, which used the Edwards occupational classification as an index of socioeconomic status, concluded that there was no discernible difference in the incidence of illness among the several classes (*36*).

The existence of areas of disagreement becomes increasingly apparent when more specific cases are considered. To illustrate, in contrast to a very strong inverse relationship between socioeconomic status and infant mortality found in Houston, Tex. (*34*), the association appeared to be almost nonexistent in Syracuse, N.Y. (*37*), and in Providence, R.I. (*38*). Similarly, although some studies suggest that the relationship does not hold for the major chronic diseases (*4, 30*), still others would indicate that the inverse relationship is just as strong for deaths due to chronic ailments as it is for deaths resulting from infectious causes (*39*). Furthermore, even those studies that agree on the existence of a differential frequently disagree as to whether the differential is becoming smaller (*31*) or whether it is still the same or even more pronounced than it has been in the past (*30*). Such conflicting observations concerning the existence, nature, and extent of socioeconomic mortality differentials clearly indicate the need for additional research in this area.

Conclusion

The preceding review of the literature pertaining to socioeconomic mortality differentials in the United States indicates the type of research that has been done in this area and the nature of the results obtained. In the past,

the general conclusion of all of these studies, many of which employed markedly different methodological approaches, demonstrated the existence of a definite inverse relationship between mortality rates and socioeconomic status. However, in the more recent period there seems to be some conflict as to whether or not such a differential exists, either for total mortality or for mortality from specific causes. Moreover, even when the existence of such a differential is agreed upon, there is disagreement as to whether or not it is narrowing. It may be that the existence of socioeconomic mortality differentials, and whether they are becoming smaller or larger, actually varies from one area to another. On the other hand, the presence and nature of a relationship may depend on the variables chosen to measure socioeconomic status, for example, income as opposed to rent or occupation, or the particular methodological procedures employed. One recent study has demonstrated that all of these factors may exert an influence on the nature of socioeconomic mortality differentials (*40*).

In order to clarify the present situation, and to determine validly whether or not the traditional socioeconomic differential still exists, whether it characterizes all or only a few aspects of total mortality or whether it is narrowing, a continuous series of comparative studies is needed. Moreover, the comparison of areas and the description of time trends must clearly indicate what is being compared and must include specific qualifications when different methodological procedures, different sources of data, and different universes are used in the comparison. Only when we have a continuous series of studies on the ways in which different status factors affect mortality will we have a sound basis for determining the effect of overall socioeconomic status on mortality.

A project of the 1960 census will be matching a sample of death certificates to census returns for the purpose of analyzing socioeconomic mortality differentials (*41*), and it is hoped that the completion of this work may provide a starting point for the much needed ongoing series of studies concerning the relationship between various aspects of mortality and the several components of socioeconomic status.

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