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## MORTALITY OF THE AGED BEFORE AND AFTER MEDICARE

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A question which has been raised in the past is "Has Medicare resulted in reduced mortality among the aged?" To try to answer it, the death rates of persons aged 65 and over in the United States have been analyzed for the fiscal years immediately preceding and following July 1, 1966, the date that Medicare became effective. From that analysis, the answer is "No". That is, it can be concluded that there has been no accelerated downward trend in the death rates of the aged since Medicare began. In the remainder of this note, there will be discussed how this conclusion was reached.

The first problem in undertaking this study was deciding what data to use. Two possible sources were considered: (1) the Old-Age, Survivors, Disability, and Health Insurance records and (2) the death rates published by the National Center for Health Statistics in the *Monthly Vital Statistics Report*. Some of the arguments for and against using each of these sources are discussed below.

An argument in favor of using the OASDHI records is that they contain more accurate age-data. One reason is that, since eligibility for OASDHI benefits is dependent on the age of the applicant, the OASDHI records contain dates of birth that have been compared to basic documents (such as birth certificates). The NCHS age-data, however, have not been so verified. A second reason is that, since the NCHS age-data for decedents come from death certificates, they are acquired from a secondary source (that is, the individual himself is not the source of the information). Instead, the source is usually a relative or friend of the decedent. Therefore, it is not uncommon that the resulting age-data are faulty, since the person who is the source

of such data occasionally has inaccurate information himself.

On the other hand, there are also several arguments against using OASDHI records. One is that death rates would have to be developed from basic data. That development would be time-consuming and would involve costly computer operations. The NCHS data, by contrast, are already available in the form of death rates. Therefore, by using those data, we would minimize the effort required to acquire the information needed for this analysis.

A second, and probably the most important, argument against using OASDHI records is that, for the pre-Medicare years, these records reflect only that segment of the aged population which had applied for, and been found entitled to, Social Security benefits. Hence, a sizeable proportion (for example, more than 20% as of January 1, 1966) of the aged population is missing. In particular, the pre-Medicare records do not reflect those people who never filed for benefits because they were continuing in full-time employment. Since it is reasonable to assume that the general level of health of this group of people is higher than that of retirees of the same age, their absence from the data would result in overstated death rates.

After considering each of these factors, it was decided to use the NCHS data published in the *Monthly Vital Statistics Report*. By doing so, the possibility of errors due to less accurate age-data was thereby accepted in order to avoid a known bias, as well as to save time and expense.

After having chosen the NCHS data, a second problem arose—namely, that those data are expressed as calendar-year rates rather

than fiscal-year rates. To convert them to fiscal-year rates, the following formula was used for each of the several age groups involved:

$${}_1r_x = {}_c r_{x-1} + \frac{1}{2} ({}_1r_x - {}_1r_{x-1})$$

where  ${}_1r_x$  = the annual death rate for fiscal year x.

${}_c r_x$  = the annual death rate for calendar year x.

${}_1r_x$  = the annualized death rate for the first six months of calendar year x.

The rates which were thereby calculated are shown in Table 1. They reveal several pertinent points.

First, although the death rates decreased between FY 1966 (the year before the Medicare program began operations) and FY 1967, the decreases are not unusually large when compared with previous fluctuations. For example, consider the death rates for the total population aged 65-74. The rate for FY 1967 shows a decrease of 1.0 per thousand from the FY 1966 rate. However, the rates for two of the prior three years also show decreases. In particular, the decrease of 0.9 per thousand represented in the FY 1964 rate as compared with the FY 1963 rate is very similar in magnitude to the one reflected in the FY 1967 rate. An analysis of the rates for the total population aged 75-84 yields similar results.

However, similar remarks cannot be made about the FY 1967 death rate for the population aged 85 and over. That rate shows a decrease from the FY 1966 rate of 13.8 per thousand, more than twice the magnitude of any one-year decrease for the prior years shown. But the significance of this decrease is minimized by the increased rate for FY 1968. Between FY 1967 and FY 1968, the death rates increased for all three age groups. For ages 65-74, 75-84, and 85 and over, the death rates increased 0.4, 1.2, and 11.7 per thousand, respectively. These increases tend to minimize the importance of the decreases in FY 1967.

The data for FY 1969 do not help to clarify the general pattern of mortality. For ages 65-74, the death rate rose to 38.2 per thou-

sand, the highest that it has been since the Medicare program began. For ages 75-84, the death rate decreased to its FY 1967 level, the lowest of those shown. Similarly, for ages 85 and over, the FY 1969 death rate is the lowest of all years shown. However, only for this last age group (which showed a decrease of 14.1 per thousand) was the fluctuation unusually large when compared with pre-Medicare fluctuations.

Table 2, showing 3-year moving averages of the death rates, attempts to minimize the effects of the annual fluctuations of the death rates. The averages for FY 1967-69 were then compared to the prior averages (except those for FY 1965-67 and FY 1966-68, since they include a mixture of Medicare and pre-Medicare years).

The FY 1967-69 average rate of 37.9 per thousand for ages 65-74 was not unusually low; in fact, it was higher than the average rates for FY 1961-63 and FY 1962-64.

The FY 1967-69 average rate of 79.6 per thousand for ages 75-84 was the lowest one shown for that age group. To properly interpret this fact, it is necessary to consider what average rate could normally have been expected for that year-grouping. An analysis of the pre-Medicare 3-year moving averages indicates that the average rate had been decreasing about 1 per thousand from one period to the next. Extrapolation based on constant decreases of that magnitude yields an average rate for FY 1967-69 of about 79 per thousand. Thus, the FY 1967-69 average of 79.6 per thousand is not unexpectedly low.

On the other hand, the same comment is not true for the FY 1967-69 average rate for ages 85 and over. The average rate of 193.7 per thousand for FY 1967-69 is well below the range of 200-204 per thousand in which the pre-Medicare average rate was fluctuating.

Therefore, because of the increasing death rates and relatively level 3-year moving averages for ages 65-74, because of the predictably decreasing averages for ages 75-84, and in spite of the generally lower death rates for persons aged 85 and over, it is concluded that, as yet, there has not been any significant improvement in the mortality of the total aged

population since the advent of Medicare. It will be of great interest and importance to study this subject in the future as more experience becomes available.

**Table 1**  
**DEATH RATES FOR TOTAL POPULATION AGED 65 AND OVER,**  
**BY AGE AND FISCAL YEAR, 1961-68**

Fiscal Year	Death Rates per Thousand, by Age		
	65-74	75-84	85 and Over
1961	36.8	85.0	194.5
1962	36.4	84.0	197.0
1963	38.9	85.9	208.8
1964	38.0	82.4	202.8
1965	37.7	81.7	200.2
1966	38.5	82.1	204.4
1967	37.5	79.2	190.6
1968	37.9	80.4	202.3
1969	38.2	79.2	188.2

Source: Computed from the death rates published in the *Monthly Vital Statistics Report*.

**Table 2**  
**THREE-YEAR MOVING AVERAGES OF DEATH RATES FOR TOTAL**  
**POPULATION AGED 65 AND OVER, BY AGE AND FISCAL-YEAR**  
**GROUPING**

Fiscal-Year Grouping	Averages of Death Rates per Thousand, by Age		
	65-74	75-84	85 and Over
1961-63	37.4	85.0	200.1
1962-64	37.8	84.1	202.9
1963-65	38.2	83.3	203.9
1964-66	38.1	82.1	202.5
1965-67	37.9	81.0	198.4
1966-68	38.0	80.6	199.1
1967-69	37.9	79.6	193.7