

# Mortality After Retirement

by ROBERT J. MYERS\*

***Proposals to amend the old-age and survivors insurance program and the widespread adoption of industrial pension plans have renewed interest in the effect of retirement on the individual worker. In the following pages, data from three Government programs, including old-age and survivors insurance, and from several private pension plans are examined to determine what retirement means in terms of the workers' mortality.***

UNDER the old-age and survivors insurance program, benefits are paid to covered workers between the ages of 65 and 75 only when they have substantially retired from covered employment.<sup>1</sup> The primary aim of the program is thus to provide retirement income rather than annuities beginning at age 65.

From a broad viewpoint, the Nation cannot afford to make such cash payments to retired aged individuals without also considering the effect of retirement policies on the individuals concerned and on the national economy. Retirement for the individual should not be considered as the goal of gainful employment, but rather as an event that, for one reason or another, may occur at the end of his working life. Retirement undoubtedly affects the individual in many ways—in his spiritual well-being, his economic status, and his physical condition. Probably the most easily measurable element is the last-mentioned, which can, in turn, perhaps be most accurately studied from the viewpoint of mortality.

What is the effect of retirement on mortality? Should workers be continued in employment after they reach age 65, or should they, as many retirement plans today require,

be compulsorily retired at that age? The advantages, both to the individual worker and to the Nation, of the former course have recently been stressed. A person compelled to retire, it is argued, loses his vitality and tends to die much earlier than if he is allowed to continue in gainful work.

This belief runs contrary to the opinion often expressed not so many years ago that workers were being compelled to remain at work because there was no pension plan to take care of them, so that their end was inevitably death from exhaustion. Accordingly, it was then advocated that older workers should be pensioned and so be able to spend their declining years in peace and leisure.

Today there are about 18,000 private pension plans supplementing the old-age and survivors insurance program established by the Social Security Act. Many of these plans, in line to some extent with previous employer practice, provide for a compulsory retirement age—often 65. Most of the plans, however, permit deferment of retirement if the employer consents. That retirement at age 65 is by no means universal is indicated by the fact that the average retirement age for workers covered by the old-age and survivors insurance program is currently 69 for men and somewhat more than 68 for women; for the period 1940–50, the averages were generally about a year higher.

Specific and reliable data on the effect that retirement has on the mortality of workers unfortunately are not available, and no clear and definite conclusions can be drawn

because of the many conflicting factors involved. One complication in the analysis is the factor of constantly improving mortality among the aged, especially in the past 15 years. The analysis is complicated, too, by another question. Do people retire because they are disabled and thus subject to high mortality, or is the high mortality, on the other hand, the result of retirement? In an effort to throw some light on the matter, this article examines data on the mortality of retired persons from several Government retirement systems and a few nongovernmental pension plans.

## ***Probable Experience Under Four Types of Plans***

Before proceeding to examine the available data, the effect that the particular provisions of a plan might have on the resulting experience should be studied. Because completely different results—varying with the structure of the benefit system and the administrative procedure adopted—may be obtained for what is essentially the same underlying mortality, this factor is highly important.

Let it first be assumed that mortality is not affected by retirement. Then, in considering four hypothetical pension plans, it will be possible to see that any indications of lower or higher mortality after retirement arise solely from the particular plan and its provisions.

Plan A pays no benefits before age 65—either for early age retirements or disability retirements—but provides for compulsory retirement at age 65 and pays an annuity beginning at that age to workers who have previously left service because of disability. Under this plan, mortality after age 65 would, for the entire retired group, be fairly comparable with that previous to age 65, or with what might be termed the “general level.” Employees in active service when they attain age 65 would, of course, have lower mortality rates

\* Chief Actuary, Social Security Administration.

<sup>1</sup> For a detailed description and analysis of the operation of the specific provisions of the retirement test see Robert J. Myers, “Old-Age and Survivors Insurance: Retirement Test Experience,” *Social Security Bulletin*, November 1953, and Robert J. Myers, “Basis and Background of Retirement Test,” *Social Security Bulletin*, March 1954.

than those disabled persons previously separated from service who receive an annuity at age 65.

Plan B is like Plan A, with the major difference that it does not call for compulsory retirement at age 65. For ages just above 65, it is likely that the mortality experience would be higher than the general level because there would be a tendency for the less healthy workers to retire at or shortly after age 65 and for the healthier ones to continue at work. After age 70, the mortality experience of the entire retired group would approach the general level because virtually everybody would have retired by then.

Under Plan C, disability pensions are provided at the time the disability occurs (or, alternatively, disabled persons receive no vested right for a pension at age 65). If retirement is compulsory at age 65, the mortality experience for nondisabled retired workers will probably be definitely lower than the general level at the ages slightly over age 65 but eventually will merge into that of the general level. If retirement is not compulsory at age 65, the resulting mortality experience will probably be somewhat higher than the

general level at the ages just beyond age 65 but lower than that for the group of disabled pensioners.

Plan D permits optional retirement before age 65 and pays disability pensions under a definition or test of disability that is not strict or rigidly administered. There is a logical subdivision between disability pensioners and others because of a differential in benefit amount favoring the former. The disability pensioners will experience high mortality, while the other pensioners retiring before age 65 will experience, at least for a few years, low mortality. Those in the second group would undoubtedly obtain the larger disability pensions if they could. Since they do not, they must be considered medically to be select.

### Old-Age and Survivors Insurance

About 80 percent of the paid civilian jobs in the Nation are covered by old-age and survivors insurance. In the program's actual operation, a vast store of valuable data on mortality experience has been accumulated. Unfortunately, it has not been possible to tabulate and analyze all this information. Only limited analysis of mortality data, stratified by duration of retirement, has been made.

Data on the mortality of workers covered by the program in the early 1940's were examined, by age and duration of retirement. Table 1 gives the experience for 1941-44 by duration of retirement, while table 2 gives detailed data by age for 1944. The study showed significantly higher mortality rates for persons who had recently retired than for workers who had more than 1 or 2 years of retirement. For white men, the mortality rates during the first year (actually the first full year of experience beginning 6 months after retirement) was about 15 percent higher for retirements in 1940-41 than general population mortality rates. For 1942-43, however, the difference was considerably greater—probably because those who retired in the war years tended to be less healthy, since the more active individuals stayed at work to help the war effort.

After the first 1½ years of retirement, the male mortality rates were

**Table 2.—Ratio (percent) of actual to expected deaths<sup>1</sup> among white male retired workers<sup>2</sup> under old-age and survivors insurance, by age at retirement and duration of retirement, 1944**

Age at retirement <sup>3</sup>	Duration of retirement <sup>4</sup> by number of years			
	½	1½	2½	3½
All ages.....	138	102	101	97
65.....	175	111	110	101
66.....	157	110	105	99
67.....	159	112	111	102
68.....	155	111	102	99
69.....	164	112	102	91
70.....	135	105	108	98
71.....	136	89	102	98
72.....	128	100	100	( <sup>5</sup> )
73.....	128	94	( <sup>5</sup> )	( <sup>5</sup> )
74.....	113	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )

<sup>1</sup> Expected deaths based on U. S. White Male Life Table, 1939-41. Actual deaths: 16,456.

<sup>2</sup> Includes all persons who claimed benefits even though some returned to work.

<sup>3</sup> Age attained in calendar year of retirement.

<sup>4</sup> Approximately the 1-year period beginning ½ year after retirement and successive 1-year periods.

<sup>5</sup> Not available.

Source: Analytical Note No. 34, Analysis Division, Bureau of Old-Age and Survivors Insurance, Sept. 28, 1945.

close to the rates for the general population. For white women, the rates were considerably lower than those of the population, but the ratios of actual to expected deaths for the first year were about 10 percent higher than those for subsequent years. The detailed analysis for white men in 1944, in a sense an atypical year, indicates that the higher-than-average mortality in the first year of retirement occurs to the greatest extent at age 65 and gradually diminishes with advancing age.

In a study of more recent data the overall mortality experience of retired workers was examined but only with respect to attained age and not with respect to duration of retirement. This experience is summarized in table 3, which shows for men aged 65 and 66 higher-than-average mortality rates and for older men a gradually diminishing difference between them and the general population. In other words, the results of the investigation indicated relatively higher mortality rates immediately after retirement and dilution of the effect at the older ages, where most of the experience is among persons who have been retired for some time rather than among the newly retired. For women there appears to be the

**Table 1.—Ratio (percent) of actual to expected deaths<sup>1</sup> among white retired workers<sup>2</sup> under old-age and survivors insurance, by duration of retirement, 1941-44**

Year of retirement	Duration of retirement <sup>3</sup> by number of years			
	½	1½	2½	3½
Men				
1940.....	115	99	98	97
1941.....	116	103	101	( <sup>4</sup> )
1942.....	125	102	( <sup>4</sup> )	( <sup>4</sup> )
1943.....	138	( <sup>4</sup> )	( <sup>4</sup> )	( <sup>4</sup> )
Women				
1940.....	87	73	77	80
1941.....	85	81	76	( <sup>4</sup> )
1942.....	87	77	( <sup>4</sup> )	( <sup>4</sup> )
1943.....	94	( <sup>4</sup> )	( <sup>4</sup> )	( <sup>4</sup> )

<sup>1</sup> Expected deaths based on U. S. White Male and Female Life Tables, 1939-41. Actual deaths: men, 57,196; women, 4,487.

<sup>2</sup> Includes all persons who claimed benefits even though some returned to work.

<sup>3</sup> Approximately the 1-year period beginning ½ year after retirement and successive 1-year periods.

<sup>4</sup> Not available.

Source: Analytical Note No. 34, Analysis Division, Bureau of Old-Age and Survivors Insurance, Sept. 28, 1945.

**Table 3.—Ratio (percent) of actual to expected deaths<sup>1</sup> among retired workers<sup>2</sup> under old-age and survivors insurance, by attained age, 1950-52**

Attained age	Men	Women
All ages.....	109	90
65.....	136	90
66.....	145	107
67.....	128	99
68.....	121	98
69.....	116	94
70.....	115	90
71.....	111	90
72.....	107	87
73.....	106	85
74.....	105	85
75-79.....	99	82
80-84.....	98	85
85-89.....	101	90
90 and over.....	103	100

<sup>1</sup> Expected deaths based on U. S. White Male and Female Life Tables, 1950. Actual deaths (including an allowance of about 5 percent for lag in reporting): men, 366,896; women, 42,299.

<sup>2</sup> Includes all persons who claimed benefits even though some returned to work.

same general tendency, although to a much smaller degree. At age 75 and over the mortality rates of male retired workers closely parallel population mortality. Women who have retired, however, have 10-15 percent lower mortality rates than women in the general population; even at and shortly after age 65 their rate is close to that of the general population.

In a discussion of the relative mortality of retired persons and of active workers eligible to retire, it has been shown that the latter have a relatively low mortality rate in comparison with the general population; for men aged 65-74 the difference is possibly as much as 40 percent.<sup>2</sup> This finding might have been expected in view of the fact that a better-than-average standard of health is necessary if the older worker is to remain in active employment. With such low mortality rates among those not entitled to benefits, it is not surprising to find higher-than-average rates among the beneficiaries aged 65-74.

The old-age and survivors insurance data clearly indicate that mortality rates are considerably higher than average for individuals who have just retired, but that the difference gradually diminishes for later

<sup>2</sup> Louis O. Shudde, "Mortality Experience under the Old-Age and Survivors Insurance System," *Transactions of the Society of Actuaries*, May 1951.

years. This tendency is most apparent for men.

### Railroad Retirement Program

Some 1.5 million railroad workers are covered by a retirement program that may be described as a combination of an industrywide private pension plan and a social insurance system, since it contains elements of both. In its actual operation, much valuable mortality experience has been accumulated. It is, in fact, the only large public retirement system for which good mortality data, according to duration of retirement, are available.

Table 4 gives the ratio of actual to expected deaths among age annuitants during a recent 3-year period. Under the railroad retirement plan, individuals may retire before age 65 with larger benefits if permanent and total disability is proved than if the retirement is for "age"; in certain circumstances, the worker may retire for "occupational" disability.

The mortality rates for age retirements at ages 60-64 are as much as 25 percent below the expected level during the early years of retirement but ultimately approach those of the life table used for determining expected deaths. For individuals retiring at ages 65-69, on the other hand, the actual mortality rates are appreciably higher than the expected rates—particularly in the first 2 years of retirement. This situation, of course, could be anticipated; healthy persons reaching age 65 tend to continue at work, and those in poor health retire. The mortality of workers retiring at exactly age 65, although high, is less in the first few years of retirement than the mortality of those retiring at ages 66-68. For those retiring at ages 70 and over, the mortality experience is fairly close to that expected and shows no significant fluctuation with duration of retirement. This situation, again, was to have been expected because age 70 is, by employer practice, virtually a compulsory retirement age on most railroads. The group retired at age 70 or over is, accordingly, to a certain extent, a good cross section of all persons of those ages; it is composed, however, of persons who are

perhaps somewhat healthier than most or they would not have been in employment up to that age.

In view of the specific provisions of the railroad retirement program, it seems clear that the mortality of those who retire at or shortly after age 65 is relatively high in the first few years of retirement. The evidence is not conclusive, however, that this higher mortality is due to the act of retiring. It seems, instead, probable that the retirements were to some extent caused by ill health that would in any case have produced higher mortality.

### Civil-Service Retirement System

The civil-service retirement system covers some 1.6 million employees of the Federal Government and is, in effect, a large, self-administered pension plan. Depending upon length of service, the worker can retire on full annuity at ages 60 or 62. In certain cases, both disability and age retirement benefits are available before the worker reaches age 60. Since age retirement benefits that are then payable are in a reduced amount, any disabled person would attempt to have his retirement based on disability.

Unfortunately, data by duration of retirement are not available for this system. Table 5, however, does show

**Table 4.—Ratio (percent) of actual to expected deaths<sup>1</sup> among railroad retirement age annuitants, by duration of retirement, 1947-50<sup>2</sup>**

Age at retirement <sup>3</sup>	Duration of retirement by number of years					
	0	1	2	3	4	5 and over
All ages.....	114	107	102	100	100	106
65.....	112	110	99	95	89	104
66.....	135	118	115	99	105	114
67.....	123	114	109	116	124	111
68.....	141	132	110	109	105	115
69.....	111	110	95	107	97	105
60-64.....	74	87	75	78	96	101
65-69.....	121	114	104	101	99	107
70 and over.....	103	93	103	101	104	104

<sup>1</sup> Expected deaths based on 1944 Railway Annuity Mortality Table, set back 1 year in age. Actual deaths; 25,545.

<sup>2</sup> Based on data furnished by Office of Director of Research, Railroad Retirement Board. Such data in summary form are contained in table A-2, *Annual Report of the Railroad Retirement Board for the Fiscal Year Ended June 30, 1952* (but shown there by attained age rather than age at retirement).

<sup>3</sup> Age last birthday.

the ratio of actual to expected deaths by attained age for age retirements during a recent 3-year period. For men, the mortality experience under age 60—which relates to individuals who voluntarily retired on a reduced annuity and thus apparently could not prove disability—was relatively low, just as in the railroad retirement system. For those aged 60–66, mortality is definitely higher than that according to the valuation table, while at the older ages the two tend to come together. Since this is an aggregate experience for all ages of retirement, it would be expected that this concurrence would develop, at least after age 70—the compulsory retirement age. The same general trends are evident for women.

**Table 5.—Ratio (percent) of actual to expected deaths among civil-service retirement nondisability annuitants, fiscal years 1949–50 to 1951–52<sup>1</sup>**

Attained age	Men	Women
All ages.....	99	81
Under 60.....	99	40
60.....	121	94
61.....	109	65
62.....	119	84
63.....	113	79
64.....	120	61
65.....	119	79
66.....	113	69
67.....	103	79
68.....	110	83
69.....	102	66
70–74.....	94	74
75–79.....	95	84
80–84.....	97	100
85–89.....	92	98
90 and over.....	93	106

<sup>1</sup> Based on data furnished by Retirement Section, U. S. Civil Service Commission. Actual deaths: men, 16,307; women, 1,561.

There are, however, greater fluctuations in the mortality ratios due to the smaller number of persons involved, and the mortality ratios for ages under 80 tend to show actual mortality well below that expected. This is not a significant factor in determining the effect of retirement but rather indicates that the mortality rates in the valuation table in use for women are too high.

In general, the experience under the civil-service retirement program seems to confirm that of the railroad retirement system. Mortality rates are definitely lower than “expected” for age retirements before the normal age. They are definitely higher for those retiring at either the normal

age or a few years later. Here again, experience seems to indicate that, for retirements at or after the normal age, ill health was, at least in large part, the cause of retirement and not the result.

### Private Plans

For a number of years, experience has been collected for group annuity plans. These plans are in force primarily for commercial and industrial concerns. In general, the annuities become payable at age 65, whether the individual retires at that age or later, although in actual fact he may not receive the payment. Two subdivisions are possible in the group annuity data—“normal” retirements (generally payable from age 65 on) and “early” retirements (in many if not most instances, disability retirements). As would be anticipated, the mortality rates for the “early” retirements are relatively high, especially at ages before 65, but they subsequently tend to approach the rates for the “normal” retirements (table 6). For the “normal” retirements, on the other hand, the mortality rates shortly after age 65 tend to be somewhat low. The reason is that payments generally begin automatically at age 65 and are thus made to comparatively healthy persons since many of the disabled persons have already been excluded from this group as a result of “early” retirement. The mortality ratios for the oldest age groups are artificially high because the death rates of the Standard Annuity Table are unduly low at those ages.

The lower portion of table 6 compares the group annuity experience with general population mortality. The overall mortality rates of “normal” retirements are significantly less than those of the general population—by about 15 percent for men and by almost 25 percent for women. Men aged 60 and under are the only significant exception, but it may be said that they are not really “normal” retirements but rather “early” retirements. The mortality rates of “normal” retirements are relatively lowest at ages 61–70 (most of the experience is undoubtedly at ages 65–70) but in the older ages tend to approach and ultimately merge with the general population level. This ex-

**Table 6.—Ratio (percent) of actual to expected deaths<sup>1</sup> among individuals receiving group annuities, 1946–50**

Attained age	Men		Women	
	“Normal” retirement	“Early” retirement	“Normal” retirement	“Early” retirement
Expected deaths based on 1937 Standard Annuity Table				
All ages.....	109	174	95	126
Under 56.....	( <sup>2</sup> )	312	( <sup>2</sup> )	180
56–60.....	152	248	57	124
61–65.....	96	197	73	108
66–70.....	102	149	81	128
71–75.....	112	136	118	132
76–80.....	119	137	123	179
81–85.....	137	113	168	( <sup>2</sup> )
86–90.....	124	( <sup>2</sup> )	177	( <sup>2</sup> )
91 and over.....	127	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Expected deaths based on U. S. White Life Tables, 1948				
All ages.....	86	139	77	112
Under 56.....	( <sup>2</sup> )	260	( <sup>2</sup> )	188
56–60.....	128	208	50	127
61–65.....	78	160	75	102
66–70.....	80	116	65	104
71–75.....	89	108	87	99
76–80.....	94	109	83	125
81–85.....	107	88	119	( <sup>2</sup> )
86–90.....	95	( <sup>2</sup> )	105	( <sup>2</sup> )
91 and over.....	98	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )

<sup>1</sup> Actual deaths: Men—normal retirements, 11,837; early retirements, 3,477. Women—normal retirements, 891; early retirements, 232.

<sup>2</sup> Insufficient data.

Source: “Report of the Committee on Group Mortality and Morbidity, Group Annuity Mortality,” *Transactions of the Society of Actuaries*, April 1952.

perience is to be expected since persons who have recently been in active employment are relatively healthier in comparison with the general population than persons who have been retired or unemployed for some years before reaching age 65. Furthermore, experience among “normal” retirements includes a significant proportion of persons who continue in active employment after the “normal” retirement date, and their mortality rates are known to be low, so that their inclusion with the retired group lowers the mortality rates of the entire group.

Next, in a comparison of “early” retirements and the general population, the relatively high ratios for those younger than age 65—especially men—no doubt reflect a higher proportion of disability among those who avail themselves of the opportunity to retire at the earliest possible time. The relative mortality of this group tends to decrease with advanc-

**Table 7.—Ratio (percent) of actual to expected deaths<sup>1</sup> among male service pensioners in three self-administered private pension plans**

Attained age <sup>2</sup>	Group annuity, 1946-50		Plan 1, <sup>3</sup> 1943-52	Plan 2, <sup>4</sup> 1946-51	Plan 3, <sup>5</sup> 1946-51
	"Normal" retirement	"Early" retirement			
Expected deaths based on 1937 Standard Annuity Table					
All ages.....	109	174	130	111	105
Under 55.....	( <sup>6</sup> )	312	465	-----	-----
55-59.....	152	248	280	-----	-----
60-64.....	96	197	166	-----	-----
65-69.....	102	149	116	86	94
70-74.....	112	136	118	107	102
75-79.....	119	137	123	138	117
80-84.....	137	113	131	147	120
85-89.....	124	( <sup>6</sup> )	120	117	129
90 and over.....	127	( <sup>6</sup> )	128	( <sup>6</sup> )	110
Expected deaths based on 1946-50 Graduated Group Annuity Experience <sup>7</sup>					
65-69.....	99	144	112	83	91
70-74.....	100	122	106	96	91
75-79.....	98	113	101	114	96
80-84.....	104	86	99	112	91
85-89.....	96	( <sup>6</sup> )	93	90	99
90 and over.....	104	( <sup>6</sup> )	105	( <sup>6</sup> )	90

<sup>1</sup> Actual deaths: Plan 1—5,316; Plan 2—613; Plan 3—1,672.

<sup>2</sup> Actual attained age groups of group annuity experience were 1 year older, that is under 56, 56-60, etc.

<sup>3</sup> Group of public utilities covered under uniform plan.

<sup>4</sup> Electric utility company.

<sup>5</sup> Large company in electrical manufacturing industry.

<sup>6</sup> Insufficient data.

<sup>7</sup> Ray M. Peterson, "Group Annuity Mortality," *Transactions of the Society of Actuaries*, October 1952.

Source: "Report of Special Committee on Experience under Self-Administered Retirement Plans," *Transactions of the Society of Actuaries*, April 1954.

ing age but for men continues higher than that of the general population for a number of years beyond age 65.

The first results of a continuing study of mortality experience under self-administered retirement plans have recently become available.<sup>3</sup> As noted previously, the experience must be considered carefully since the particular provisions of each plan materially affect the results. Table 7 compares the actual and expected deaths among male service pensioners under three of the five privately administered pension plans for which data were given. These three plans

<sup>3</sup> "Report of Special Committee on Experience under Self-Administered Retirement Plans," *Transactions of the Society of Actuaries*, April 1954.

provide for compulsory retirement at age 65, while the other two do not. Also entered, for purposes of comparison, is the experience for men under group annuities covering about the same period of time. The mortality table used by the committee as a basis of the "expected" deaths is significantly too low at the oldest ages so that the mortality ratios are artificially high. Accordingly, the lower portion of the table shows mortality ratios based on a more realistic table — 1946-50 Graduated Group Annuity Experience.

Plan 1 pays disability pensions before age 65, and the experience under that provision is included. Accordingly, as would be expected, there are high mortality ratios before age 65, while after age 65—at least between ages 65 and 75—the ratios tend to be somewhat higher than the group annuity "normal" retirement experience.

Plans 2 and 3 also pay separate disability benefits before age 65, but this experience is not included. For ages 65-74, as a result, these plans show very low mortality rates, since persons employed at age 65, even though they are then compulsorily retired, tend on the whole to be healthy. Certainly the result would not, of itself, seem to give any indication that compulsory retirement produces high mortality.

### Summary

Analysis of the mortality experience under various pension programs—government and private—indicates clearly that, in the absence of any special circumstances, the mortality rates for voluntarily retired workers during the first year or two of retirement are considerably higher than the general level that otherwise might be expected but that they thereafter merge with that level. It seems probable that these higher mortality rates in the early years of retirement arise from the fact that workers in poorer health are more likely to retire at or shortly after the minimum retirement age, while the healthier persons continue at work.

Workers retiring under a plan that does not have compulsory retirement generally tend to be less healthy than those who continue to work. In a plan providing for compulsory re-

tirement at a particular age, on the other hand, those still in service at that age generally tend to be somewhat healthier than the normal population since they have recently been at work. It would be completely erroneous to compare mortality rates under a plan with compulsory retirement with those under a plan with voluntary retirement if only pensioners were considered. If such a comparison were made, the results would probably seem to indicate lower mortality rates under the compulsory plan—a conclusion that would not be valid. It would really be necessary to contrast the mortality rates of pensioners under the compulsory retirement plan with those of both active employees and pensioners under the voluntary retirement plan. Data of this type are not available, since usually the mortality rates of active employees are less closely studied than those for retired persons, particularly in plans administered by government agencies. If any progress is to be made in exploration of the subject of mortality after retirement, it is clear that such data will be necessary.

The analysis should not be taken to mean that compulsory retirement might not have a serious effect on an individual's health and vitality, especially if he had not adjusted himself to the separation from employment. Unfortunately, available data do not measure the effect of retirement on mortality rates after retirement. A priori reasoning would seem to indicate that compulsory retirement would certainly have some deleterious effect for some persons under some circumstances. If, for example, compulsory retirement is suddenly imposed, the effect might be serious; if retirement is long planned for and publicized in advance, the effect, if any, would be less serious. Again, persons having outside interests and hobbies are less likely to be severely affected by retirement than those who do not. The kind of occupation from which retirement would take place would also seem to bear on the question; compulsory retirement for a person who had a dull, monotonous, routine job would seem to be less harmful than for a person who had an interesting and varied type of work.