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## INTRODUCTION

THE Joint Continuous Mortality Investigation Committee of the Institute and Faculty has pleasure in presenting the third number of its *Reports*.

The first section of this number contains the Committee's proposals for new standard tables for pensioners and for immediate annuities, incorporating mortality projections. The Committee's special thanks are due to Mr A. D. Wilkie and to the Faculty of Actuaries Mortality Research Group for their work on projection. The proposed tables take as their starting point the graduated experience tables which appear in *C.M.I.R. 2*.

There follows the second consolidated report published in *C.M.I.R.* giving the summaries of mortality experienced in the latest 4-year period 1971-74. The assured lives investigation has been extended since the last report was presented in *C.M.I.R. 1* and a change in terminology is now needed. The main investigation hitherto referred to simply as 'assured lives' needs to be given its full and proper description of 'whole life and endowment assurances, males; policies issued in the U.K.' to distinguish it from the new sections which refer, respectively, to policies issued in the Republic of Ireland, to female lives, and to temporary assurances. It is planned to present in *C.M.I.R. 4* the first 4-year report on the experience under Permanent Health Insurance policies; this will relate to the 4 years 1972-75; the last section of the present number gives the statistics of the individual policies in 1974 and 1975, supplementing the corresponding figures for 1972 and 1973 which appeared in *C.M.I.R. 2*. (The latter section was not available for the Institute discussion.)

Discussions of the contents of *C.M.I.R. 3* at the Institute of Actuaries on 23 January 1978 and at the Faculty of Actuaries on 10 April 1978 are being reported in *J.I.A.* and *T.F.A.*

E. B. O. Sherlock  
Chairman of the Committee

# PROPOSED STANDARD TABLES FOR LIFE OFFICE PENSIONERS AND ANNUITANTS

## INTRODUCTION

1. In the paper 'The Graduation of Pensioners' and of Annuitants' Mortality Experience, 1967-70' (*C.M.I.R.*, 2, 57) the Committee produced graduated experience tables of mortality for life office pensioners and for immediate annuitants based on the data for 1967-70. The Committee stressed that these tables were suitable solely as a standard of comparison for life offices; they did not purport to provide a suitable tool for the calculation of premiums and reserves without adjustment for, amongst other things, possible future improvements in mortality. The Committee undertook to search for a suitable way to provide new standard tables with full monetary functions suitable for general use. This paper presents such tables for comment by the actuarial profession before a final decision on publication is taken.

2. The Committee has been helped in its deliberations by the work of the Faculty of Actuaries Mortality Research Group, whose paper 'Observations Arising from "The Graduation of Pensioners' and of Annuitants' Mortality Experience 1967-70"' (*T.F.A.* 36, forthcoming) has provided useful evidence on which a practical decision could be reached. The Committee would like to record its appreciation of the work done by the members of that Research Group.

3. The essential structure of a table that allows for forecast changes in mortality is a double-entry table with a value of  $q$  for each year of age for each future calendar year; or, what is the same thing, a separate mortality table for each calendar year of birth. We shall denote mortality rates in the former table by  $q_{x, T}$  where  $x$  is the age attained in calendar year  $T$ , and those in the latter table by  ${}^Yq_x$  where  $x$  is the age attained by a life born in year  $Y$ . Clearly  ${}^Yq_x = q_{x, Y+x}$ . From the values of  ${}^Yq_x$  for a given  $Y$  one can calculate all the normal mortality functions  ${}^Yl_x$ ,  ${}^Ya_x$ , etc., applicable to lives born in year  $Y$ . Alternatively, one could treat the mortality rates for year  $T$  as if they were from a single life table, and calculate monetary functions from such a cross-sectional table. This, of course, is what is done when an assured lives table for a specific group of calendar years, such as A1949-52 or A1967-70, is used to represent assured lives mortality.

4. In order to construct a double-entry mortality table it is convenient to start with a given base table, say  $q_{x, 0}$ , and to use a simple formula connecting  $q_{x, 0}$  with  $q_{x, T}$  such as:

$$q_{x, T} = (r_x)^T q_{x, 0}$$

where the mortality rates decrease by geometric progression from year to year. This is the model used in the projected tables on which the  $a(55)$  annuitants mor-

## 2 *Proposed Standard Tables for Life Office Pensioners and Annuitants*

tality tables were based, and also in the common population projection methods. We shall start with this model, and discuss 20-year reduction factors, *i.e.*  $(r_x)^{20}$ ; the Faculty Mortality Research Group used 40-year reduction factors, the squares of our values.

5. The base tables both for pensioners and for annuitants can conveniently be taken as the Peg 1967-70 and *aeg* 1967-70 experience graduated tables. The mortality rates for age  $x$  in these tables apply on average to a life attaining age  $x$  during 1968, or a life born in year 1968- $x$ .

6. When the  $a(55)$  tables were constructed it was possible to calculate reduction factors from the experience of annuitants over more than 60 years from 1880 to 1945 and it was appropriate to calculate projected reduction factors by extrapolation. Such an approach is neither possible nor appropriate on this occasion. Both for pensioners and for annuitants consistent data are available for too short a period for any trend to be measured satisfactorily. It is, therefore necessary to look primarily at the experience of other groups, *e.g.* the whole population and assured lives. Further, a simple projection of past trends may not be appropriate: the steady and rapid improvement that took place in the first half of the twentieth century may not continue; indeed there is some evidence that the rate of improvement in mortality has slackened in recent years.

### CHANGES IN POPULATION MORTALITY

7. Table 1 shows 20-year reduction factors for population mortality in England and Wales over the periods 1911 to 1931, 1931 to 1951, 1951 to 1971 and for the whole period 1911 to 1971, based on the values of  $q_x$  in ELT 8, ELT 10, ELT 11 and the experimental graduations by McCutcheon and Eilbeck of ELT 13 (*T.F.A.* 35, 281) using their graduation No. 4.

8. From this table we see that mortality at young ages has improved more than at older ages; that female mortality has improved more than male; and that the improvement since 1951 has been slower than between 1931 and 1951 except for the very high ages.

9. A comparison of changes in mortality for a number of countries over the period from 1950 to 1970 was given by Giles and Wilkie in 'Recent Mortality Trends: Some International Comparisons' (*T.F.A.* 33, 375). Table 2 extracts selected 20-year factors from the data in that paper, giving the lowest, median, and highest values for the 22 countries, together with the values for England and Wales and for Scotland.

10. From this we see that the improvements in mortality in England and Wales and in Scotland have been similar to one another and generally similar to the median of all 22 countries. However, the variation between countries has been large and there has been a substantial number of countries where the mortality of males has become considerably worse over the 20-year period, and some where the mortality of females has hardly improved.

Table 1. 20-year reduction factors: England and Wales population

| Age            | 1911 to 1931 | 1931 to 1951 | 1951 to 1971 | 1911 to 1971 |
|----------------|--------------|--------------|--------------|--------------|
| <i>Males</i>   |              |              |              |              |
| 20             | .91          | .41          | .82          | .67          |
| 30             | .71          | .46          | .62          | .59          |
| 40             | .69          | .52          | .78          | .65          |
| 50             | .76          | .75          | .87          | .79          |
| 60             | .79          | .98          | .88          | .88          |
| 70             | .93          | .94          | .98          | .95          |
| 80             | 1.01         | .94          | .88          | .94          |
| 90             | 1.04         | 1.02         | .82          | .96          |
| <i>Females</i> |              |              |              |              |
| 20             | .91          | .31          | .54          | .53          |
| 30             | .78          | .40          | .47          | .53          |
| 40             | .67          | .52          | .70          | .62          |
| 50             | .72          | .64          | .86          | .73          |
| 60             | .77          | .72          | .81          | .76          |
| 70             | .85          | .79          | .79          | .81          |
| 80             | .95          | .88          | .77          | .86          |
| 90             | 1.05         | .96          | .82          | .94          |

[The factors are e.g.  $(q_x^{1931} \div q_x^{1911})$  or  $(q_x^{1971} \div q_x^{1911})^{20/60}$ ]

#### CHANGES IN ASSURED LIVES MORTALITY

11. In order to make a comparison of assured lives mortality on a compatible basis, the data for 1924-29 (durations 3 and over) and for 1949-52 (durations 2 and over) were regraduated using the same formula as for A1967-70. Table 3 shows 20-year reduction factors for the periods from 1924-29 to 1949-52 (24 years), 1949-52 to 1967-70 (18 years), and 1924-29 to 1967-70 (42 years).

12. From this we see that the improvements have been similar for the two periods and that the improvements have been at the same level at ages from 60 upwards. A comparison with Table 1 shows that the improvements, both in the last 20-year period and for the whole period under review, have generally been greater for assured lives than for the male population of England and Wales.

#### CHANGES IN PENSIONERS' MORTALITY

13. The mortality of life office pensioners has been investigated since 1948. The data for each period 1948-50, 1951-54, 1955-58, 1959-62, 1963-66, 1967-70, and 1971-74 have been graduated using the same formula as in the Peg 1967-70 tables. For males, the general level of mortality rose from 1948-50 up to 1955-58; however, the experience in the first two periods was rather restricted. An explanation of the increase may be that the class of life office pensioners was extended from the earliest clerical 'staff' to a rather wider group. Since 1955-58 there has been a gradual decline in mortality rates. Table 4 shows 20-year factors based on the change from 1955-58 to 1971-74.

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Table 2. 20-year reduction factors, 1949-51 to 1969-71 for 22 countries

| Age            | Lowest | Median | Highest | England<br>and Wales | Scotland |
|----------------|--------|--------|---------|----------------------|----------|
| <i>Males</i>   |        |        |         |                      |          |
| 20-24          | ·22    | ·74    | 1·22    | ·64                  | ·65      |
| 25-29          | ·27    | ·66    | 1·05    | ·56                  | ·55      |
| 30-34          | ·32    | ·70    | ·96     | ·61                  | ·68      |
| 35-39          | ·43    | ·76    | ·94     | ·67                  | ·73      |
| 40-44          | ·50    | ·86    | 1·30    | ·83                  | ·85      |
| 45-49          | ·52    | ·86    | 1·11    | ·84                  | ·86      |
| 50-54          | ·59    | ·86    | 1·17    | ·84                  | ·86      |
| 55-59          | ·64    | ·94    | 1·22    | ·88                  | ·91      |
| 60-64          | ·69    | ·98    | 1·33    | ·91                  | ·98      |
| 65-69          | ·72    | 1·06   | 1·29    | ·98                  | 1·07     |
| 70-74          | ·77    | 1·00   | 1·26    | 1·00                 | 1·05     |
| 75-79          | ·82    | ·95    | 1·16    | ·95                  | 1·01     |
| 80-84          | ·80    | ·90    | 1·16    | ·90                  | ·91      |
| <i>Females</i> |        |        |         |                      |          |
| 20-24          | ·16    | ·49    | ·75     | ·36                  | ·21      |
| 25-29          | ·18    | ·41    | ·75     | ·36                  | ·25      |
| 30-34          | ·20    | ·46    | ·75     | ·44                  | ·36      |
| 35-39          | ·27    | ·58    | ·83     | ·60                  | ·56      |
| 40-44          | ·34    | ·70    | 1·06    | ·78                  | ·74      |
| 45-49          | ·42    | ·74    | ·94     | ·81                  | ·90      |
| 50-54          | ·47    | ·71    | ·95     | ·82                  | ·88      |
| 55-59          | ·55    | ·75    | ·97     | ·80                  | ·85      |
| 60-64          | ·55    | ·77    | ·98     | ·79                  | ·80      |
| 65-69          | ·59    | ·76    | 1·00    | ·78                  | ·75      |
| 70-74          | ·66    | ·76    | ·97     | ·76                  | ·73      |
| 75-79          | ·68    | ·77    | 1·02    | ·78                  | ·77      |
| 80-84          | ·72    | ·78    | 1·00    | ·76                  | ·79      |

Table 3. 20-year reduction factors: assured lives (all males)

| Age | 1924-29 to 1949-52 | 1949-52 to 1967-70 | 1924-29 to 1967-70 |
|-----|--------------------|--------------------|--------------------|
| 20  | ·61                | ·65                | ·62                |
| 30  | ·49                | ·57                | ·53                |
| 40  | ·60                | ·70                | ·64                |
| 50  | ·79                | ·80                | ·79                |
| 60  | ·88                | ·83                | ·86                |
| 70  | ·90                | ·84                | ·88                |
| 80  | ·89                | ·86                | ·87                |
| 90  | ·87                | ·88                | ·88                |

[The factors are e.g.  $(q_x^{49-52} \div q_x^{24-29})^{20/24}$ ,  $(q_x^{67-70} \div q_x^{49-52})^{20/18}$  etc.]

Table 4. 20-year reduction factors: life office pensioners (lives)

| Age | Males              | Females            |
|-----|--------------------|--------------------|
|     | 1955-58 to 1971-74 | 1959-62 to 1971-74 |
| 60  | .71                | .78                |
| 70  | .84                | .72                |
| 80  | .98                | .68                |
| 90  | 1.12               | .67                |

14. For females the experience is much scantier. Mortality rates were rather unstable until 1959-62, since when they have also shown a steady fall. Table 4 shows 20-year factors based on the change from 1959-62 to 1971-74.

15. The rise at the highest ages in males could be accounted for by the pensioners at these ages in 1955-58 being members of the original good mortality group of 1948-50; otherwise we observe that the improvements are greater for females than for males, but 'slope' the other way—a consequence perhaps of the scant data at high ages for females. The factor at age 70 for males (.84) happens to be the same as for male assured lives from 1949-52 to 1967-70; but otherwise the factors are not very close to our previous observations.

#### CHANGES IN ANNUITANTS' MORTALITY

16. The 1956 Finance Act made the voluntary purchase of a life annuity financially more attractive and the Committee has taken the view that a different class of life, with rather lower mortality rates, began to enter the life office annuitants' investigation from 1957 onwards. There was a distinct drop in mortality at the earliest durations, which then continued to improve slowly. At the ultimate durations, however, the group of pre-1957 annuitants is still substantial. In the 1967-70 experience the pre-1957 annuitants were all at durations 10 and over, whereas the post-1956 annuitants were all at durations 13 and under. The mortality rates of the pre-1957 group were substantially higher than those of the post-1956 group. Some of the difference can be attributed to the higher average duration of the pre-1957 group, some to the different class of life. It may be assumed further that the post-1956 group has not yet achieved its ultimate mortality level; how much higher that would be than the 1967-70 experience is impossible to say. No data, of course, exist for the post-1956 group at high enough durations for earlier periods, so the trend of their mortality rates is unknown. Table 5, however, shows 20-year reduction factors for the 1967-70 experience of the pre-1957 and post-1956 groups (both at durations 5 and over) as compared with the 1947 tables of annuitants' mortality which appeared on p. xviii of the introduction to the *a(55)* tables.

17. It can be seen that the improvements for the pre-1957 group were apparently quite small, whereas the post-1956 group show apparently quite large improvements over 1947, but both of these apparent trends are exaggerated by the special nature of the data. The pre-1957 annuitants have increased in average



Table 5. 20-year reduction factors: life office annuitants 1947 to 1967-70

| Age | Males    |           | Females  |           |
|-----|----------|-----------|----------|-----------|
|     | pre-1957 | post-1956 | pre-1957 | post-1956 |
| 60  | —        | 1.02      | —        | .73       |
| 70  | 1.23     | .89       | .94      | .78       |
| 80  | .99      | .85       | .94      | .76       |
| 90  | .94      | .88       | .90      | .78       |

duration, and the post-1956 annuitants are of a lower average duration and appear to be a different class of life with a lower level of mortality. It seems likely that the true underlying rate of improvement of mortality lies somewhere between the two.

18. In the paper 'Mortality of Life Office Annuitants' (*J.I.A.* 78, 27; *T.F.A.* 20, 263), which introduced the *a*(55) tables, the Committee quoted the rates of reduction for annuitants' mortality for previous periods. Table 6 shows the equivalent 20-year reduction factors for the whole period from 1880 to 1945.

Table 6. 20-year reduction factors: life office annuitants 1880 to 1945

| Age   | Males | Females |
|-------|-------|---------|
| 50-59 | .76   | .82     |
| 60-69 | .89   | .84     |
| 70-79 | .94   | .87     |
| 80-89 | .97   | .91     |
| 90-94 | —     | .93     |

19. On that occasion the Committee decided to use the same projected rates of reduction for both sexes when constructing the double-entry tables. The rates actually used for the *a*(55) tables are shown in Table 7.

Table 7. 20-year reduction factors: projections for *a*(55) tables

| Age | Both Sexes |
|-----|------------|
| 50  | .79        |
| 60  | .82        |
| 70  | .86        |
| 80  | .89        |
| 90  | .93        |

#### POPULATION PROJECTIONS

20. The Faculty Mortality Research Group quotes 40-year improvement factors from the latest published British population projections by the Government Actuary (Population Projections 1974-2014, O.P.C.S.) and from Scott's paper 'The Projection of Mortality Rates in Great Britain' (*Trans. 20th I.C.A.* 2, 643). The corresponding 20-year factors are shown in Table 8.

Table 8. 20-year reduction factors: projections for British population

| Age | Government Actuary |         | Scott |         |
|-----|--------------------|---------|-------|---------|
|     | Males              | Females | Males | Females |
| 52  | ·87                | ·87     | 1·03  | 1·01    |
| 57  | ·87                | ·87     | ·97   | ·98     |
| 62  | ·88                | ·87     | ·93   | ·98     |
| 67  | ·91                | ·87     | ·93   | ·96     |
| 72  | ·93                | ·87     | ·93   | ·94     |
| 77  | ·96                | ·89     | ·93   | ·92     |
| 82  | ·98                | ·94     | ·93   | ·92     |
| 87  | ·99                | ·97     | ·93   | ·92     |

21. It will be observed that, whereas the Government Actuary's projections assume less reduction at the higher ages, Scott's assume less reduction, or even increases, at the lower ages. Further, Scott assumes that the mortality of females at certain ages may improve more slowly than that of males. Scott's projections are based on a study of individual causes of death, and it may be felt that this gives an interesting insight into the way in which mortality rates may develop. The overwhelming reason for the reduction in mortality over the past century has been the reduction, indeed almost elimination, of deaths from infectious diseases. It might be thought over-optimistic to expect correspondingly large reductions in mortality from motor vehicle accidents (which are now proportionately very important at young adult ages) or from cancer or heart disease, which are not yet susceptible to the same methods of prevention or cure as apply, for example, to typhoid, tuberculosis or pneumonia. The evidence of other countries also shows that a uniform improvement in mortality rates, even in prosperous and peaceful conditions, is not always achieved.

#### CHOICE OF IMPROVEMENT FACTORS

22. The Faculty Mortality Research Group suggested two mortality forecasts for life office pensioners, an 'optimistic' basis, assuming improvements at ages above 60 at roughly the same rate as in the recent past, and a 'pessimistic' basis assuming improvements roughly in line with the official projections, though below those of Scott. They suggested using the same factors at each age, which (converted to 20-year factors) were:

|               | Males | Females |
|---------------|-------|---------|
| 'Pessimistic' | ·949  | ·922    |
| 'Optimistic'  | ·866  | ·806    |

23. The Committee agrees that there is no strong reason for using factors that vary by age. Although in the past the improvements in mortality at younger ages have been greater than at older ages, in the more recent experience this has not

been the case for ages above about 60, which are the important ones for both pensioners and annuitants. For the England and Wales population and for assured lives the reduction factors for the latest recorded periods have been roughly the same at each age from 60 upwards; for other countries the mortality improvement has been least for males around 65 to 75; for pensioners the male and female experiences have shown opposite results; and for annuitants the improvements seem to have been greater at higher ages. All this suggests that using the same reduction factor at each age is not unreasonable.

24. In spite of the fact that the mortality of females, has, in the past, generally improved faster than that of males so that the gap between male and female mortality has widened, there is no very convincing argument or evidence to indicate what will happen in the future. The Committee suggests, therefore, that the same improvement factor should be used for male and female rates. Similarly, in the absence of good reasons for any other course, the Committee suggests that the same improvement factor should be used for pensioners' lives and amounts data, and annuitants' ultimate and select rates.

25. Since the calculated mortality rates will be used primarily for the calculation of premium rates and valuation reserves, concepts of optimistic and pessimistic projections seem inappropriate. Rather, a single cautious, but not extreme, basis seems appropriate, somewhere between the two. Actuaries using the tables will always have to make their own adjustments where circumstances demand and, as will be seen later, the form of the proposed tables is designed to make such adjustments particularly easy.

26. The Committee reached, therefore, the tentative conclusion that the projected mortality rates for all the tables under consideration should incorporate a 20-year improvement factor of about .9.

#### CHOICE OF FORMULA

27. It is necessary to choose not only a rate of reduction over a period, but the shape of the reduction factor for shorter and longer periods. Thus, with the same reduction factor at all ages, the most commonly used formula would be

$$q_{x,T} = r^T q_{x,0}$$

and if  $q$  were to follow Gompertz law (which applies strictly to  $\mu_x$ ) then  $q_{x,T} = r^T Bc^x$  where  $B, c$  are the Gompertz parameters for the base year 0. Most of the tables concerned with annuitants and pensioners have, however, been graduated using a logistic form

$$q_x = \frac{Bc^x}{1 + Bc^x} \quad \text{or} \quad q_x/p_x = Bc^x.$$

It can be seen from the following table that  $q_{x,T}/p_{x,T} = r^T q_{x,0}/p_{x,0}$  gives a close approximation to the forecast figures using the formula directly. Table 9 shows specimen values for  $q$  using  $r^{20} = .9$ .

Table 9

|                          |         |        |       |      |      |      |
|--------------------------|---------|--------|-------|------|------|------|
| $q_{x,0}$                | ·005    | ·01    | ·05   | ·1   | ·2   | ·5   |
| (a) $q_{x, 20}$          | ·0045   | ·009   | ·045  | ·09  | ·18  | ·45  |
| (b) $q_{x, 20}$          | ·004502 | ·00901 | ·0452 | ·091 | ·184 | ·474 |
| (b) $q_{x, 20}/q_{x, 0}$ | ·9004   | ·901   | ·905  | ·909 | ·918 | ·947 |

$$(a) q_{x, 20} = r^{20} q_x \text{ where } r^{20} = \cdot 9$$

$$(b) q_{x, 20} = \frac{r^{20} q_x}{1 - q_x (1 - r^{20})} \text{ given by } \frac{q_{x, 20}}{p_{x, 20}} = r^{20} \frac{q_{x, 0}}{p_{x, 0}}$$

There is very little difference between the results on basis (a) and basis (b) until  $q_x$  reaches quite high values, appropriate to ages over about 90. Therefore this modification of the reduction factor is equivalent to the use of a slightly larger value of  $r$  at the highest ages.

28. The advantage of the approach above is that it enables the reduction to be expressed in a very simple form. If we now introduce the formula expressed in the way it is quoted for all the pensioners' tables and for all but one of the graduated part of the annuitants' tables, viz.

$$\log (q_x/p_x) = A + B(x-70)/50$$

we can rewrite the forecast values as:

$$\log (q_{x,T}/p_{x,T}) = A + B(x-70)/50 + C \cdot T \text{ where } C = \log r = \frac{1}{20} \log \cdot 9$$

or as:

$$\log (q_{x,T}/p_{x,T}) = A + B(x-kT-70)/50$$

$$\text{where } k = -50C/B = \frac{-2 \cdot 5 \log \cdot 9}{B} = \frac{\cdot 2634}{B}.$$

This formula shows that a constant reduction factor applied to  $(q_x/p_x)$  is equivalent to a reduction of  $k$  years in the age for each year ahead we are forecasting, or of 1 year in the age for each  $1/k$  years ahead.

#### ALTERNATIVE MODEL

29. In the actual graduations of annuitants' and pensioners' mortality a two-parameter form of the formula was used in all but one case where a four parameter formula was more satisfactory. For the present purpose, however, it is convenient to revert to the simpler form for all graduations. Assuming then that  $r^{20} = \cdot 9$  the value of  $1/k$  corresponding to each graduation can be calculated and the results are given in Table 10.

Table 10

|                               | $r^{20} = .9$ | $B$       | $1/k = B/.2634$ |
|-------------------------------|---------------|-----------|-----------------|
| Pensioners:                   |               |           |                 |
| males, lives                  |               | 4.2142613 | 16.00           |
| males, amounts                |               | 4.4802968 | 17.01           |
| females, lives                |               | 5.2448241 | 19.91           |
| females, amounts              |               | 5.4433637 | 20.67           |
| Annuitants:                   |               |           |                 |
| males, duration 0             |               | 4.1782890 | 15.86           |
| males, durations 1 and over   |               | 4.4976687 | 17.08           |
| females, duration 0           |               | 6.1370401 | 23.30           |
| females, durations 1 and over |               | 5.2600441 | 19.97           |

30. The extreme values of  $1/k$  are for annuitants at duration 0 and these are perhaps of less importance than the remainder which, although spread, did suggest to the Committee that it should consider as an alternative to a fixed reduction factor the possibility of using a fixed value of  $1/k$  for all categories of life. Table 11 shows the 20-year reduction factors corresponding to different values of  $1/k$  for each of the eight mortality tables.

Table 11

|                               | $r^{20} = e^{-Bk/2.5}$ |      |      |      |      |      |      |
|-------------------------------|------------------------|------|------|------|------|------|------|
|                               | 1/k:                   | 14   | 16   | 18   | 20   | 22   | 24   |
| Pensioners:                   |                        |      |      |      |      |      |      |
| males, lives                  |                        | .887 | .900 | .911 | .919 | .926 | .932 |
| males, amounts                |                        | .880 | .894 | .905 | .914 | .922 | .928 |
| females, lives                |                        | .861 | .877 | .890 | .900 | .909 | .916 |
| females, amounts              |                        | .856 | .873 | .886 | .897 | .906 | .913 |
| Annuitants:                   |                        |      |      |      |      |      |      |
| males, duration 0             |                        | .887 | .901 | .911 | .920 | .927 | .932 |
| males, durations 1 and over   |                        | .879 | .894 | .905 | .914 | .921 | .928 |
| females, duration 0           |                        | .839 | .858 | .873 | .884 | .894 | .903 |
| females, durations 1 and over |                        | .860 | .877 | .890 | .900 | .909 | .916 |

31. It appears from this table that use of the same value of  $1/k$  for all cases would imply a slightly more optimistic reduction factor for females than for males but almost identical factors for pensioners and annuitants. Thus, no significant departure from the general objectives of paragraphs 24 to 26 would result from a change to the alternative model. If the choice of  $r^{20}$  at about .9 is accepted, the choice for  $1/k$  seems to be between 18 and 20 years. Probably 18 gives the closest fit to .9 but as that figure itself is to some extent arbitrary and 18 suggests a greater degree of precision than actually exists, it may be felt, and the Committee recommends, that the best choice would be  $1/k = 20$ .

32. If this recommendation is accepted, the projected double-entry tables would all be based on the assumption that the mortality table for calendar year

$T$  is the same as the table for the base year with a deduction of  $T/20$  from the age, i.e.:

$$q_{x, T} = q_{x-T/20, 0}$$

It will be observed that each year of birth table also has the same logistic form:  ${}^Yq_x/{}^Yp_x = B_Y C_1^x$  where  $B_Y = Br^Y$  and  $C_1 = Cr$ ; and that the table for any year of birth is the same as that for any other with an appropriate age adjustment, i.e.  ${}^Yq_x = {}^{Y_0}q_{x-(Y-Y_0)/20}$ .

#### FURTHER PROBLEMS

33. The four pensioners' tables were all graduated by the formula:

$$\log(q_x/p_x) = A + B(x - 70)/50$$

for all ages from 50 upwards. No values below age 50 had been considered necessary. The annuitants' tables, however, were dealt with differently. The table for females, durations 1 and over, had been graduated using a cubic function rather than a linear function. The discussion above used the corresponding linear function. The difference in the values of  $q_x$  from age 65 upwards is not great. Table 12 compares the two.

Table 12. *Female annuitants, 1967-70, durations 1 and over*

| Age | $10^5 q_x$             |             |
|-----|------------------------|-------------|
|     | 2-parameter graduation | 4-parameter |
| 65  | 1,204                  | 1,262       |
| 70  | 2,020                  | 1,971       |
| 75  | 3,372                  | 3,250       |
| 80  | 5,576                  | 5,490       |
| 85  | 9,084                  | 9,207       |
| 90  | 14,462                 | 14,839      |
| 95  | 22,246                 | 22,323      |
| 100 | 32,621                 | 30,729      |

Below age 50 assured lives mortality was used—A1967-70 for males and A1967-70 adjusted for females; between ages 50 and 65 these were blended with the graduated annuitants' tables; the values for duration 0 below age 65 for both sexes and above age 85 for females were taken as fixed proportions of the ultimate rates. Replacing the four-parameter female graduation by the two-parameter one and carrying out the same procedures produces rates that are fairly close to the *aeg* 1967-70 rates, but differ slightly for duration 0 at ages below 65 and above 85.

34. The logic of deducting  $\frac{1}{20}$  from the age for each year of projection does not strictly apply to the rates for young ages, based as they are on a different formula. However, the practical convenience of the method suggests that the same rule should be adhered to throughout. Mortality rates at young ages are so low that their effect on annuity values is quite small. For example, using the *aeg*



## 12 *Proposed Standard Tables for Life Office Pensioners and Annuitants*

1967-70 table, we can compare the annuity values (a) assuming tabular mortality rates from age 20 upwards and (b) assuming no mortality at all from age 20 to age 50. At 10% interest we get:

| $a_{20}$ | Males | Females |
|----------|-------|---------|
| (a)      | 9.825 | 9.889   |
| (b)      | 9.917 | 9.944   |

It therefore seemed satisfactory to apply the  $\frac{1}{20}$  adjustment at all ages. The 20-year reduction factors at the youngest ages are close to 1.0, and for males below age 29 the rates *increase* with time. This contradicts recent British experience, but in fact mortality rates at these ages have been rising in some other countries, so there may be a small excuse for treating them as a realistic forecast.

35. As will be discussed below (paragraphs 44 to 47) it was decided also to extend the female pensioners' tables to young ages to provide a mortality basis for widows of pension scheme members. Direct extension of the formula to young ages is satisfactory down to age 30, and constant rates of mortality are assumed below that age.

### THE DOUBLE-ENTRY TABLES

36. The complete double-entry table of mortality rates requires, for each of the eight tables under consideration, 20 columns of values of  $q_x$  (or  $q_{\{x\}}$ ), one for the base year and one for each forecast year up to 19 years ahead; the table for the twentieth year ahead is the same as that for the base year, with a deduction of 1 year from the age, and for subsequent years the columns are repeated cyclically with 1 year's age adjustment up to 39 years ahead and then 2 years' adjustment from years 40-59, etc. The mortality table for a particular year of birth runs diagonally down to the right, cycling round similarly. The office that wishes to use a double-entry table for calculating monetary values by computer requires no more information than this; a computer routine to calculate all or any of the double-entry tables will be available. This will allow also the rate of mortality improvement to be varied by altering the factor  $1/k$ ; a more rapid improvement in mortality requires a lower value of  $1/k$ , such as 18 years; a slower improvement requires a larger value, such as 22 years. An office could choose also between 'lives' and 'amounts' tables for pensioners.

37. Table 13 shows specimen annuity values using the forecast tables for lives attaining ages 55, 65, 75 and 85 in specific calendar years. Table 14 shows corresponding annuity values using calendar year tables, *i.e.* by constructing a mortality table on the forecast mortality rates for year  $T$ . Table 15 shows for each of the annuity values in Table 13, *i.e.* those using the forecast tables, the year in which the annuity value using calendar year tables is most closely the same, *i.e.*  $T$  such that  $a_{x, T} \doteq a_{x, T}$ .

# PRACTICAL TABLES

38. To calculate by computer any specific monetary function from the double-entry table, or any desired set of such functions, is not intrinsically difficult. However, the number of possible monetary values, including joint-life functions, is enormous, and no worth-while service would be performed by attempting to publish values at a range of rates of interest. Some more practical tables are required for use in traditional ways, for clerical calculation, for use in existing computer programs and in the case of annuities for use possibly in specifying 'capital contents'. For these purposes a single-entry table is desirable.

39. The Committee considered carefully how such a table should be constructed. The method used for the  $a(55)$  tables and the earlier  $a(m)$  and  $a(f)$  tables was to estimate the average number of years before the entrants in a particular year would attain each particular age, and to project the base-year table that number of years ahead, plus, in the case of the  $a(55)$  tables, a further 8 years to make the rates appropriate to entrants in 1955, the base-year being 1947. Thus, low ages were projected a few years ahead and higher ages were projected many years ahead. The resulting mortality table gave suitable monetary values, but was itself applicable neither to any calendar year nor to any year of birth. As it happened, however, the resulting projection factors were similar for all ages and for both sexes (see 'The  $a(55)$  Tables for Annuitants', Preface, Table II).

40. An alternative method, particularly appropriate to pensioners, is to choose a particular year of birth, e.g. that for a life born in 1920 who will attain age 65 in 1985. This table would be reasonably appropriate for male pensioners retiring at age 65 during the 1980's. Such a table would be one of the diagonals of the double-entry table and values appropriate to other years of birth could be obtained by adjusting the age by  $\frac{1}{20}$  of a year for each year of birth.

41. A third method, which is the one favoured by the Committee, is to choose the table for a particular calendar year, which will be broadly appropriate to the mix of business in force over the medium-term future. The year 1990 would seem an appropriate year for use during the 1980s; in due course a later year will become appropriate. A comparison of Tables 13 and 14 shows that annuity values using calendar year 1990 mortality are broadly similar to those based on forecast tables for entrants in 1985, and Table 15 confirms that 1990 is broadly the right year to use. Thus, the same effect will be achieved as if the second possibility had been chosen.

42. For pensioners there is still a choice to be made between 'lives' and 'amounts' mortality. It would be possible but more expensive to publish tables of monetary functions on both bases, but the Committee is already proposing two sets of tables, one for pensioners and one for annuitants, to replace the  $a(55)$  tables, and feels that offices would prefer only one set of pensioners' tables rather than two. In spite of all the difficulties with the 'amounts' data, discussed in 'Considerations affecting the preparation of standard tables of mortality' (*J.I.A.* 101, 133, *T.F.A.* 34, 135), the Committee considers that the use of the

Table 13. *Annuity values ( $a_x$ ) using forecast tables*

| Rate of<br>interest<br>(%) | Age | Males,<br>Lives | Pensioners        |                   | Females,<br>Amounts | Females,<br>Lives | Males,<br>Select | Annuitants         |                    | Females,<br>Ultimate |
|----------------------------|-----|-----------------|-------------------|-------------------|---------------------|-------------------|------------------|--------------------|--------------------|----------------------|
|                            |     |                 | Males,<br>Amounts | Females,<br>Lives |                     |                   |                  | Males,<br>Ultimate | Females,<br>Select |                      |
| <i>Entering in 1975</i>    |     |                 |                   |                   |                     |                   |                  |                    |                    |                      |
| 0                          | 55  | 19·961          | 21·306            | 26·013            | 26·631              | 22·705            | 22·649           | 27·957             | 27·901             |                      |
|                            | 65  | 13·052          | 13·943            | 17·411            | 17·843              | 15·054            | 14·949           | 19·154             | 19·047             |                      |
|                            | 75  | 7·784           | 8·252             | 10·360            | 10·577              | 9·150             | 8·978            | 11·773             | 11·625             |                      |
|                            | 85  | 4·219           | 4·382             | 5·346             | 5·390               | 5·079             | 4·835            | 6·322              | 6·173              |                      |
| 5                          | 55  | 11·443          | 11·958            | 13·556            | 13·763              | 12·454            | 12·424           | 14·101             | 14·072             |                      |
|                            | 65  | 8·607           | 9·053             | 10·639            | 10·837              | 9·573             | 9·506            | 11·342             | 11·278             |                      |
|                            | 75  | 5·803           | 6·095             | 7·335             | 7·467               | 6·642             | 6·517            | 8·107              | 8·004              |                      |
|                            | 85  | 3·465           | 3·587             | 4·278             | 4·313               | 4·104             | 3·907            | 4·951              | 4·834              |                      |
| 10                         | 55  | 7·650           | 7·894             | 8·583             | 8·670               | 8·122             | 8·102            | 8·787              | 8·769              |                      |
|                            | 65  | 6·243           | 6·498             | 7·342             | 7·447               | 6·784             | 6·736            | 7·685              | 7·642              |                      |
|                            | 75  | 4·564           | 4·762             | 5·557             | 5·643               | 5·126             | 5·029            | 6·028              | 5·952              |                      |
|                            | 85  | 2·926           | 3·020             | 3·538             | 3·566               | 3·422             | 3·258            | 4·029              | 3·933              |                      |
| 15                         | 55  | 5·642           | 5·777             | 6·135             | 6·179               | 5·904             | 5·889            | 6·233              | 6·220              |                      |
|                            | 65  | 4·834           | 4·995             | 5·501             | 5·564               | 5·173             | 5·137            | 5·697              | 5·665              |                      |
|                            | 75  | 3·734           | 3·875             | 4·423             | 4·483               | 4·137             | 4·059            | 4·737              | 4·677              |                      |
|                            | 85  | 2·524           | 2·600             | 3·003             | 3·026               | 2·923             | 2·783            | 3·377              | 3·297              |                      |

Table 13. (cont.)

| Entering in 1985 |    |        |        |        |        |        |        |        |        |
|------------------|----|--------|--------|--------|--------|--------|--------|--------|--------|
| 0                | 55 | 20·345 | 21·711 | 26·472 | 27·099 | 23·134 | 23·080 | 28·426 | 28·371 |
|                  | 65 | 13·360 | 14·274 | 17·809 | 18·252 | 15·396 | 15·293 | 19·565 | 19·461 |
|                  | 75 | 8·007  | 8·493  | 10·666 | 10·895 | 9·402  | 9·233  | 12·099 | 11·953 |
|                  | 85 | 4·360  | 4·534  | 5·545  | 5·596  | 5·241  | 5·000  | 6·545  | 6·394  |
| 5                | 55 | 11·578 | 12·094 | 13·685 | 13·891 | 12·592 | 12·563 | 14·221 | 14·194 |
|                  | 65 | 8·752  | 9·204  | 10·798 | 10·998 | 9·721  | 9·656  | 11·494 | 11·433 |
|                  | 75 | 5·935  | 6·237  | 7·501  | 7·637  | 6·783  | 6·661  | 8·272  | 8·172  |
|                  | 85 | 3·566  | 3·695  | 4·414  | 4·453  | 4·215  | 4·021  | 5·096  | 4·978  |
| 10               | 55 | 7·710  | 7·952  | 8·630  | 8·716  | 8·179  | 8·159  | 8·828  | 8·812  |
|                  | 65 | 6·322  | 6·578  | 7·418  | 7·523  | 6·859  | 6·814  | 7·753  | 7·712  |
|                  | 75 | 4·650  | 4·852  | 5·656  | 5·744  | 5·214  | 5·120  | 6·122  | 6·048  |
|                  | 85 | 3·001  | 3·101  | 3·636  | 3·668  | 3·502  | 3·341  | 4·130  | 4·034  |
| 15               | 55 | 5·674  | 5·807  | 6·157  | 6·200  | 5·932  | 5·918  | 6·251  | 6·239  |
|                  | 65 | 4·883  | 5·043  | 5·543  | 5·605  | 5·217  | 5·182  | 5·732  | 5·702  |
|                  | 75 | 3·794  | 3·937  | 4·487  | 4·548  | 4·195  | 4·119  | 4·795  | 4·737  |
|                  | 85 | 2·583  | 2·662  | 3·076  | 3·101  | 2·984  | 2·846  | 3·450  | 3·370  |

Table 14. *Annuity values ( $a_x$ ) using calendar year tables*

| Rate of<br>Interest (%) | Age | Pensioners      |                   |                   |                     | Annuitants       |                    |                    |                      |
|-------------------------|-----|-----------------|-------------------|-------------------|---------------------|------------------|--------------------|--------------------|----------------------|
|                         |     | Males,<br>Lives | Males,<br>Amounts | Females,<br>Lives | Females,<br>Amounts | Males,<br>Select | Males,<br>Ultimate | Females,<br>Select | Females,<br>Ultimate |
| Calendar year 1980      |     |                 |                   |                   |                     |                  |                    |                    |                      |
| 0                       | 55  | 19·598          | 20·884            | 25·368            | 25·952              | 22·228           | 22·175             | 27·227             | 27·174               |
|                         | 65  | 12·909          | 13·771            | 17·109            | 17·520              | 14·847           | 14·746             | 18·786             | 18·684               |
|                         | 75  | 7·763           | 8·222             | 10·279            | 10·490              | 9·101            | 8·933              | 11·654             | 11·510               |
|                         | 85  | 4·241           | 4·405             | 5·363             | 5·407               | 5·093            | 4·854              | 6·327              | 6·179                |
| 5                       | 55  | 11·353          | 11·856            | 13·417            | 13·618              | 12·343           | 12·313             | 13·954             | 13·926               |
|                         | 65  | 8·564           | 9·001             | 10·551            | 10·743              | 9·511            | 9·446              | 11·239             | 11·178               |
|                         | 75  | 5·802           | 6·091             | 7·310             | 7·439               | 6·628            | 6·506              | 8·067              | 7·967                |
|                         | 85  | 3·485           | 3·608             | 4·296             | 4·331               | 4·119            | 3·926              | 4·962              | 4·846                |
| 10                      | 55  | 7·625           | 7·866             | 8·547             | 8·633               | 8·091            | 8·071              | 8·751              | 8·734                |
|                         | 65  | 6·231           | 6·482             | 7·314             | 7·417               | 6·764            | 6·718              | 7·653              | 7·611                |
|                         | 75  | 4·570           | 4·765             | 5·552             | 5·636               | 5·125            | 5·030              | 6·015              | 5·941                |
|                         | 85  | 2·943           | 3·038             | 3·556             | 3·584               | 3·436            | 3·274              | 4·042              | 3·947                |
| 15                      | 55  | 5·634           | 5·769             | 6·125             | 6·169               | 5·894            | 5·880              | 6·222              | 6·210                |
|                         | 65  | 4·832           | 4·992             | 5·493             | 5·554               | 5·168            | 5·133              | 5·686              | 5·655                |
|                         | 75  | 3·742           | 3·882             | 4·424             | 4·483               | 4·140            | 4·063              | 4·734              | 4·676                |
|                         | 85  | 2·539           | 2·616             | 3·018             | 3·041               | 2·936            | 2·798              | 3·389              | 3·309                |

Table 14. (cont.)

| Calendar year 1990 |    |        |        |        |        |        |        |        |        |
|--------------------|----|--------|--------|--------|--------|--------|--------|--------|--------|
| 0                  | 55 | 19·968 | 21·274 | 25·808 | 26·399 | 22·662 | 22·611 | 27·675 | 27·622 |
|                    | 65 | 13·209 | 14·093 | 17·492 | 17·914 | 15·179 | 15·080 | 19·181 | 19·082 |
|                    | 75 | 7·981  | 8·458  | 10·578 | 10·799 | 9·347  | 9·183  | 11·971 | 11·829 |
|                    | 85 | 4·381  | 4·556  | 5·560  | 5·611  | 5·253  | 5·017  | 6·546  | 6·397  |
| 5                  | 55 | 11·486 | 11·990 | 13·544 | 13·744 | 12·490 | 12·462 | 14·073 | 14·046 |
|                    | 65 | 8·706  | 9·149  | 10·707 | 10·901 | 9·656  | 9·594  | 11·388 | 11·330 |
|                    | 75 | 5·932  | 6·230  | 7·472  | 7·605  | 6·767  | 6·648  | 8·229  | 8·131  |
|                    | 85 | 3·585  | 3·715  | 4·431  | 4·471  | 4·229  | 4·039  | 5·106  | 4·989  |
| 10                 | 55 | 7·685  | 7·924  | 8·594  | 8·679  | 8·154  | 8·136  | 8·792  | 8·776  |
|                    | 65 | 6·309  | 6·561  | 7·389  | 7·492  | 6·839  | 6·794  | 7·720  | 7·680  |
|                    | 75 | 4·655  | 4·855  | 5·649  | 5·736  | 5·211  | 5·120  | 6·108  | 6·036  |
|                    | 85 | 3·018  | 3·119  | 3·653  | 3·684  | 3·516  | 3·358  | 4·141  | 4·047  |
| 15                 | 55 | 5·666  | 5·799  | 6·147  | 6·190  | 5·927  | 5·914  | 6·241  | 6·229  |
|                    | 65 | 4·880  | 5·039  | 5·534  | 5·595  | 5·211  | 5·177  | 5·722  | 5·692  |
|                    | 75 | 3·801  | 3·943  | 4·488  | 4·548  | 4·197  | 4·124  | 4·792  | 4·735  |
|                    | 85 | 2·598  | 2·678  | 3·091  | 3·117  | 2·996  | 2·861  | 3·462  | 3·383  |



**Table 15. Calendar year in which annuity value ( $a_x$ ) using calendar year tables is approximately equal to annuity value using forecast tables**

| Rate of Interest (%) | Age | Pensioners   |                |                |                  | Annuitants    |                 |                 |                   |
|----------------------|-----|--------------|----------------|----------------|------------------|---------------|-----------------|-----------------|-------------------|
|                      |     | Males, Lives | Males, Amounts | Females, Lives | Females, Amounts | Males, Select | Males, Ultimate | Females, Select | Females, Ultimate |
| Entering in 1975     |     |              |                |                |                  |               |                 |                 |                   |
| 0                    | 55  | 1990         | 1991           | 1995           | 1995             | 1991          | 1991            | 1996            | 1996              |
|                      | 65  | 1985         | 1985           | 1988           | 1988             | 1986          | 1986            | 1989            | 1989              |
|                      | 75  | 1981         | 1981           | 1983           | 1983             | 1982          | 1982            | 1984            | 1984              |
|                      | 85  | 1978         | 1978           | 1979           | 1979             | 1979          | 1979            | 1980            | 1980              |
| 5                    | 55  | 1987         | 1988           | 1991           | 1992             | 1988          | 1988            | 1992            | 1992              |
|                      | 65  | 1983         | 1984           | 1986           | 1986             | 1984          | 1984            | 1987            | 1987              |
|                      | 75  | 1980         | 1980           | 1982           | 1982             | 1981          | 1981            | 1982            | 1982              |
|                      | 85  | 1978         | 1978           | 1979           | 1979             | 1979          | 1978            | 1979            | 1979              |
| 10                   | 55  | 1984         | 1985           | 1988           | 1988             | 1986          | 1986            | 1989            | 1988              |
|                      | 65  | 1982         | 1982           | 1984           | 1984             | 1983          | 1982            | 1985            | 1985              |
|                      | 75  | 1979         | 1980           | 1980           | 1981             | 1980          | 1980            | 1981            | 1981              |
|                      | 85  | 1978         | 1978           | 1978           | 1978             | 1978          | 1978            | 1979            | 1979              |
| 15                   | 55  | 1982         | 1983           | 1985           | 1985             | 1984          | 1983            | 1986            | 1986              |
|                      | 65  | 1980         | 1981           | 1982           | 1982             | 1981          | 1981            | 1983            | 1983              |
|                      | 75  | 1979         | 1979           | 1980           | 1980             | 1980          | 1979            | 1981            | 1980              |
|                      | 85  | 1977         | 1977           | 1978           | 1978             | 1978          | 1978            | 1978            | 1978              |

Table 15. (cont.)

| Entering in 1985 |    |      |      |      |      |      |      |      |      |
|------------------|----|------|------|------|------|------|------|------|------|
| 0                | 55 | 2000 | 2001 | 2005 | 2006 | 2002 | 2002 | 2007 | 2007 |
|                  | 65 | 1995 | 1996 | 1998 | 1999 | 1997 | 1996 | 2000 | 1999 |
|                  | 75 | 1991 | 1991 | 1993 | 1993 | 1992 | 1992 | 1994 | 1994 |
|                  | 85 | 1989 | 1989 | 1989 | 1989 | 1989 | 1989 | 1990 | 1990 |
| 5                | 55 | 1997 | 1998 | 2001 | 2002 | 1998 | 1998 | 2003 | 2003 |
|                  | 65 | 1993 | 1994 | 1996 | 1996 | 1994 | 1994 | 1997 | 1997 |
|                  | 75 | 1990 | 1991 | 1992 | 1992 | 1991 | 1991 | 1993 | 1992 |
|                  | 85 | 1988 | 1988 | 1989 | 1989 | 1989 | 1988 | 1989 | 1989 |
| 10               | 55 | 1994 | 1995 | 1998 | 1998 | 1995 | 1994 | 1999 | 1999 |
|                  | 65 | 1992 | 1992 | 1994 | 1994 | 1993 | 1993 | 1995 | 1995 |
|                  | 75 | 1989 | 1990 | 1991 | 1991 | 1990 | 1990 | 1991 | 1991 |
|                  | 85 | 1988 | 1988 | 1988 | 1988 | 1988 | 1988 | 1989 | 1989 |
| 15               | 55 | 1993 | 1993 | 1995 | 1995 | 1992 | 1991 | 1996 | 1996 |
|                  | 65 | 1991 | 1991 | 1992 | 1992 | 1991 | 1991 | 1993 | 1993 |
|                  | 75 | 1989 | 1989 | 1990 | 1990 | 1990 | 1989 | 1990 | 1990 |
|                  | 85 | 1987 | 1987 | 1988 | 1988 | 1988 | 1988 | 1988 | 1988 |

'amounts' tables for the calculation of monetary values would be more prudent than the use of the 'lives' tables. The proposed standard tables will therefore be based on the 'amounts' tables.

43. The proposed standard tables are shown in Tables 16 and 17 designated PA(90) and *a*(90) for pensioners (amounts) and annuitants respectively. They are the same as the Peg 1967-70 and *aeg* 1967-70 tables (adjusted for females) with a deduction of  $1\frac{2}{3}$  of a year from the age. Tables based on 'lives' mortality, PL(90), are also shown although it is not intended to base monetary functions on these. Tables 18 and 19 show comparisons of the mortality rates in the proposed new tables with those of other mortality tables, and Tables 20 and 21 show similar comparisons of selected annuity values.

#### PENSION SCHEME WIDOWS

44. The Committee has, as yet, no data on which to base mortality tables for the widows of life office pensioners and of those members of pension schemes who die in service. Even in the information being collected from 1975 onwards there will be very little data for the widows of pension scheme members who die in service, and the experience of the widows of those who die after retirement may be confused by the mixing of compulsory widows' pensions with optional commutations of pension into joint life and survivor benefits. It will be many years before any significant number of female members' widowers receive any benefits. Nevertheless, the granting of widows' pension benefits, whether before or after retirement, requires offices to use some mortality rates to calculate appropriate premiums and reserves for such benefits. No doubt the *a*(55) table has been used in the past, perhaps adjusted in some way, without any justification on the basis of collective experience (though some offices may have investigated their own experience). The Committee, however, felt that it should give some consideration to the appropriate mortality to use.

45. The mortality of pensioners retiring at or after normal pension age is generally lighter than population mortality but heavier than that of assured lives; this is true over the main ages relevant to pensioners, namely 65 to 80. [Below age 65 for males (but not at all for females) the graduated Peg 1967-70 rates are higher than McCutcheon and Eilbeck's graduated rates for ELT 13; it seems likely that at least some retirements 'at normal pension age' before age 65 are of those who are less than fully fit for work. Above age 85 for males the graduated Peg 1967-70 rates are lower than the A1967-70 assured lives rates; pensioners at these ages include the survivors of these who experienced comparatively good mortality in 1948-50 at the start of the pensioners' investigation]. Pensioners retiring at or after normal pension age are a more select group than the whole population on three counts: they exclude those who have been so unfit as never to work; they exclude those who have retired early through ill health; and to some extent they include those in higher 'social classes' who experience lighter mortality than the population as a whole (this should be

particularly true of the 'amounts' data). On the other hand the medical selection of assured lives is probably more stringent than a requirement just to be at work, and the effects of medical selection appear to continue for a very long time.

46. Some of the same conditions apply to the widows of pension scheme members. They are likely to be of the same 'social class' as their spouses, but there is no reason to expect them to be in particularly good health at any time except when a widow's pension option can be taken voluntarily. In the population as a whole the mortality of widows is worse than that of married females. It seems likely that the mortality of male pensioners' widows would be somewhat worse than that of female pensioners, though better than that of the female population as a whole. It is, therefore, on the safe side to use female pensioners' mortality for members' widows; indeed a rather higher mortality level could still be considered sufficiently prudent. However, in the absence of any better information, the Committee recommends the use of the female pensioners' mortality table for widows of pension scheme members.

47. The Peg 1967-70 tables and the PA(90) tables for female lives have therefore been extended down to age 20 to provide a basis for the widows of members of pension schemes who die in service, as noted in paragraph 35.

#### PUBLISHED TABLES

48. The precise monetary and other values to be printed will be decided after the views of life offices and others have been canvassed. The general style of the  $a(55)$  tables seems appropriate for the  $a(90)$  tables. There is no precedent for pensioners' tables, but the functions probably required are only: mortality functions; commutation factors  $D$ ,  $N$ , and  $S$ ; annuity values for single lives; possibly values of  ${}_5E_x$  and  ${}_{10}E_x$  for aid in calculating annuities guaranteed for 5 or 10 years; annuity values both joint life and last survivor for one male at ages over about 55 and one female life (there appears to be no need for annuity values for two males or for two females in the pensioners' tables); all at suitable rates of interest (perhaps including negative rates to allow for pensions escalating at a higher rate than the rate of interest).

#### CAUTION

49. Finally, the Committee must stress that none of the mortality tables presented is in any way suitable for the in-service, mortality of members of pension schemes or for the mortality of the life on whose death a reversionary annuity or widow's pension may commence. For these something closer to assured lives mortality would be appropriate. Nor are the tables appropriate, without adjustment, to purchasers of retirement annuities under the provisions of the Finance Act 1956, whose mortality in 1971-74 was substantially *lower* than that of ordinary annuitants (see *C.M.I.R.*, 3, 69).

Table 16. *Proposed standard tables for Pensioners:  $q_x$* 

| Age | PA(90)  |         | PL(90)  |         | Age |
|-----|---------|---------|---------|---------|-----|
|     | Males   | Females | Males   | Females |     |
| 20  |         | ·000301 |         | ·000385 | 20  |
| 21  |         | ·000301 |         | ·000385 | 21  |
| 22  |         | ·000301 |         | ·000385 | 22  |
| 23  |         | ·000301 |         | ·000385 | 23  |
| 24  |         | ·000301 |         | ·000385 | 24  |
| 25  |         | ·000301 |         | ·000385 | 25  |
| 26  |         | ·000301 |         | ·000385 | 26  |
| 27  |         | ·000301 |         | ·000385 | 27  |
| 28  |         | ·000301 |         | ·000385 | 28  |
| 29  |         | ·000301 |         | ·000385 | 29  |
| 30  |         | ·000301 |         | ·000385 | 30  |
| 31  |         | ·000301 |         | ·000385 | 31  |
| 32  |         | ·000332 |         | ·000423 | 32  |
| 33  |         | ·000371 |         | ·000470 | 33  |
| 34  |         | ·000413 |         | ·000522 | 34  |
| 35  |         | ·000461 |         | ·000579 | 35  |
| 36  |         | ·000514 |         | ·000643 | 36  |
| 37  |         | ·000573 |         | ·000714 | 37  |
| 38  |         | ·000639 |         | ·000793 | 38  |
| 39  |         | ·000712 |         | ·000881 | 39  |
| 40  |         | ·000794 |         | ·000978 | 40  |
| 41  |         | ·000885 |         | ·001086 | 41  |
| 42  |         | ·000987 |         | ·001206 | 42  |
| 43  |         | ·001100 |         | ·001339 | 43  |
| 44  |         | ·001227 |         | ·001487 | 44  |
| 45  |         | ·001367 |         | ·001652 | 45  |
| 46  |         | ·001524 |         | ·001834 | 46  |
| 47  |         | ·001699 |         | ·002036 | 47  |
| 48  |         | ·001895 |         | ·002261 | 48  |
| 49  |         | ·002112 |         | ·002510 | 49  |
| 50  | ·006646 | ·002354 | ·008575 | ·002787 | 50  |
| 51  | ·007265 | ·002624 | ·009322 | ·003095 | 51  |
| 52  | ·007940 | ·002925 | ·010134 | ·003436 | 52  |
| 53  | ·008678 | ·003261 | ·011015 | ·003814 | 53  |
| 54  | ·009484 | ·003634 | ·011972 | ·004234 | 54  |
| 55  | ·010364 | ·004051 | ·013011 | ·004700 | 55  |
| 56  | ·011324 | ·004515 | ·014139 | ·005217 | 56  |
| 57  | ·012373 | ·005031 | ·015363 | ·005791 | 57  |
| 58  | ·013517 | ·005607 | ·016692 | ·006427 | 58  |
| 59  | ·014765 | ·006247 | ·018133 | ·007133 | 59  |

Table 16 (cont.)

| Age | PA(90)  |         | PL(90)  |         | Age |
|-----|---------|---------|---------|---------|-----|
|     | Males   | Females | Males   | Females |     |
| 60  | ·016127 | ·006961 | ·019696 | ·007916 | 60  |
| 61  | ·017612 | ·007755 | ·021391 | ·008784 | 61  |
| 62  | ·019232 | ·008640 | ·023229 | ·009746 | 62  |
| 63  | ·020997 | ·009624 | ·025220 | ·010812 | 63  |
| 64  | ·022920 | ·010719 | ·027377 | ·011993 | 64  |
| 65  | ·025015 | ·011937 | ·029713 | ·013302 | 65  |
| 66  | ·027296 | ·013291 | ·032242 | ·014751 | 66  |
| 67  | ·029778 | ·014797 | ·034978 | ·016356 | 67  |
| 68  | ·032479 | ·016471 | ·037937 | ·018132 | 68  |
| 69  | ·035416 | ·018331 | ·041136 | ·020097 | 69  |
| 70  | ·038608 | ·020396 | ·044592 | ·022271 | 70  |
| 71  | ·042075 | ·022689 | ·048324 | ·024673 | 71  |
| 72  | ·045838 | ·025233 | ·052351 | ·027327 | 72  |
| 73  | ·049920 | ·028053 | ·056694 | ·030258 | 73  |
| 74  | ·054346 | ·031179 | ·061374 | ·033492 | 74  |
| 75  | ·059139 | ·034641 | ·066413 | ·037059 | 75  |
| 76  | ·064326 | ·038472 | ·071833 | ·040989 | 76  |
| 77  | ·069935 | ·042708 | ·077660 | ·045317 | 77  |
| 78  | ·075992 | ·047387 | ·083916 | ·050078 | 78  |
| 79  | ·082528 | ·052551 | ·090627 | ·055310 | 79  |
| 80  | ·089572 | ·058243 | ·097817 | ·061054 | 80  |
| 81  | ·097153 | ·064510 | ·105511 | ·067351 | 81  |
| 82  | ·105301 | ·071400 | ·113734 | ·074247 | 82  |
| 83  | ·114047 | ·078963 | ·122511 | ·081787 | 83  |
| 84  | ·123418 | ·087253 | ·131864 | ·090018 | 84  |
| 85  | ·133444 | ·096321 | ·141815 | ·098988 | 85  |
| 86  | ·144150 | ·106223 | ·152386 | ·108745 | 86  |
| 87  | ·155561 | ·117011 | ·163594 | ·119337 | 87  |
| 88  | ·167699 | ·128736 | ·175456 | ·130808 | 88  |
| 89  | ·180580 | ·141448 | ·187985 | ·143203 | 89  |
| 90  | ·194221 | ·155192 | ·201191 | ·156562 | 90  |
| 91  | ·208629 | ·170007 | ·215078 | ·170917 | 91  |
| 92  | ·223809 | ·185924 | ·229648 | ·186298 | 92  |
| 93  | ·239760 | ·202968 | ·244897 | ·202725 | 93  |
| 94  | ·256471 | ·221150 | ·260817 | ·220208 | 94  |
| 95  | ·273928 | ·240469 | ·277390 | ·238748 | 95  |
| 96  | ·292106 | ·260910 | ·294598 | ·258331 | 96  |
| 97  | ·310973 | ·282443 | ·312411 | ·278933 | 97  |
| 98  | ·330491 | ·305019 | ·330796 | ·300511 | 98  |
| 99  | ·350609 | ·328574 | ·349713 | ·323011 | 99  |



Table 16. (cont.)

| Age | PA(90)  |         | PL(90)  |         | Age |
|-----|---------|---------|---------|---------|-----|
|     | Males   | Females | Males   | Females |     |
| 100 | ·371274 | ·353024 | ·369115 | ·346361 | 100 |
| 101 | ·392420 | ·378268 | ·388949 | ·370476 | 101 |
| 102 | ·413978 | ·404189 | ·409158 | ·395254 | 102 |
| 103 | ·435871 | ·430657 | ·429679 | ·420582 | 103 |
| 104 | ·458016 | ·457526 | ·450444 | ·446336 | 104 |
| 105 | ·480329 | ·484645 | ·471384 | ·472381 | 105 |
| 106 | ·502720 | ·511855 | ·492424 | ·498577 | 106 |
| 107 | ·525100 | ·538995 | ·513492 | ·524780 | 107 |
| 108 | ·547380 | ·565905 | ·534511 | ·550848 | 108 |
| 109 | ·569472 | ·592433 | ·555409 | ·576640 | 109 |
| 110 | ·591291 | ·618432 | ·576113 | ·602021 | 110 |
| 111 | ·612756 | ·643770 | ·596552 | ·626864 | 111 |
| 112 | ·633791 | ·668328 | ·616662 | ·651056 | 112 |
| 113 | ·654329 | ·692003 | ·636381 | ·674494 | 113 |
| 114 | ·674306 | ·714709 | ·655652 | ·697090 | 114 |

Table 17. *Proposed standard tables for Annuitants: a(90)*

| Males |            |            | Females    |            |     |
|-------|------------|------------|------------|------------|-----|
| Age   | Durations  |            | Durations  |            | Age |
|       | Duration 0 | 1 and over | Duration 0 | 1 and over |     |
|       | $q_{[x]}$  | $q_x$      | $q_{[x]}$  | $q_x$      |     |
| 20    | ·000669    | ·000947    | ·000177    | ·000340    | 20  |
| 21    | ·000632    | ·000894    | ·000171    | ·000329    | 21  |
| 22    | ·000598    | ·000846    | ·000168    | ·000323    | 22  |
| 23    | ·000566    | ·000802    | ·000171    | ·000328    | 23  |
| 24    | ·000538    | ·000762    | ·000178    | ·000342    | 24  |
| 25    | ·000514    | ·000727    | ·000188    | ·000361    | 25  |
| 26    | ·000493    | ·000697    | ·000196    | ·000376    | 26  |
| 27    | ·000476    | ·000674    | ·000202    | ·000389    | 27  |
| 28    | ·000464    | ·000657    | ·000207    | ·000397    | 28  |
| 29    | ·000458    | ·000647    | ·000209    | ·000401    | 29  |
| 30    | ·000456    | ·000646    | ·000213    | ·000409    | 30  |
| 31    | ·000461    | ·000652    | ·000221    | ·000424    | 31  |
| 32    | ·000473    | ·000669    | ·000232    | ·000445    | 32  |
| 33    | ·000492    | ·000696    | ·000247    | ·000475    | 33  |
| 34    | ·000518    | ·000734    | ·000267    | ·000512    | 34  |
| 35    | ·000554    | ·000784    | ·000292    | ·000561    | 35  |
| 36    | ·000600    | ·000849    | ·000323    | ·000619    | 36  |
| 37    | ·000656    | ·000928    | ·000359    | ·000689    | 37  |
| 38    | ·000723    | ·001024    | ·000401    | ·000771    | 38  |
| 39    | ·000804    | ·001137    | ·000451    | ·000865    | 39  |

Table 17. (cont.)

| Age | Males      |                         | Females    |                         | Age |
|-----|------------|-------------------------|------------|-------------------------|-----|
|     | Duration 0 | Durations<br>1 and over | Duration 0 | Durations<br>1 and over |     |
|     | $q_{[x]}$  | $q_x$                   | $q_{[x]}$  | $q_x$                   |     |
| 40  | ·000898    | ·001271                 | ·000506    | ·000972                 | 40  |
| 41  | ·001008    | ·001426                 | ·000569    | ·001092                 | 41  |
| 42  | ·001134    | ·001605                 | ·000637    | ·001224                 | 42  |
| 43  | ·001279    | ·001809                 | ·000712    | ·001367                 | 43  |
| 44  | ·001443    | ·002043                 | ·000792    | ·001521                 | 44  |
| 45  | ·001630    | ·002307                 | ·000878    | ·001686                 | 45  |
| 46  | ·001841    | ·002605                 | ·000968    | ·001859                 | 46  |
| 47  | ·002078    | ·002941                 | ·001063    | ·002042                 | 47  |
| 48  | ·002345    | ·003318                 | ·001163    | ·002233                 | 48  |
| 49  | ·002642    | ·003739                 | ·001267    | ·002434                 | 49  |
| 50  | ·002975    | ·004209                 | ·001377    | ·002645                 | 50  |
| 51  | ·003345    | ·004733                 | ·001493    | ·002868                 | 51  |
| 52  | ·003757    | ·005316                 | ·001617    | ·003106                 | 52  |
| 53  | ·004217    | ·005968                 | ·001750    | ·003362                 | 53  |
| 54  | ·004744    | ·006713                 | ·001894    | ·003637                 | 54  |
| 55  | ·005349    | ·007569                 | ·002050    | ·003938                 | 55  |
| 56  | ·006037    | ·008543                 | ·002227    | ·004277                 | 56  |
| 57  | ·006809    | ·009635                 | ·002431    | ·004668                 | 57  |
| 58  | ·007659    | ·010838                 | ·002669    | ·005125                 | 58  |
| 59  | ·008582    | ·012144                 | ·002947    | ·005659                 | 59  |
| 60  | ·009570    | ·013542                 | ·003270    | ·006280                 | 60  |
| 61  | ·010617    | ·015024                 | ·003640    | ·006990                 | 61  |
| 62  | ·011722    | ·016587                 | ·004056    | ·007790                 | 62  |
| 63  | ·012887    | ·018236                 | ·004520    | ·008680                 | 63  |
| 64  | ·014121    | ·019982                 | ·005030    | ·009659                 | 64  |
| 65  | ·015440    | ·021849                 | ·005589    | ·010734                 | 65  |
| 66  | ·016863    | ·023862                 | ·006204    | ·011915                 | 66  |
| 67  | ·018316    | ·026049                 | ·006996    | ·013220                 | 67  |
| 68  | ·019880    | ·028432                 | ·007903    | ·014665                 | 68  |
| 69  | ·021576    | ·031025                 | ·008926    | ·016265                 | 69  |
| 70  | ·023412    | ·033846                 | ·010080    | ·018037                 | 70  |
| 71  | ·025401    | ·036914                 | ·011381    | ·019998                 | 71  |
| 72  | ·027554    | ·040249                 | ·012848    | ·022167                 | 72  |
| 73  | ·029883    | ·043871                 | ·014502    | ·024566                 | 73  |
| 74  | ·032404    | ·047803                 | ·016365    | ·027217                 | 74  |
| 75  | ·035129    | ·052068                 | ·018462    | ·030145                 | 75  |
| 76  | ·038074    | ·056691                 | ·020823    | ·033377                 | 76  |
| 77  | ·041255    | ·061697                 | ·023478    | ·036943                 | 77  |
| 78  | ·044690    | ·067115                 | ·026463    | ·040874                 | 78  |
| 79  | ·048397    | ·072971                 | ·029816    | ·045203                 | 79  |

Table 17. (cont.)

| Age | Males      |                         | Females    |                         | Age |
|-----|------------|-------------------------|------------|-------------------------|-----|
|     | Duration 0 | Durations<br>1 and over | Duration 0 | Durations<br>1 and over |     |
|     | $q_{(x)}$  | $q_x$                   | $q_{(x)}$  | $q_x$                   |     |
| 80  | ·052394    | ·079295                 | ·033579    | ·049967                 | 80  |
| 81  | ·056701    | ·086115                 | ·037798    | ·055204                 | 81  |
| 82  | ·061340    | ·093463                 | ·042525    | ·060955                 | 82  |
| 83  | ·066332    | ·101369                 | ·047813    | ·067262                 | 83  |
| 84  | ·071699    | ·109861                 | ·053721    | ·074170                 | 84  |
| 85  | ·077463    | ·118972                 | ·060313    | ·081726                 | 85  |
| 86  | ·083650    | ·128728                 | ·067482    | ·089976                 | 86  |
| 87  | ·090283    | ·139158                 | ·074227    | ·098970                 | 87  |
| 88  | ·097385    | ·150288                 | ·081566    | ·108755                 | 88  |
| 89  | ·104982    | ·162140                 | ·089534    | ·119379                 | 89  |
| 90  | ·113097    | ·174735                 | ·098167    | ·130889                 | 90  |
| 91  | ·121754    | ·188088                 | ·107496    | ·143378                 | 91  |
| 92  | ·130976    | ·202211                 | ·117552    | ·156736                 | 92  |
| 93  | ·140784    | ·217112                 | ·128361    | ·171147                 | 93  |
| 94  | ·151199    | ·232790                 | ·139943    | ·186591                 | 94  |
| 95  | ·162239    | ·249240                 | ·152315    | ·203086                 | 95  |
| 96  | ·173920    | ·266449                 | ·165483    | ·220644                 | 96  |
| 97  | ·186255    | ·284395                 | ·179449    | ·239265                 | 97  |
| 98  | ·199254    | ·303051                 | ·194201    | ·258935                 | 98  |
| 99  | ·212922    | ·322380                 | ·209720    | ·279627                 | 89  |
| 100 | ·227262    | ·342336                 | ·225976    | ·301301                 | 100 |
| 101 | ·242271    | ·362865                 | ·242924    | ·323899                 | 101 |
| 102 | ·257940    | ·383907                 | ·260512    | ·347350                 | 102 |
| 103 | ·274256    | ·405393                 | ·278674    | ·371565                 | 103 |
| 104 | ·291198    | ·427248                 | ·297332    | ·396443                 | 104 |
| 105 | ·308742    | ·449390                 | ·316402    | ·421869                 | 105 |
| 106 | ·326856    | ·471734                 | ·335786    | ·447715                 | 106 |
| 107 | ·345501    | ·494193                 | ·355386    | ·473848                 | 107 |
| 108 | ·364634    | ·516675                 | ·375093    | ·500124                 | 108 |
| 109 | ·384204    | ·539089                 | ·394800    | ·526400                 | 109 |
| 110 | ·404156    | ·561347                 | ·414397    | ·552530                 | 110 |
| 111 | ·424431    | ·583361                 | ·433780    | ·578373                 | 111 |
| 112 | ·444963    | ·605047                 | ·452846    | ·603794                 | 112 |
| 113 | ·465684    | ·626327                 | ·471500    | ·628666                 | 113 |
| 114 | ·486525    | ·647129                 | ·489656    | ·652875                 | 114 |

Table 18. *Values of  $10^5q_x$  and  $10^5q_{[x]}$  by various tables: Males*

| Age | PL(90) | PA(90) | $10^5q_x$ (ultimate) |                 |         |          |            |         | $10^5q_{[x]}$ (select) |         |         |         |         |     | Age |
|-----|--------|--------|----------------------|-----------------|---------|----------|------------|---------|------------------------|---------|---------|---------|---------|-----|-----|
|     |        |        | Peg<br>(mL)          | 1967-70<br>(mA) | $a(55)$ | A1967-70 | ELT<br>13* | $aeg$   |                        | A       |         | $aeg$   |         |     |     |
|     |        |        |                      |                 |         |          |            | 1967-70 | $a(90)$                | $a(55)$ | 1967-70 | 1967-70 | $a(90)$ |     |     |
| 20  |        |        |                      |                 | 118     | 89       | 106        | 89      | 95                     | 71      | 66      | 63      | 67      | 20  |     |
| 25  |        |        |                      |                 | 128     | 69       | 88         | 69      | 73                     | 77      | 47      | 49      | 51      | 25  |     |
| 30  |        |        |                      |                 | 139     | 65       | 97         | 65      | 65                     | 83      | 44      | 46      | 46      | 30  |     |
| 35  |        |        |                      |                 | 168     | 86       | 134        | 86      | 78                     | 101     | 60      | 60      | 55      | 35  |     |
| 40  |        |        |                      |                 | 230     | 144      | 226        | 144     | 127                    | 138     | 102     | 102     | 90      | 40  |     |
| 45  |        |        |                      |                 | 349     | 264      | 416        | 264     | 231                    | 209     | 174     | 186     | 163     | 45  |     |
| 50  | 858    | 665    | 940                  | 733             | 547     | 479      | 739        | 479     | 421                    | 328     | 286     | 338     | 298     | 50  |     |
| 55  | 1,301  | 1,036  | 1,426                | 1,143           | 870     | 844      | 1,248      | 875     | 757                    | 522     | 447     | 619     | 535     | 55  |     |
| 60  | 1,970  | 1,613  | 2,157                | 1,777           | 1,402   | 1,443    | 2,075      | 1,527   | 1,354                  | 841     | 670     | 1,079   | 957     | 60  |     |
| 65  | 2,971  | 2,502  | 3,251                | 2,753           | 2,297   | 2,403    | 3,453      | 2,407   | 2,185                  | 1,378   | 969     | 1,701   | 1,544   | 65  |     |
| 70  | 4,459  | 3,861  | 4,871                | 4,244           | 3,776   | 3,911    | 5,546      | 3,724   | 3,385                  | 2,266   | 1,363   | 2,561   | 2,341   | 70  |     |
| 75  | 6,641  | 5,914  | 7,240                | 6,487           | 6,164   | 6,229    | 8,269      | 5,717   | 5,207                  | 3,698   | 1,875   | 3,838   | 3,513   | 75  |     |
| 80  | 9,782  | 8,957  | 10,631               | 9,794           | 9,861   | 9,703    | 12,019     | 8,683   | 7,930                  | 6,212   | 2,531   | 5,715   | 5,239   | 80  |     |
| 85  | 14,182 | 13,344 | 15,348               | 14,526          | 15,246  | 14,727   | 17,293     | 12,974  | 11,897                 | 10,291  |         | 8,429   | 7,746   | 85  |     |
| 90  | 20,119 | 19,422 | 21,650               | 21,011          | 22,413  | 21,651   | 24,077     | 18,947  | 17,474                 | 16,137  |         | 12,265  | 11,310  | 90  |     |
| 95  | 27,739 | 27,393 | 29,635               | 29,396          | 30,903  | 30,593   | 31,999     | 26,821  | 24,924                 | 22,250  |         | 17,512  | 16,224  | 95  |     |
| 100 | 36,912 | 37,127 | 39,095               | 39,456          | 39,668  | 41,229   | 40,535     | 36,495  | 34,234                 |         |         | 24,381  | 22,726  | 100 |     |

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Table 19. Values of  $10^5 q_x$  and  $10^5 q_{[x]}$  by various tables: Females

| Age | PL(90) | PA(90) | $10^5 q_x$ (ultimate) |        | $a(55)$ | ELT 13* | $aeg$   |  | $a(90)$ | $10^5 q_{[x]}$ (select) |         |         | Age |
|-----|--------|--------|-----------------------|--------|---------|---------|---------|--|---------|-------------------------|---------|---------|-----|
|     |        |        | Peg 1967-70           |        |         |         | 1967-70 |  |         | $aeg$                   | 1967-70 | $a(90)$ |     |
|     |        |        | (fL)                  | (fA)   |         |         |         |  |         |                         |         |         |     |
| 20  | 39     | 30     |                       |        | 117     | 45      | 33      |  | 34      | 70                      | 16      | 18      | 20  |
| 25  | 39     | 30     |                       |        | 123     | 45      | 38      |  | 36      | 74                      | 19      | 19      | 25  |
| 30  | 39     | 30     |                       |        | 132     | 60      | 43      |  | 41      | 79                      | 21      | 21      | 30  |
| 35  | 58     | 46     |                       |        | 153     | 93      | 63      |  | 56      | 92                      | 31      | 29      | 35  |
| 40  | 98     | 79     |                       |        | 191     | 160     | 111     |  | 97      | 115                     | 55      | 51      | 40  |
| 45  | 165    | 137    |                       |        | 261     | 281     | 188     |  | 169     | 157                     | 93      | 88      | 45  |
| 50  | 279    | 235    | 313                   | 265    | 376     | 449     | 289     |  | 265     | 226                     | 144     | 138     | 50  |
| 55  | 470    | 405    | 527                   | 456    | 553     | 676     | 484     |  | 394     | 332                     | 241     | 205     | 55  |
| 60  | 792    | 696    | 888                   | 784    | 855     | 1,025   | 836     |  | 628     | 513                     | 416     | 327     | 60  |
| 65  | 1,330  | 1,194  | 1,490                 | 1,343  | 1,385   | 1,641   | 1,262   |  | 1,073   | 831                     | 627     | 559     | 65  |
| 70  | 2,227  | 2,040  | 2,493                 | 2,293  | 2,307   | 2,784   | 1,971   |  | 1,804   | 1,384                   | 1,152   | 1,008   | 70  |
| 75  | 3,706  | 3,464  | 4,140                 | 3,888  | 3,881   | 4,787   | 3,250   |  | 3,015   | 2,329                   | 2,107   | 1,846   | 75  |
| 80  | 6,105  | 5,824  | 6,801                 | 6,517  | 6,495   | 8,014   | 5,490   |  | 4,997   | 4,092                   | 3,825   | 3,358   | 80  |
| 85  | 9,899  | 9,632  | 10,977                | 10,726 | 10,628  | 12,937  | 9,207   |  | 8,173   | 7,174                   | 6,844   | 6,031   | 85  |
| 90  | 15,656 | 15,519 | 17,241                | 17,155 | 16,694  | 19,805  | 14,839  |  | 13,089  | 12,020                  | 11,129  | 9,817   | 90  |
| 95  | 23,875 | 24,047 | 26,035                | 26,301 | 24,688  | 28,831  | 22,323  |  | 20,309  | 17,775                  | 16,742  | 15,232  | 95  |
| 100 | 34,636 | 35,302 | 37,293                | 38,083 | 33,846  | 40,489  | 30,729  |  | 30,130  |                         | 23,047  | 22,598  | 100 |

\*McCutcheon and Eilbeck's Graduation No. 4.

Table 20. Comparison of annuity values ( $a_x$ ) by various tables: Males

| Rate of interest (%) | Age | PL(90) | PA(90) | Peg 1967-70 |        | $a(55)$<br>ultimate | $aeg$<br>1967-70 |          | $a(90)$<br>ultimate | $a(55)$<br>select | $aeg$<br>1967-70 |        | $a(90)$<br>select |
|----------------------|-----|--------|--------|-------------|--------|---------------------|------------------|----------|---------------------|-------------------|------------------|--------|-------------------|
|                      |     |        |        | (mL)        | (mA)   |                     | ultimate         | ultimate |                     |                   | select           | select |                   |
| 0                    | 55  | 19·968 | 21·274 | 19·158      | 20·420 | 21·369              | 21·686           | 22·611   | 21·445              | 21·742            | 22·662           |        |                   |
|                      | 65  | 13·209 | 14·093 | 12·555      | 13·391 | 13·807              | 14·351           | 15·080   | 13·936              | 14·455            | 15·179           |        |                   |
|                      | 75  | 7·981  | 8·458  | 7·507       | 7·944  | 7·891               | 8·639            | 9·183    | 8·098               | 8·811             | 9·347            |        |                   |
|                      | 85  | 4·381  | 4·556  | 4·078       | 4·228  | 4·007               | 4·663            | 5·017    | 4·241               | 4·907             | 5·253            |        |                   |
| 5                    | 55  | 11·486 | 11·990 | 11·192      | 11·694 | 12·122              | 12·149           | 12·462   | 12·164              | 12·180            | 12·490           |        |                   |
|                      | 65  | 8·706  | 9·149  | 8·393       | 8·823  | 9·081               | 9·269            | 9·594    | 9·166               | 9·336             | 9·656            |        |                   |
|                      | 75  | 5·932  | 6·230  | 5·646       | 5·925  | 5·915               | 6·336            | 6·648    | 6·071               | 6·462             | 6·767            |        |                   |
|                      | 85  | 3·585  | 3·715  | 3·367       | 3·481  | 3·321               | 3·792            | 4·039    | 3·515               | 3·990             | 4·229            |        |                   |
| 10                   | 55  | 7·685  | 7·924  | 7·552       | 7·795  | 8·017               | 8·001            | 8·136    | 8·045               | 8·022             | 8·154            |        |                   |
|                      | 65  | 6·309  | 6·561  | 6·136       | 6·386  | 6·555               | 6·625            | 6·794    | 6·617               | 6·673             | 6·839            |        |                   |
|                      | 75  | 4·655  | 4·855  | 4·468       | 4·658  | 4·665               | 4·923            | 5·120    | 4·787               | 5·021             | 5·211            |        |                   |
|                      | 85  | 3·018  | 3·119  | 2·854       | 2·943  | 2·823               | 3·176            | 3·358    | 2·988               | 3·342             | 3·516            |        |                   |
| 15                   | 55  | 5·666  | 5·799  | 5·595       | 5·732  | 5·862               | 5·844            | 5·914    | 5·882               | 5·859             | 5·927            |        |                   |
|                      | 65  | 4·880  | 5·039  | 4·774       | 4·934  | 5·051               | 5·078            | 5·177    | 5·098               | 5·114             | 5·211            |        |                   |
|                      | 75  | 3·801  | 3·943  | 3·670       | 3·807  | 3·820               | 3·990            | 4·124    | 3·921               | 4·070             | 4·197            |        |                   |
|                      | 85  | 2·598  | 2·678  | 2·470       | 2·541  | 2·448               | 2·722            | 2·861    | 2·591               | 2·864             | 2·996            |        |                   |

Table 21. *Comparison of annuity values ( $a_x$ ) by various tables: Females*

| Rate of<br>interest<br>(%) | Age | PL(90) | PA(90) | Peg 1967-70 |        | $a(55)$<br>ultimate | $aeg$<br>1967-70 |          | $a(90)$<br>ultimate | $a(55)$<br>select | $aeg$<br>1967-70 |        | $a(90)$<br>select |
|----------------------------|-----|--------|--------|-------------|--------|---------------------|------------------|----------|---------------------|-------------------|------------------|--------|-------------------|
|                            |     |        |        | (fL)        | (fA)   |                     | ultimate         | ultimate |                     |                   | select           | select |                   |
| 0                          | 55  | 25.808 | 26.399 | 24.843      | 25.417 | 25.293              | 26.473           | 27.622   | 25.349              | 26.538            | 27.675           |        |                   |
|                            | 65  | 17.492 | 17.914 | 16.653      | 17.053 | 17.089              | 18.269           | 19.082   | 17.185              | 18.386            | 19.181           |        |                   |
|                            | 75  | 10.578 | 10.799 | 9.927       | 10.126 | 10.205              | 11.163           | 11.829   | 10.370              | 11.294            | 11.971           |        |                   |
|                            | 85  | 5.560  | 5.611  | 5.133       | 5.169  | 5.295               | 5.859            | 6.397    | 5.500               | 6.011             | 6.546            |        |                   |
| 5                          | 55  | 13.544 | 13.744 | 13.263      | 13.464 | 13.390              | 13.698           | 14.046   | 13.420              | 13.731            | 14.073           |        |                   |
|                            | 65  | 10.707 | 10.901 | 10.362      | 10.552 | 10.553              | 11.021           | 11.330   | 10.612              | 11.092            | 11.388           |        |                   |
|                            | 75  | 7.472  | 7.605  | 7.116       | 7.239  | 7.272               | 7.796            | 8.131    | 7.389               | 7.886             | 8.229            |        |                   |
|                            | 85  | 4.431  | 4.471  | 4.137       | 4.167  | 4.244               | 4.627            | 4.989    | 4.408               | 4.748             | 5.106            |        |                   |
| 10                         | 55  | 8.594  | 8.679  | 8.489       | 8.576  | 8.532               | 8.634            | 8.776    | 8.551               | 8.655             | 8.792            |        |                   |
|                            | 65  | 7.389  | 7.492  | 7.222       | 7.325  | 7.320               | 7.539            | 7.680    | 7.361               | 7.587             | 7.720            |        |                   |
|                            | 75  | 5.649  | 5.736  | 5.434       | 5.516  | 5.531               | 5.848            | 6.036    | 5.620               | 5.917             | 6.108            |        |                   |
|                            | 85  | 3.653  | 3.684  | 3.440       | 3.465  | 3.514               | 3.791            | 4.047    | 3.650               | 3.889             | 4.141            |        |                   |
| 15                         | 55  | 6.147  | 6.190  | 6.097       | 6.143  | 6.115               | 6.156            | 6.229    | 6.128               | 6.171             | 6.241            |        |                   |
|                            | 65  | 5.534  | 5.595  | 5.441       | 5.504  | 5.498               | 5.615            | 5.692    | 5.529               | 5.651             | 5.722            |        |                   |
|                            | 75  | 4.488  | 4.548  | 4.347       | 4.405  | 4.412               | 4.620            | 4.735    | 4.484               | 4.675             | 4.792            |        |                   |
|                            | 85  | 3.091  | 3.117  | 2.931       | 2.951  | 2.985               | 3.193            | 3.383    | 3.101               | 3.276             | 3.462            |        |                   |

## MORTALITY OF ASSURED LIVES

### EXPERIENCES FOR 1971-74

THIS report is on the experiences of the years 1971-74. The previous report on the mortality of assured lives related to the years 1967-70 and was published in *C.M.I.R.* 1, 19; at that time the only data collected were for the main investigation based on whole-life and endowment assurances issued in the U.K. on male lives, a very small proportion of female lives also being included by a few offices; in this latest report separate sections are included on the new investigations into the experiences of whole-life and endowment assurances issued in the Republic of Ireland (males), whole-life and endowment assurances issued in the U.K. (females), and temporary assurances issued in the U.K. (males).

#### WHOLE-LIFE AND ENDOWMENT ASSURANCES (MALES): POLICIES ISSUED IN THE U.K.

Table 1 shows the actual deaths in 1971-74 and compares them with the deaths expected by the A1949-52 table; it shows the ratios of actual to expected deaths, together with the corresponding ratios for the periods 1963-66 and 1967-70. Tables 2 and 3 give similar comparisons for the medically examined and the non-medical lives respectively, with a summary in Table 4; it should be remembered that, although the expression 'assured lives' is used throughout, the investigations are based on 'policies' rather than 'lives.'

Table 5 shows similar comparisons based on the A1967-70 table, but does not include any comparative figures for the previous quadrennia.

A comparison of trends between the experiences of assured lives (durations 2 and over, males) and the population of Great Britain is given in Table 6. The percentage ratios for the population have been based on the note by L.V. Martin and C.D. Daykin on 'The Recent Trend of Mortality in Great Britain' in *J.I.A.* 103, 213 by averaging the respective male ratios for each of the 4 years 1971-74; they calculated their expected deaths on the basis of mortality experienced by the population in 1963-66, and to enable a valid comparison to be made the assured lives' expected deaths have been based on the rates experienced by (male) assured lives also in 1963-66. There is thus some discontinuity with the comparison given in *C.M.I.R.* 1, partly due to the change in the base period, and partly because Martin and Daykin recalculated the earlier figures (shown in notes by Martin alone) by reference to revised population estimates based on the results of the 1971 census.



Table 7 shows the central rates of mortality in quinary age groups derived from the assured lives' male experience at durations 2 and over for 1971-74, for the medical and non-medical sections separately and combined, alongside the corresponding central rates for 1967-70 (medical and non-medical combined) and the combined national rates for both quadrennia derived from the note by Martin and Daykin. In this table also there is discontinuity with earlier notes where, for this comparison, the assured lives' central rates have hitherto been based on durations 5 and over.

The comparison in Table 1 shows that the reduction in mortality from period to period has continued into 1971-74 at durations 2 and over. However at the select durations the overall changes were small, and mortality tended to rise between 1967-70 and 1971-74 at the lowest ages at duration 0.

In previous reports an approximate algebraic relationship has been shown between observed mortality and that of the standard table. This time the relationship  $q_x$  (1971-74) =  $\cdot 940 q_x$  (A1967-70) is not improved upon by introducing a second constant. The relationships for the various quadrennia may now be rewritten as follows:

$$\begin{aligned} q_x (1953-58) &= 1\cdot131 q_x (1967-70) - \cdot00002 \\ q_x (1959-62) &= 1\cdot083 q_x (1967-70) - \cdot00003 \\ q_x (1963-66) &= 1\cdot060 q_x (1967-70) - \cdot00003 \\ q_x (1967-70) &= 1\cdot000 q_x (1967-70) \\ q_x (1971-74) &= \cdot940 q_x (1967-70) \end{aligned}$$

The 1971-74 data have also been graduated by a 'best fit' of the same formula as was employed in the graduation of the A1967-70 table,

$$q_x/p_x = Bc^y - Hy \text{ where } y = x - Y$$

and the resulting parameters are:

|                 | Duration 0 | Duration 1 | Durations 2 and over |
|-----------------|------------|------------|----------------------|
| $Y$             | 8.2254837  | 16.992410  | 25.733423            |
| $B \times 10^3$ | 2.5293339  | .88842196  | .65448564            |
| $c^5$           | 1.1826314  | 1.3744017  | 1.6005627            |
| $H \times 10^4$ | 2.1498621  | 1.1386757  | .80081911            |

The parameters are similar to those for 1967-70, except at duration 0, but the fit is not so good; duration 1 has too few runs, and all the values of  $\chi^2$  are higher than previously.

Specimen mortality rates based on the above parameters are shown on the next page, together with the ratios (as percentages) of the A1967-70 rates:

| x   | Duration 0        |         | Duration 1        |         | Durations 2 and over |         |
|-----|-------------------|---------|-------------------|---------|----------------------|---------|
|     | $q_x \times 10^5$ | Ratio % | $q_x \times 10^5$ | Ratio % | $q_x \times 10^5$    | Ratio % |
| 20  | 69                | 105     | 73                | 92      | 84                   | 94      |
| 30  | 46                | 105     | 55                | 98      | 64                   | 98      |
| 40  | 99                | 97      | 122               | 101     | 136                  | 94      |
| 50  | 259               | 88      | 348               | 99      | 445                  | 93      |
| 60  | 566               | 84      | 872               | 98      | 1,351                | 94      |
| 70  | 1,077             | 79      | 1,945             | 97      | 3,713                | 95      |
| 80  | 1,865             | 74      | 4,003             | 97      | 9,382                | 96      |
| 90  |                   |         |                   |         | 21,335               | 99      |
| 100 |                   |         |                   |         | 41,247               | 100     |

The comparison in Table 5, showing the separate experiences for the medical and non-medical sections, indicates that while the medical section experienced mortality at all durations appreciably lower than A1967-70, the non-medical experience remained generally close to A1967-70.

Mortality in the age group up to 20 deteriorated, as can be seen most clearly from Table 3. The significant increase is for ages up to 20, non-medical, durations 2 and over, bringing the ratio of actual to expected deaths closer to the figures for durations 0 and 1. The cause-of-death investigation has hitherto indicated that much of the mortality at these ages is due to motor vehicle accidents which tend not to be affected by duration.

The comparison of trends in Table 6 shows that reductions in mortality since 1963-66 have been generally more marked for assured lives than for the population apart from a few of the percentages in the twenties and eighties of age; the reductions from the base period to 1971-74 were generally greater than from the base period to 1967-70, except for one age group in the assured lives and three age groups in the population. The central rates of mortality shown in Table 7 also indicate consistent reduction from 1967-70 to 1971-74 throughout the assured lives' male experience; for the male population these reductions were experienced consistently only after the middle fifties of age.

Table 1. *Whole-life and endowment assurances 1971-74, males: actual and ratios of actual to expected deaths by the A 1949-52 table; medical and non-medical combined*

| Age group<br>(nearest ages) | Actual<br>deaths | 100 A/E<br>1971-74 | 100 A/E<br>1967-70 | 100 A/E<br>1963-66 |
|-----------------------------|------------------|--------------------|--------------------|--------------------|
| <i>Duration 0</i>           |                  |                    |                    |                    |
| -20                         | 172              | 118                | 116                | 111                |
| 21-25                       | 333              | 85                 | 81                 | 90                 |
| 26-30                       | 252              | 66                 | 62                 | 82                 |
| 31-35                       | 203              | 78                 | 70                 | 78                 |
| 36-40                       | 202              | 85                 | 95                 | 106                |
| 41-45                       | 234              | 88                 | 103                | 107                |
| 46-50                       | 326              | 102                | 92                 | 94                 |
| 51-55                       | 212              | 73                 | 95                 | 94                 |
| 56-60                       | 126              | 79                 | 78                 | 86                 |
| 61-65                       | 46               | 58                 | 93                 | 104                |
| 66-70                       | 27               | 66                 | 56                 | 112                |
| 71-                         | 7                | 41                 | 79                 | 131                |
| All ages                    | 2,140            | 83                 | 86                 | 95                 |

*Mortality of Assured Lives*

Table 1 (continued)

| Age group<br>(nearest ages) | Actual<br>deaths | 100 A/E<br>1971-74 | 100 A/E<br>1967-70 | 100 A/E<br>1963-66 |
|-----------------------------|------------------|--------------------|--------------------|--------------------|
| <i>Duration 1</i>           |                  |                    |                    |                    |
| -20                         | 113              | 111                | 108                | 121                |
| 21-25                       | 269              | 73                 | 82                 | 92                 |
| 26-30                       | 273              | 66                 | 70                 | 72                 |
| 31-35                       | 238              | 79                 | 71                 | 76                 |
| 36-40                       | 252              | 85                 | 92                 | 92                 |
| 41-45                       | 320              | 89                 | 86                 | 101                |
| 46-50                       | 377              | 83                 | 93                 | 103                |
| 51-55                       | 389              | 85                 | 81                 | 86                 |
| 56-60                       | 245              | 84                 | 77                 | 91                 |
| 61-65                       | 83               | 60                 | 74                 | 90                 |
| 66-70                       | 66               | 73                 | 66                 | 89                 |
| 71-                         | 28               | 85                 | 97                 | 57                 |
| All ages                    | 2,653            | 80                 | 82                 | 91                 |
| <i>Durations 2 and over</i> |                  |                    |                    |                    |
| -20                         | 136              | 101                | 89                 | 93                 |
| 21-25                       | 720              | 63                 | 70                 | 75                 |
| 26-30                       | 1,456            | 58                 | 56                 | 64                 |
| 31-35                       | 1,613            | 56                 | 58                 | 66                 |
| 36-40                       | 2,661            | 68                 | 72                 | 80                 |
| 41-45                       | 4,896            | 74                 | 81                 | 87                 |
| 46-50                       | 8,793            | 76                 | 81                 | 83                 |
| 51-55                       | 13,407           | 76                 | 80                 | 83                 |
| 56-60                       | 17,752           | 76                 | 82                 | 87                 |
| 61-65                       | 17,031           | 79                 | 85                 | 94                 |
| 66-70                       | 6,376            | 78                 | 85                 | 90                 |
| 71-75                       | 5,499            | 85                 | 88                 | 91                 |
| 76-80                       | 4,669            | 84                 | 86                 | 91                 |
| 81-85                       | 3,993            | 83                 | 85                 | 89                 |
| 86-90                       | 2,617            | 84                 | 84                 | 91                 |
| 91-95                       | 1,138            | 78                 | 82                 | 90                 |
| 96-100                      | 236              | 76                 | 83                 | 76                 |
| 101-                        | 15               | 33                 | 19                 | 11                 |
| -45                         | 11,482           | 67                 | 71                 | 79                 |
| 46-60                       | 39,952           | 76                 | 81                 | 85                 |
| 61-75                       | 28,906           | 80                 | 86                 | 92                 |
| 76-                         | 12,668           | 83                 | 85                 | 90                 |
| All ages                    | 93,008           | 77                 | 82                 | 87                 |

Table 2. *Whole-life and endowment assurances 1971-74, males, medically examined: actual and ratios of actual to expected deaths by the A 1949-52 table*

| Age group<br>(nearest ages) | Actual<br>deaths | 100 A/E<br>1971-74 | 100 A/E<br>1967-70 | 100 A/E<br>1963-66 |
|-----------------------------|------------------|--------------------|--------------------|--------------------|
| <i>Duration 0</i>           |                  |                    |                    |                    |
| -20                         | 9                | 150                | 83                 | 89                 |
| 21-25                       | 28               | 72                 | 65                 | 58                 |
| 26-30                       | 33               | 61                 | 67                 | 94                 |
| 31-35                       | 27               | 66                 | 85                 | 80                 |
| 36-40                       | 36               | 95                 | 121                | 122                |
| 41-45                       | 39               | 89                 | 68                 | 94                 |
| 46-50                       | 54               | 89                 | 76                 | 90                 |
| 51-55                       | 72               | 58                 | 81                 | 70                 |
| 56-60                       | 39               | 53                 | 53                 | 69                 |
| 61-65                       | 18               | 44                 | 75                 | 69                 |
| 66-70                       | 7                | 32                 | 50                 | 83                 |
| 71-                         | 7                | 50                 | 80                 | 100                |
| All ages                    | 369              | 66                 | 74                 | 81                 |
| <i>Duration 1</i>           |                  |                    |                    |                    |
| -20                         | 4                | 100                | 100                | 167                |
| 21-25                       | 26               | 76                 | 79                 | 106                |
| 26-30                       | 40               | 68                 | 76                 | 72                 |
| 31-35                       | 40               | 80                 | 59                 | 65                 |
| 36-40                       | 46               | 92                 | 87                 | 83                 |
| 41-45                       | 59               | 97                 | 67                 | 95                 |
| 46-50                       | 67               | 76                 | 77                 | 84                 |
| 51-55                       | 126              | 70                 | 70                 | 80                 |
| 56-60                       | 89               | 66                 | 57                 | 79                 |
| 61-65                       | 29               | 41                 | 54                 | 86                 |
| 66-70                       | 21               | 50                 | 55                 | 74                 |
| 71-                         | 17               | 68                 | 67                 | 31                 |
| All ages                    | 564              | 71                 | 67                 | 81                 |
| <i>Durations 2 and over</i> |                  |                    |                    |                    |
| -20                         | 1                | 25                 | 67                 | 25                 |
| 21-25                       | 48               | 64                 | 76                 | 65                 |
| 26-30                       | 181              | 61                 | 52                 | 64                 |
| 31-35                       | 297              | 59                 | 63                 | 63                 |
| 36-40                       | 583              | 66                 | 70                 | 79                 |
| 41-45                       | 1,185            | 69                 | 78                 | 82                 |
| 46-50                       | 2,407            | 73                 | 77                 | 82                 |
| 51-55                       | 4,003            | 70                 | 76                 | 81                 |
| 56-60                       | 6,205            | 69                 | 77                 | 83                 |
| 61-65                       | 6,915            | 71                 | 80                 | 89                 |
| 66-70                       | 3,901            | 76                 | 82                 | 88                 |
| 71-75                       | 3,752            | 84                 | 89                 | 89                 |

*Mortality of Assured Lives*

Table 2 (continued)

| Age group<br>(nearest ages) | Actual<br>deaths | 100 A/E<br>1971-74 | 100 A/E<br>1967-70 | 100 A/E<br>1963-66 |
|-----------------------------|------------------|--------------------|--------------------|--------------------|
| 76-80                       | 3,378            | 83                 | 86                 | 90                 |
| 81-85                       | 3,137            | 82                 | 84                 | 89                 |
| 86-90                       | 2,205            | 84                 | 83                 | 91                 |
| 91-95                       | 1,012            | 77                 | 82                 | 90                 |
| 96-100                      | 225              | 77                 | 85                 | 77                 |
| 101-                        | 13               | 30                 | 20                 | 12                 |
| -45                         | 2,295            | 66                 | 72                 | 77                 |
| 46-60                       | 12,615           | 70                 | 77                 | 82                 |
| 61-75                       | 14,568           | 75                 | 82                 | 89                 |
| 76-                         | 9,970            | 82                 | 84                 | 89                 |
| All ages                    | 39,448           | 74                 | 80                 | 86                 |

Table 3. *Whole-life and endowment assurances 1971-74, males, non-medical: actual and ratios of actual to expected deaths by the A 1949-52 table*

| Age group<br>(nearest ages) | Actual<br>deaths | 100 A/E<br>1971-74 | 100 A/E<br>1967-70 | 100 A/E<br>1963-66 |
|-----------------------------|------------------|--------------------|--------------------|--------------------|
| <i>Duration 0</i>           |                  |                    |                    |                    |
| -20                         | 163              | 116                | 119                | 112                |
| 21-25                       | 305              | 86                 | 83                 | 95                 |
| 26-30                       | 219              | 67                 | 62                 | 79                 |
| 31-35                       | 176              | 80                 | 66                 | 78                 |
| 36-40                       | 166              | 83                 | 88                 | 101                |
| 41-45                       | 195              | 88                 | 111                | 111                |
| 46-50                       | 272              | 105                | 97                 | 96                 |
| 51-55                       | 140              | 85                 | 107                | 118                |
| 56-60                       | 87               | 102                | 99                 | 107                |
| 61-65                       | 28               | 72                 | 110                | 157                |
| 66-70                       | 20               | 105                | 62                 | 140                |
| 71-                         | 0                | 0                  | 60                 | 267                |
| All ages                    | 1,771            | 87                 | 90                 | 100                |
| <i>Duration 1</i>           |                  |                    |                    |                    |
| -20                         | 109              | 111                | 108                | 117                |
| 21-25                       | 243              | 72                 | 82                 | 90                 |
| 26-30                       | 233              | 65                 | 69                 | 72                 |
| 31-35                       | 198              | 79                 | 74                 | 79                 |
| 36-40                       | 206              | 84                 | 94                 | 95                 |
| 41-45                       | 261              | 88                 | 90                 | 104                |
| 46-50                       | 310              | 85                 | 99                 | 110                |
| 51-55                       | 263              | 94                 | 90                 | 90                 |
| 56-60                       | 156              | 100                | 95                 | 106                |
| 61-65                       | 54               | 81                 | 99                 | 96                 |
| 66-70                       | 45               | 94                 | 76                 | 107                |
| 71-                         | 11               | 138                | 160                | 133                |
| All ages                    | 2,089            | 83                 | 88                 | 95                 |

Table 3 (continued)

| Age group<br>(nearest ages) | Actual<br>deaths | 100 A/E<br>1971-74 | 100 A/E<br>1967-70 | 100 A/E<br>1963-66 |
|-----------------------------|------------------|--------------------|--------------------|--------------------|
| <i>Durations 2 and over</i> |                  |                    |                    |                    |
| -20                         | 135              | 104                | 91                 | 99                 |
| 21-25                       | 672              | 63                 | 70                 | 76                 |
| 26-30                       | 1,275            | 57                 | 57                 | 64                 |
| 31-35                       | 1,316            | 55                 | 57                 | 68                 |
| 36-40                       | 2,078            | 68                 | 72                 | 81                 |
| 41-45                       | 3,711            | 76                 | 82                 | 89                 |
| 46-50                       | 6,386            | 77                 | 83                 | 85                 |
| 51-55                       | 9,404            | 80                 | 82                 | 86                 |
| 56-60                       | 11,547           | 81                 | 87                 | 91                 |
| 61-65                       | 10,116           | 86                 | 91                 | 100                |
| 66-70                       | 2,475            | 81                 | 89                 | 98                 |
| 71-75                       | 1,747            | 86                 | 87                 | 98                 |
| 76-80                       | 1,291            | 88                 | 88                 | 95                 |
| 81-85                       | 856              | 88                 | 88                 | 89                 |
| 86-90                       | 412              | 87                 | 94                 | 93                 |
| 91-95                       | 126              | 86                 | 78                 | 102                |
| 96-100                      | 11               | 61                 | 44                 | 43                 |
| 101-                        | 2                | 67                 | 0                  | 0                  |
| -45                         | 9,187            | 67                 | 71                 | 80                 |
| 46-60                       | 27,337           | 80                 | 84                 | 88                 |
| 61-75                       | 14,338           | 85                 | 90                 | 99                 |
| 76-                         | 2,698            | 88                 | 88                 | 93                 |
| All ages                    | 53,560           | 79                 | 83                 | 89                 |

Table 4. *Whole-life and endowment assurances 1971-74, males: percentages of actual to expected deaths by the A 1949-52 table*

| <i>Durations</i> | Age group<br>(nearest ages) | Medical     |             |             | Non-medical |             |             | Combined    |             |             |
|------------------|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                  |                             | 1971<br>-74 | 1967<br>-70 | 1963<br>-66 | 1971<br>-74 | 1967<br>-70 | 1963<br>-66 | 1971<br>-74 | 1967<br>-70 | 1963<br>-66 |
| 0                | All ages                    | 66          | 74          | 81          | 87          | 90          | 100         | 83          | 86          | 95          |
| 1                | All ages                    | 71          | 67          | 81          | 83          | 88          | 95          | 80          | 82          | 91          |
| 2 and over       | Up to 45                    | 66          | 72          | 77          | 67          | 71          | 80          | 67          | 71          | 79          |
|                  | 46-60                       | 70          | 77          | 82          | 80          | 84          | 88          | 76          | 81          | 85          |
|                  | 61-75                       | 75          | 82          | 89          | 85          | 90          | 99          | 80          | 86          | 92          |
|                  | 76 and over                 | 82          | 84          | 89          | 88          | 88          | 93          | 83          | 85          | 90          |
|                  | All ages                    | 74          | 80          | 86          | 79          | 83          | 89          | 77          | 82          | 87          |

Table 5. *Whole-life and endowment assurances 1971-74, males: actual and ratios of actual to expected deaths by the A 1967-70 table*

| Age group<br>(nearest ages) | Medical          |         | Non-medical      |         | Combined         |         |
|-----------------------------|------------------|---------|------------------|---------|------------------|---------|
|                             | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E |
| <i>Duration 0</i>           |                  |         |                  |         |                  |         |
| -20                         | 9                | 150     | 163              | 103     | 172              | 104     |
| 21-25                       | 28               | 90      | 305              | 107     | 333              | 105     |
| 26-30                       | 33               | 94      | 219              | 104     | 252              | 103     |
| 31-35                       | 27               | 93      | 176              | 114     | 203              | 110     |
| 36-40                       | 36               | 103     | 166              | 92      | 202              | 94      |
| 41-45                       | 39               | 89      | 195              | 88      | 234              | 88      |
| 46-50                       | 54               | 92      | 272              | 108     | 326              | 105     |
| 51-55                       | 72               | 64      | 140              | 93      | 212              | 80      |
| 56-60                       | 39               | 61      | 87               | 119     | 126              | 92      |
| 61-65                       | 18               | 56      | 28               | 93      | 46               | 74      |
| 66-70                       | 7                | 44      | 20               | 143     | 27               | 90      |
| 71-                         | 7                | 88      | 0                | 0       | 7                | 70      |
| All ages                    | 369              | 78      | 1,771            | 102     | 2,140            | 97      |
| <i>Duration 1</i>           |                  |         |                  |         |                  |         |
| -20                         | 4                | 100     | 109              | 102     | 113              | 102     |
| 21-25                       | 26               | 96      | 243              | 88      | 269              | 89      |
| 26-30                       | 40               | 98      | 233              | 95      | 273              | 95      |
| 31-35                       | 40               | 111     | 198              | 109     | 238              | 110     |
| 36-40                       | 46               | 107     | 206              | 98      | 252              | 100     |
| 41-45                       | 59               | 105     | 261              | 97      | 320              | 98      |
| 46-50                       | 67               | 87      | 310              | 97      | 377              | 95      |
| 51-55                       | 126              | 85      | 263              | 112     | 389              | 102     |
| 56-60                       | 89               | 82      | 156              | 125     | 245              | 105     |
| 61-65                       | 29               | 53      | 54               | 104     | 83               | 78      |
| 66-70                       | 21               | 70      | 45               | 129     | 66               | 102     |
| 71-                         | 17               | 106     | 11               | 183     | 28               | 127     |
| All ages                    | 564              | 88      | 2,089            | 101     | 2,653            | 98      |
| <i>Durations 2 and over</i> |                  |         |                  |         |                  |         |
| -20                         | 1                | 25      | 135              | 122     | 136              | 118     |
| 21-25                       | 48               | 96      | 672              | 93      | 720              | 93      |
| 26-30                       | 181              | 106     | 1,275            | 99      | 1,456            | 100     |
| 31-35                       | 297              | 98      | 1,316            | 92      | 1,613            | 93      |
| 36-40                       | 583              | 92      | 2,078            | 95      | 2,661            | 94      |
| 41-45                       | 1,185            | 87      | 3,711            | 96      | 4,896            | 93      |
| 46-50                       | 2,407            | 91      | 6,386            | 96      | 8,793            | 95      |
| 51-55                       | 4,003            | 87      | 9,404            | 99      | 13,407           | 95      |
| 56-60                       | 6,205            | 83      | 11,547           | 98      | 17,752           | 92      |

Table 5 (continued)

| Age group<br>(nearest ages)         | Medical          |         | Non-medical      |         | Combined         |         |
|-------------------------------------|------------------|---------|------------------|---------|------------------|---------|
|                                     | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E |
| <i>Durations 2 and over (cont.)</i> |                  |         |                  |         |                  |         |
| 61-65                               | 6,915            | 83      | 10,116           | 101     | 17,031           | 93      |
| 66-70                               | 3,901            | 88      | 2,475            | 94      | 6,376            | 90      |
| 71-75                               | 3,752            | 98      | 1,747            | 100     | 5,499            | 98      |
| 76-80                               | 3,378            | 97      | 1,291            | 103     | 4,669            | 98      |
| 81-85                               | 3,137            | 96      | 856              | 103     | 3,993            | 98      |
| 86-90                               | 2,205            | 98      | 412              | 102     | 2,617            | 99      |
| 91-95                               | 1,012            | 88      | 126              | 99      | 1,138            | 89      |
| 96-100                              | 225              | 86      | 11               | 69      | 236              | 85      |
| 101-                                | 13               | 34      | 2                | 67      | 15               | 37      |
| -45                                 | 2,295            | 91      | 9,187            | 95      | 11,482           | 95      |
| 46-60                               | 12,615           | 86      | 27,337           | 98      | 39,952           | 94      |
| 61-75                               | 14,568           | 88      | 14,338           | 100     | 28,906           | 93      |
| 76-                                 | 9,970            | 95      | 2,698            | 102     | 12,668           | 97      |
| All ages                            | 39,448           | 89      | 53,560           | 98      | 93,008           | 94      |

Table 6. Ratios of actual deaths in the male whole-life and endowment assurance experience at durations 2 and over, to those expected on the basis of the actual rates observed in the same experience in 1963-66; compared with ratios of actual deaths in the male population of Great Britain to those expected on the basis of the actual rates observed in that population in 1963-66

| Assured lives (males)* |                    |                    | Great Britain population (males) |                    |                    |
|------------------------|--------------------|--------------------|----------------------------------|--------------------|--------------------|
| Ages nearest birthday  | 100 A/E<br>1971-74 | 100 A/E<br>1967-70 | Ages last birthday               | 100 A/E<br>1971-74 | 100 A/E<br>1967-70 |
| 21-25                  | 84                 | 93                 | 20-24                            | 92                 | 89                 |
| 26-30                  | 91                 | 88                 | 25-29                            | 89                 | 92                 |
| 31-35                  | 84                 | 88                 | 30-34                            | 90                 | 93                 |
| 36-40                  | 85                 | 90                 | 35-39                            | 88                 | 90                 |
| 41-45                  | 85                 | 93                 | 40-44                            | 94                 | 98                 |
| 46-50                  | 92                 | 98                 | 45-49                            | 100                | 99                 |
| 51-55                  | 92                 | 96                 | 50-54                            | 98                 | 99                 |
| 56-60                  | 87                 | 94                 | 55-59                            | 95                 | 97                 |
| 61-65                  | 84                 | 90                 | 60-64                            | 91                 | 96                 |
| 66-70                  | 87                 | 94                 | 65-69                            | 95                 | 99                 |
| 71-75                  | 93                 | 97                 | 70-74                            | 99                 | 101                |
| 76-80                  | 92                 | 95                 | 75-79                            | 99                 | 100                |
| 81-85                  | 93                 | 96                 | 80-84                            | 95                 | 92                 |
| 86-                    | 90                 | 92                 | 85-                              | 95                 | 100                |

\* Under whole-life and endowment assurances.



**Table 7. Central rates of mortality in the years 1971-74 and 1967-70. Assured lives (males)\* at durations 2 and over and male population of Great Britain**

| Ages<br>last<br>birthday | 1971-74                |         |          |                         | 1967-70                   |                         |
|--------------------------|------------------------|---------|----------|-------------------------|---------------------------|-------------------------|
|                          | Assured lives (males)* |         |          | G.B. male<br>population | Assured lives<br>(males)* |                         |
|                          | Med                    | Non-med | Combined |                         | Combined                  | G.B. male<br>population |
| 30-34                    | ·0007                  | ·0007   | ·0007    | ·0011                   | ·0007                     | ·0011                   |
| 35-39                    | ·0010                  | ·0010   | ·0010    | ·0017                   | ·0011                     | ·0017                   |
| 40-44                    | ·0017                  | ·0017   | ·0017    | ·0030                   | ·0019                     | ·0031                   |
| 45-49                    | ·0031                  | ·0033   | ·0032    | ·0055                   | ·0034                     | ·0054                   |
| 50-54                    | ·0053                  | ·0059   | ·0057    | ·0093                   | ·0061                     | ·0094                   |
| 55-59                    | ·0090                  | ·0104   | ·0099    | ·0158                   | ·0104                     | ·0161                   |
| 60-64                    | ·0145                  | ·0175   | ·0162    | ·0257                   | ·0175                     | ·0270                   |
| 65-69                    | ·0252                  | ·0266   | ·0258    | ·0423                   | ·0284                     | ·0443                   |
| 70-74                    | ·0458                  | ·0476   | ·0464    | ·0670                   | ·0488                     | ·0682                   |
| 75-79                    | ·0747                  | ·0764   | ·0751    | ·1006                   | ·0777                     | ·1008                   |

\* Under whole-life and endowment assurances.

#### WHOLE-LIFE AND ENDOWMENT ASSURANCES (MALES): POLICIES ISSUED IN THE REPUBLIC OF IRELAND

This is the first report on the results of an investigation into data submitted by 12 offices relating to policies issued in the Republic of Ireland on male lives. This is a much smaller investigation than that relating to policies issued in the United Kingdom, and does not justify the same amount of subdivision by ages. The actual deaths have been compared with those expected according to the latest standard table in the U.K., *i.e.* the A1967-70, and Table 8 gives the results alongside those for the U.K. policies. It will be seen that the mortality experienced under the Irish policies was generally higher than that under the U.K. policies, although in the medical sections at duration 1 the ratio of actual to expected deaths was about the same. The mortality experienced under the Irish policies was also higher than A1967-70, except in the medical section at durations 0 and 1.

Table 8. *Whole-life and endowment assurances 1971-74, males: actual and ratios of actual to expected deaths by the A1967-70 table, policies issued in the Republic of Ireland and policies issued in the United Kingdom*

| Duration           | Age group<br>(nearest ages) | Issued in Ireland |         | Issued in the U.K. |         |
|--------------------|-----------------------------|-------------------|---------|--------------------|---------|
|                    |                             | Actual<br>deaths  | 100 A/E | Actual<br>deaths   | 100 A/E |
| <i>Medical</i>     |                             |                   |         |                    |         |
| 0                  | All ages                    | 25                | 89      | 369                | 78      |
| 1                  | All ages                    | 34                | 89      | 564                | 88      |
| 2 and over         | —45                         | 200               | 100     | 2,295              | 91      |
|                    | 46–60                       | 1,203             | 112     | 12,615             | 86      |
|                    | 61–75                       | 1,042             | 105     | 14,568             | 88      |
|                    | 76–                         | 328               | 112     | 9,970              | 95      |
|                    | All ages                    | 2,773             | 108     | 39,448             | 89      |
| <i>Non-medical</i> |                             |                   |         |                    |         |
| 0                  | All ages                    | 73                | 109     | 1,771              | 102     |
| 1                  | All ages                    | 85                | 116     | 2,089              | 101     |
| 2 and over         | —45                         | 459               | 102     | 9,187              | 95      |
|                    | 46–60                       | 1,033             | 122     | 27,337             | 98      |
|                    | 61–75                       | 265               | 105     | 14,338             | 100     |
|                    | 76–                         | 47                | 121     | 2,698              | 102     |
|                    | All ages                    | 1,804             | 114     | 53,560             | 98      |
| <i>Combined</i>    |                             |                   |         |                    |         |
| 0                  | All ages                    | 98                | 103     | 2,140              | 97      |
| 1                  | All ages                    | 119               | 107     | 2,653              | 98      |
| 2 and over         | —45                         | 659               | 102     | 11,482             | 95      |
|                    | 46–60                       | 2,236             | 117     | 39,952             | 94      |
|                    | 61–75                       | 1,307             | 105     | 28,906             | 93      |
|                    | 76–                         | 375               | 113     | 12,668             | 97      |
|                    | All ages                    | 4,577             | 110     | 93,008             | 94      |

It is possible that these results could have been caused to some extent by different underwriting methods being employed in the two countries, and to investigate further the effects of selection by the offices issuing policies in the Republic the duration 2 and over data were subdivided between durations 2-4 and durations 5 and over, and shown in Table 9 alongside the results for durations 0 and 1 combined compared with the A1967-70 ultimate rates. If a standard table were to be constructed from the experience of the Irish policies the select period would not necessarily be 2 years.

**Table 9. Whole-life and endowment assurances 1971-74, males, policies issued in the Republic of Ireland: ratios of actual to expected deaths in duration groups according to A1967-70 ultimate**

| Age group<br>(nearest ages) | Durations 0-1    |         | Durations 2-4    |         | Durations 5 and over |         |
|-----------------------------|------------------|---------|------------------|---------|----------------------|---------|
|                             | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E | Actual<br>deaths     | 100 A/E |
| <i>Medical</i>              |                  |         |                  |         |                      |         |
| -45                         | 25               | 75      | 38               | 84      | 162                  | 105     |
| 46-60                       | 31               | 57      | 87               | 85      | 1,116                | 115     |
| 61-75                       | 3                | 26      | 26               | 72      | 1,016                | 106     |
| 76-                         | 0                |         | 2                | 200     | 326                  | 111     |
| All ages                    | 59               | 59      | 153              | 83      | 2,620                | 110     |
| <i>Non-medical</i>          |                  |         |                  |         |                      |         |
| -45                         | 133              | 87      | 158              | 101     | 301                  | 103     |
| 46-60                       | 24               | 78      | 75               | 95      | 958                  | 125     |
| 61-75                       | 1                |         | 7                | 175     | 258                  | 104     |
| 76-                         | 0                |         | 0                |         | 47                   | 124     |
| All ages                    | 158              | 86      | 240              | 100     | 1,564                | 116     |
| <i>Combined</i>             |                  |         |                  |         |                      |         |
| -45                         | 158              | 85      | 196              | 97      | 463                  | 104     |
| 46-60                       | 55               | 64      | 162              | 90      | 2,074                | 119     |
| 61-75                       | 4                | 32      | 33               | 82      | 1,274                | 106     |
| 76-                         | 0                |         | 2                | 100     | 373                  | 113     |
| All ages                    | 217              | 76      | 393              | 92      | 4,184                | 112     |

Note: 100 A/E has been omitted from the above table in any group where actual deaths were less than 2.

#### WHOLE-LIFE AND ENDOWMENT ASSURANCES (FEMALES): POLICIES ISSUED IN THE U.K.

This is the first report on the new investigation into the mortality of female lives assured under policies issued in the U.K. The effective date of the inception of the investigation was 1 January 1973, and 20 offices made returns of their policies in force at that date; a few included information of 1972 deaths, but the volume was too small to regard 1972 as one of the years under review. A further 15 offices started to make returns from 1 January 1974. A number of the offices in question excluded from their data policies already in force at the time they started to make their returns. This was anticipated from their original replies.

Although part of the assured lives' report for 1971-74, this section in fact relates only to the 2 years 1973-74.

It was first necessary to decide what tables might be suitable standards with which to compare the mortality experienced. The latest population table for

females was the appropriate section of E.L.T. No. 12, and this was used for one set of comparisons although it was anticipated that the mortality experienced by assured lives would be lower than this table. It was thought that it would be interesting also to make a comparison on the basis of an assured lives' table even though the only ones available were based on male experiences, if only to demonstrate the fundamental unsuitability of such a table; after considering the level of mortality observed, it was decided to make a comparison with the A1967-70 table with a deduction of 6 years from all the ages. A deduction of 4 years has also been used as an indication of current practice amongst life offices.

Table 10 shows the actual deaths in 1973-74 and compares them with the expected deaths on the two bases just described. Tables 11 and 12 give similar comparisons for the medically examined and the non-medical policies respectively. As in the case of the males, all durations of 2 and over have been combined; in fact the data at the earlier durations are fairly small, and if the results of durations 5 and over had been shown they would have looked very similar to those for durations 2 and over. It is however worth mentioning that, from the limited data available, mortality at durations 2-4 seemed significantly lower than at durations 5 and over, and this will need to be investigated further when enough experience has been obtained to consider the preparation of a standard table for female assured lives.

Table 13 compares central rates of mortality in quinary age groups at durations 2 and over, for the medical and non-medical sections separately and combined, with central rates derived from the note by Martin and Daykin (*J.I.A.* 103, 213) by averaging the central rates shown for the female population of Great Britain for the two years 1973 and 1974 respectively.

Tables 10, 11 and 12 show that assured lives' mortality for females was well below the level of E.L.T. No. 12. Mortality at the select durations was also well below the A1967-70 level even after making a 6-year age adjustment, but at durations 2 and over this adjustment (which was clearly wrong at the age range 35-55) reproduced the deaths at all ages combined, as it was chosen to do. The main conclusion is that the male table is the wrong shape and is not suitable to be used for female mortality. E.L.T. No. 12 appears to be the right shape.

Table 13 shows that the mortality experienced by the female assured lives was also, throughout the age range, lower than the population mortality experienced during the 2 years in question. When preliminary work was undertaken to determine the possible bases for comparisons in this report, the *aeg* 1967-70 table (*C.M.I.R.* 2, 101-3) was not considered as it was thought that, being an annuitants' table, it would give mortality rates at the upper ages too low for comparison with assured lives although below age 50 it was in fact an assured lives' table; the rates of mortality in Table 13 indicate, however, that the assured lives' mortality at ages 60-79 was *lower* than the female annuitants' experience table. It was therefore decided to make a final comparison, for the duration 2 and over experience (medical and non-medical combined), on the

basis of the *aeg* 1967-70 ultimate table; this is given in Table 14, and it will be seen that for much of the age range the actual deaths were lower than the expected.

There is no particular reason for comparing assured lives' mortality with an annuitants' table, apart from the fact that it appears to be as good a standard as any at present available, none of which is really suitable. The Continuous Mortality Investigation Committee intend that, after data have been collected for a further 4 years, it will endeavour to construct a table based directly on the experience of female assured lives.

Table 10. *Whole-life and endowment assurances 1973-74, females: actual and ratios of actual to expected deaths by the E.L.T. No. 12 (female), and by the A 1967-70. table with 6-year and 4-year age adjustment; medical and non-medical combined*

| Age group<br>(nearest ages) | Actual<br>deaths | 100 A/E<br>E.L.T. No.<br>12 | 100 A/E<br>A 1967-70 with<br>6-year deduction<br>from age | 100 A/E<br>A 1967-70 with<br>4-year deduction<br>from age |
|-----------------------------|------------------|-----------------------------|---|---|
| <i>Duration 0</i>           |                  |                             |   |   |
| -25                         | 12               | 48                          | 40  | 34  |
| 26-35                       | 13               | 39                          | 54  | 60  |
| 36-45                       | 18               | 35                          | 112   | 92  |
| 46-                         | 26               | 22                          | 63  | 53  |
| All ages                    | 69               | 31                          | 62  | 55  |
| <i>Duration 1</i>           |                  |                             |   |   |
| -25                         | 11               | 65                          | 46  | 40  |
| 26-35                       | 6                | 23                          | 26  | 28  |
| 36-45                       | 10               | 22                          | 56  | 48  |
| 46-55                       | 34               | 48                          | 113   | 91  |
| 56-                         | 16               | 32                          | 73  | 61  |
| All ages                    | 77               | 37                          | 66  | 58  |
| <i>Durations 2 and over</i> |                  |                             |   |   |
| -25                         | 18               | 55                          | 31  | 29  |
| 26-30                       | 27               | 45                          | 34  | 38  |
| 31-35                       | 46               | 63                          | 87  | 89  |
| 36-40                       | 77               | 68                          | 140   | 126   |
| 41-45                       | 106              | 55                          | 126   | 101   |
| 46-50                       | 190              | 61                          | 123   | 97  |
| 51-55                       | 309              | 64                          | 111   | 87  |
| 56-60                       | 352              | 66                          | 99  | 79  |
| 61-65                       | 265              | 61                          | 86  | 70  |
| 66-70                       | 87               | 47                          | 66  | 54  |
| 71-75                       | 76               | 57                          | 84  | 69  |
| 76-80                       | 75               | 60                          | 94  | 78  |
| 81-85                       | 101              | 70                          | 115   | 96  |
| 86-90                       | 72               | 63                          | 104   | 88  |
| 91-                         | 77               | 92                          | 140   | 121   |
| -45                         | 274              | 58                          | 83  | 78  |
| 46-60                       | 851              | 64                          | 108   | 85  |
| 61-75                       | 428              | 57                          | 81  | 66  |
| 76-                         | 325              | 70                          | 111   | 94  |
| All ages                    | 1,878            | 62                          | 97  | 80  |

Table 11. *Whole-life and endowment assurances 1973-74, females, medically examined: actual and ratios of actual to expected deaths by the E.L.T. No. 12 (female), and by the A 1967-70 table with 6-year and 4-year age adjustment*

| Age group<br>(nearest ages) | Actual<br>deaths | 100 A/E<br>E.L.T. No.<br>12 | 100 A/E<br>A 1967-70 with<br>6-year deduction<br>from age | 100 A/E<br>A 1967-70 with<br>4-year deduction<br>from age |
|-----------------------------|------------------|-----------------------------|---|---|
| <i>Duration 0</i>           |                  |                             |   |   |
| All ages                    | 11               | 24                          | 65  | 56  |
| <i>Duration 1</i>           |                  |                             |   |   |
| All ages                    | 14               | 30                          | 67  | 57  |
| <i>Durations 2 and over</i> |                  |                             |   |   |
| -45                         | 17               | 38                          | 63  | 58  |
| 46-50                       | 27               | 63                          | 129   | 101   |
| 51-55                       | 41               | 51                          | 87  | 69  |
| 56-60                       | 68               | 65                          | 97  | 78  |
| 61-65                       | 45               | 47                          | 66  | 53  |
| 66-70                       | 33               | 49                          | 70  | 57  |
| 71-75                       | 33               | 57                          | 85  | 69  |
| 76-80                       | 28               | 45                          | 70  | 59  |
| 81-85                       | 56               | 79                          | 130   | 108   |
| 86-90                       | 28               | 55                          | 90  | 76  |
| 91-                         | 35               | 76                          | 117   | 111   |
| -45                         | 17               | 38                          | 63  | 58  |
| 46-60                       | 136              | 59                          | 99  | 78  |
| 61-75                       | 111              | 50                          | 72  | 58  |
| 76-                         | 147              | 64                          | 102   | 86  |
| All ages                    | 411              | 57                          | 89  | 73  |

Table 12. *Whole-life and endowment assurances 1973-74, females, non-medical: actual and ratios of actual to expected deaths by the E.L.T. No. 12 (female), and by the A 1967-70 table with 6-year and 4-year age adjustment*

| Age group<br>(nearest ages) | Actual<br>deaths | 100 A/E<br>E.L.T. No.<br>12 | 100 A/E<br>A 1967-70 with<br>6-year deduction<br>from age | 100 A/E<br>A 1967-70 with<br>4-year deduction<br>from age |
|-----------------------------|------------------|-----------------------------|---|---|
| <i>Duration 0</i>           |                  |                             |   |   |
| -25                         | 12               | 50                          | 41  | 36  |
| 26-35                       | 10               | 33                          | 45  | 50  |
| 36-45                       | 18               | 39                          | 120   | 103   |
| 46-                         | 18               | 22                          | 62  | 52  |
| All ages                    | 58               | 32                          | 61  | 55  |

*Mortality of Assured Lives*

Table 12 (continued)

| Age group<br>(nearest ages) | Actual<br>deaths | 100 A/E<br>E.L.T. No<br>12 | 100 A/E<br>A 1967-70 with<br>6-year deduction<br>from age | 100 A/E<br>A 1967-70 with<br>4-year deduction<br>from age |
|-----------------------------|------------------|----------------------------|---|---|
| <i>Duration 1</i>           |                  |                            |   |   |
| -25                         | 10               | 62                         | 43  | 38  |
| 26-35                       | 5                | 21                         | 24  | 26  |
| 36-45                       | 9                | 22                         | 56  | 49  |
| 46-                         | 39               | 47                         | 108   | 88  |
| All ages                    | 63               | 39                         | 66  | 58  |
| <i>Durations 2 and over</i> |                  |                            |   |   |
| -25                         | 17               | 53                         | 30  | 28  |
| 26-30                       | 27               | 48                         | 36  | 40  |
| 31-35                       | 44               | 67                         | 90  | 93  |
| 36-40                       | 71               | 70                         | 145   | 129   |
| 41-45                       | 98               | 58                         | 132   | 107   |
| 46-50                       | 163              | 60                         | 123   | 96  |
| 51-55                       | 268              | 67                         | 116   | 91  |
| 56-60                       | 284              | 66                         | 99  | 79  |
| 61-65                       | 220              | 65                         | 92  | 74  |
| 66-70                       | 54               | 46                         | 64  | 53  |
| 71-75                       | 43               | 57                         | 84  | 69  |
| 76-80                       | 47               | 75                         | 118   | 97  |
| 81-85                       | 45               | 62                         | 100   | 84  |
| 86-90                       | 44               | 70                         | 116   | 98  |
| 91-                         | 42               | 111                        | 168   | 146   |
| -45                         | 257              | 60                         | 85  | 80  |
| 46-60                       | 715              | 65                         | 110   | 87  |
| 61-75                       | 317              | 60                         | 85  | 69  |
| 76-                         | 178              | 75                         | 120   | 101   |
| All ages                    | 1,467            | 64                         | 99  | 82  |

Table 13. *Central rates of mortality in the years 1973-74. Whole-life and endowment assurances (females) at durations 2 and over and female population of Great Britain*

| Ages<br>last<br>birthday | Assured lives (females)* |             |          | Great Britain<br>female<br>population |
|--------------------------|--------------------------|-------------|----------|---------------------------------------|
|                          | Medical                  | Non-medical | Combined |                                       |
| 30-34                    | ·0003                    | ·0006       | ·0006    | ·0007                                 |
| 35-39                    | ·0008                    | ·0009       | ·0009    | ·0011                                 |
| 40-44                    | ·0006                    | ·0013       | ·0012    | ·0020                                 |
| 45-49                    | ·0022                    | ·0020       | ·0021    | ·0035                                 |
| 50-54                    | ·0028                    | ·0036       | ·0034    | ·0054                                 |
| 55-59                    | ·0054                    | ·0055       | ·0054    | ·0083                                 |
| 60-64                    | ·0065                    | ·0083       | ·0079    | ·0126                                 |
| 65-69                    | ·0094                    | ·0106       | ·0102    | ·0205                                 |
| 70-74                    | ·0211                    | ·0217       | ·0215    | ·0349                                 |
| 75-79                    | ·0335                    | ·0512       | ·0426    | ·0597                                 |

\* Under whole-life and endowment assurances.

Table 14. *Whole-life and endowment assurances 1973-74, females, durations 2 and over: actual and ratios of actual to expected deaths by the aeg 1967-70 table ultimate; medical and non-medical combined*

| Age group<br>(nearest ages) | Actual<br>deaths | 100 A/E |
|-----------------------------|------------------|---------|
| -25                         | 18               | 75      |
| 26-30                       | 27               | 71      |
| 31-35                       | 46               | 115     |
| 36-40                       | 77               | 117     |
| 41-45                       | 106              | 85      |
| 46-50                       | 190              | 91      |
| 51-55                       | 309              | 96      |
| 56-60                       | 352              | 87      |
| 61-65                       | 265              | 83      |
| 66-70                       | 87               | 71      |
| 71-75                       | 76               | 93      |
| 76-80                       | 75               | 100     |
| 81-85                       | 101              | 115     |
| 86-90                       | 72               | 97      |
| 91-                         | 77               | 128     |
| -45                         | 274              | 94      |
| 46-60                       | 851              | 91      |
| 61-75                       | 428              | 82      |
| 76-                         | 325              | 109     |
| All ages                    | 1,878            | 92      |

#### TEMPORARY ASSURANCES (MALES): POLICIES ISSUED IN THE U.K.

This is another new investigation to which 24 offices started contributing data from 1 January 1971, the number having increased to 26 by 1974. Some of these offices only included new policies issued since they joined the investigation, others included in their returns both old and new business; thus, when comparing the results with those of the whole-life and endowment assurances it must be remembered that there are proportionately more exposures at the lower durations for the temporary assurances, and this feature is accentuated by the fact that the latter classes of business are written on shorter average terms than the whole-life and endowment assurances.

The temporary assurances have been subdivided according to whether they are level or decreasing assurances, in addition to the usual subdivisions by age, duration, and whether medically examined lives or non-medical business. The instructions to offices requested them to exclude level temporary assurances for terms of less than 1 year and decreasing temporary assurances with a terminal endowment benefit or with permanent life assurance. It is believed that mortgage



protection policies and policies providing family income benefits are the main categories included.

The actual deaths were first compared with the expected deaths according to the A1967-70 table, and the results for level temporary assurances are given in Table 15, those for decreasing temporary assurances in Table 16; these may be directly compared with the figures given in Table 5 for the main assured lives' investigation. The data for the level temporary assurances are comparatively small, but it will be seen that for both the level and the decreasing temporary assurances many of the ratios of actual to expected deaths were lower than those shown for the main assured lives, the exceptions being over the younger range of ages.

Looking at the younger ages in greater detail, the ratios at durations 0 and 1 were generally lower for the temporary assurances with some exceptions, notably the medical section of the decreasing policies at duration 0. At durations 2 and over the ratios were generally lower for the level policies after age 45 and for the decreasing policies after age 50.

The ratios for the medical sections were generally lower than for the non-medical, except at the lower end of the age range at durations 2 and over.

In order to analyse further the peculiarities of the data at durations 2 and over, these were divided between durations 2-4 and 5 and over and the actual deaths compared with the expected deaths according to the A1967-70 (5) table which at the time of its construction the Committee thought might be appropriate; these results are given in Table 17 (level policies) and Table 18 (decreasing policies). The level data are based on fairly small numbers of deaths, but the indication is that the high ratios appeared mainly at durations 5 and over, at the younger ages. For the decreasing policies, with more substantial numbers in both sections, it can be seen clearly that, even when compared with the 5-year select table, mortality at durations 2-4 was relatively low, with no consistent difference between the medical and non-medical sections; at durations 5 and over the high ratios (which were referred to in the comments on Tables 15 and 16) are seen to come from both sections, up to age 50.

Although an over-all assessment would be that the use of A1967-70 for temporary assurance mortality is on the safe side from the point of view of the offices, the Committee still feel that use of the A1967-70(5) table may be preferable.

Table 15. *Level temporary assurances 1971-74, males; actual and ratios of actual to expected deaths by the A 1967-70 table*

| Age group<br>(nearest ages) | Medical          |         | Non-medical      |         | Combined         |         |
|-----------------------------|------------------|---------|------------------|---------|------------------|---------|
|                             | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E |
| <i>Duration 0</i>           |                  |         |                  |         |                  |         |
| -30                         | 4                | 100     | 14               | 74      | 18               | 78      |
| 31-45                       | 7                | 58      | 23               | 85      | 30               | 77      |
| 46-60                       | 14               | 58      | 9                | 56      | 23               | 58      |
| 61-                         | 5                | 71      | 2                | 200     | 7                | 88      |
| All ages                    | 30               | 64      | 48               | 76      | 78               | 71      |
| <i>Duration 1</i>           |                  |         |                  |         |                  |         |
| -30                         | 2                | 67      | 9                | 56      | 11               | 58      |
| 31-45                       | 7                | 58      | 25               | 100     | 32               | 86      |
| 46-60                       | 16               | 62      | 19               | 119     | 35               | 83      |
| 61-                         | 5                | 45      | 1                | 100     | 6                | 50      |
| All ages                    | 30               | 58      | 54               | 93      | 84               | 76      |
| <i>Durations 2 and over</i> |                  |         |                  |         |                  |         |
| -25                         | 1                | 100     | 4                | 100     | 5                | 100     |
| 26-30                       | 6                | 200     | 11               | 92      | 17               | 113     |
| 31-35                       | 2                | 40      | 11               | 100     | 13               | 81      |
| 36-40                       | 5                | 71      | 10               | 71      | 15               | 71      |
| 41-45                       | 14               | 127     | 15               | 83      | 29               | 100     |
| 46-50                       | 7                | 54      | 14               | 70      | 21               | 64      |
| 51-55                       | 11               | 58      | 9                | 64      | 20               | 61      |
| 56-60                       | 8                | 33      | 3                | 43      | 11               | 35      |
| 61-                         | 11               | 38      | 4                | 100     | 15               | 45      |
| -45                         | 28               | 104     | 51               | 86      | 79               | 92      |
| 46-60                       | 26               | 46      | 26               | 63      | 52               | 54      |
| 61-                         | 11               | 38      | 4                | 100     | 15               | 45      |
| All ages                    | 65               | 58      | 81               | 78      | 146              | 68      |

Table 16. *Decreasing temporary assurances 1971-74, males; actual and ratios of actual to expected deaths by the A1967-70 table*

| Age group<br>(nearest ages) | Medical          |         | Non-medical      |         | Combined         |         |
|-----------------------------|------------------|---------|------------------|---------|------------------|---------|
|                             | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E |
| <i>Duration 0</i>           |                  |         |                  |         |                  |         |
| -30                         | 11               | 110     | 45               | 66      | 56               | 72      |
| 31-45                       | 26               | 162     | 93               | 104     | 119              | 113     |
| 46-60                       | 27               | 59      | 39               | 85      | 66               | 72      |
| 61-                         | 5                | 71      | 0                | 0       | 5                | 62      |
| All ages                    | 69               | 87      | 177              | 87      | 246              | 87      |

Table 16 (continued)

| Age group<br>(nearest ages) | Medical          |         | Non-medical      |         | Combined         |         |
|-----------------------------|------------------|---------|------------------|---------|------------------|---------|
|                             | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E |
| <i>Duration 1</i>           |                  |         |                  |         |                  |         |
| -30                         | 9                | 90      | 54               | 75      | 63               | 77      |
| 31-45                       | 10               | 50      | 98               | 88      | 108              | 82      |
| 46-60                       | 45               | 76      | 62               | 90      | 107              | 84      |
| 61-                         | 5                | 45      | 4                | 200     | 9                | 69      |
| All ages                    | 69               | 69      | 218              | 85      | 287              | 81      |
| <i>Durations 2 and over</i> |                  |         |                  |         |                  |         |
| -25                         | 2                | 67      | 9                | 39      | 11               | 42      |
| 26-30                       | 18               | 90      | 73               | 70      | 91               | 73      |
| 31-35                       | 33               | 106     | 99               | 81      | 132              | 86      |
| 36-40                       | 41               | 93      | 130              | 78      | 171              | 81      |
| 41-45                       | 62               | 103     | 225              | 98      | 287              | 99      |
| 46-50                       | 73               | 92      | 265              | 93      | 338              | 93      |
| 51-55                       | 85               | 69      | 241              | 86      | 326              | 80      |
| 56-60                       | 121              | 80      | 126              | 88      | 247              | 84      |
| 61-                         | 117              | 74      | 44               | 76      | 161              | 75      |
| -45                         | 156              | 99      | 536              | 83      | 692              | 86      |
| 46-60                       | 279              | 79      | 632              | 89      | 911              | 86      |
| 61-                         | 117              | 74      | 44               | 76      | 161              | 75      |
| All ages                    | 552              | 82      | 1,212            | 86      | 1,764            | 85      |

Table 17. *Level temporary assurances 1971-74, males, durations 2 and over; actual and ratios of actual to expected deaths by the A1967-70(5) table*

| Age group<br>(nearest ages) | Medical          |         | Non-medical      |         | Combined         |         |
|-----------------------------|------------------|---------|------------------|---------|------------------|---------|
|                             | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E |
| <i>Durations 2-4</i>        |                  |         |                  |         |                  |         |
| -30                         | 6                | 200     | 14               | 93      | 20               | 111     |
| 31-45                       | 11               | 65      | 29               | 85      | 40               | 78      |
| 46-60                       | 17               | 50      | 15               | 58      | 32               | 53      |
| 61-                         | 7                | 50      | 3                | 300     | 10               | 67      |
| All ages                    | 41               | 60      | 61               | 80      | 102              | 71      |
| <i>Durations 5 and over</i> |                  |         |                  |         |                  |         |
| -30                         | 1                |         | 1                | 100     | 2                | 200     |
| 31-45                       | 10               | 200     | 7                | 117     | 17               | 155     |
| 46-60                       | 9                | 60      | 11               | 92      | 20               | 74      |
| 61-                         | 4                | 44      | 1                | 50      | 5                | 45      |
| All ages                    | 24               | 83      | 20               | 95      | 44               | 88      |

Table 18. *Decreasing temporary assurances 1971-74, males, durations 2 and over; actual and ratios of actual to expected deaths by the A 1967-70(5) table*

| Age group<br>(nearest ages) | Medical          |         | Non-medical      |         | Combined         |         |
|-----------------------------|------------------|---------|------------------|---------|------------------|---------|
|                             | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E |
| <i>Durations 2-4</i>        |                  |         |                  |         |                  |         |
| -25                         | 2                | 67      | 9                | 43      | 11               | 46      |
| 26-30                       | 10               | 71      | 65               | 81      | 75               | 80      |
| 31-35                       | 18               | 129     | 57               | 83      | 75               | 90      |
| 36-40                       | 14               | 88      | 60               | 77      | 74               | 79      |
| 41-45                       | 17               | 89      | 70               | 76      | 87               | 78      |
| 46-50                       | 20               | 87      | 89               | 90      | 109              | 89      |
| 51-55                       | 34               | 74      | 61               | 85      | 95               | 81      |
| 56-60                       | 41               | 80      | 19               | 127     | 60               | 91      |
| 61-                         | 23               | 72      | 3                | 75      | 26               | 72      |
| -45                         | 61               | 92      | 261              | 77      | 322              | 79      |
| 46-60                       | 95               | 79      | 169              | 91      | 264              | 86      |
| 61-                         | 23               | 72      | 3                | 75      | 26               | 72      |
| All ages                    | 179              | 82      | 433              | 82      | 612              | 82      |
| <i>Durations 5 and over</i> |                  |         |                  |         |                  |         |
| -30                         | 8                | 160     | 8                | 42      | 16               | 67      |
| 31-35                       | 15               | 94      | 42               | 82      | 57               | 85      |
| 36-40                       | 27               | 100     | 70               | 80      | 97               | 85      |
| 41-45                       | 45               | 110     | 155              | 116     | 200              | 114     |
| 46-50                       | 53               | 96      | 176              | 99      | 229              | 98      |
| 51-55                       | 51               | 73      | 180              | 90      | 231              | 86      |
| 56-60                       | 80               | 92      | 107              | 84      | 187              | 87      |
| 61-                         | 94               | 83      | 41               | 77      | 135              | 81      |
| -45                         | 95               | 107     | 275              | 95      | 370              | 97      |
| 46-60                       | 184              | 87      | 463              | 92      | 647              | 90      |
| 61-                         | 94               | 83      | 41               | 77      | 135              | 81      |
| All ages                    | 373              | 90      | 779              | 92      | 1,152            | 91      |

## MORTALITY OF IMMEDIATE ANNUITANTS

### EXPERIENCE FOR 1971-74

THE last report on the experience of the mortality of immediate annuitants related to the period 1967-70 and appeared in *C.M.I.R.* 1, 29, and the graduation of the experience was given in a note in *C.M.I.R.* 2, 57.

The present note reports on the experience for 1971-74. As before, the data for durations 5 and over have been subdivided between annuities purchased before 1957 and those purchased after 1956; this is because earlier investigations had indicated an apparent change in the class of life purchasing annuities after the Finance Act 1956. As the bulk of the data relate to annuities purchased at or over age 65, and as the period under investigation ended some 18 years after the Finance Act in question, it follows that the 'before 1957' data will henceforth only relate mainly to the oldest ages.

The note in *C.M.I.R.* 1 indicated that the trend for mortality at duration 0 to increase and at durations 5 and over (males only) to decrease between 1959-62 and 1963-66 had been reversed between 1963-66 and 1967-70. As the experience for 1971-74 shows a continuation of the tendency at all durations and for both sexes to fluctuate randomly from period to period rather than showing any clear secular trend, it has been decided to show the percentage ratios of actual to expected deaths for all four quadrennia side by side in Table 1, which makes the comparison on the basis of the 1947 experience rates. Table 2 shows a similar comparison for 1963-66, 1967-70 and 1971-74 on the basis of the *a*(55) table. These statistics are difficult to interpret; from 1967-70 to 1971-74 mortality of annuitants certainly did not decrease generally, except for the males at durations 5 and over. Although prudence as well as past experience has been a reason for assuming continuing improvement in the mortality of annuitants, the practice, although no doubt still justified on grounds of prudence, no longer seems supported by the immediate past.

Table 3 compares the actual deaths in 1971-74 with those expected according to the *aeg* table published in *C.M.I.R.* 2, 57. The percentage ratios for 1967-70 are also shown, and the table again demonstrates the features described in the preceding paragraph.

Table 1. *Immediate annuitants, 1959-74: percentage ratios of actual to expected deaths according to the table of annuitant mortality for 1947 printed on p. xviii of the preface to the a(55) tables for annuitants. (Actual deaths shown for 1971-74 only)*

| Duration                | Age group<br>(nearest ages) | Males            |            |            |            |            | Females          |            |            |            |            |
|-------------------------|-----------------------------|------------------|------------|------------|------------|------------|------------------|------------|------------|------------|------------|
|                         |                             | 1971-74          |            | 1967-70    | 1963-66    | 1959-62    | 1971-74          |            | 1967-70    | 1963-66    | 1959-62    |
|                         |                             | Actual<br>Deaths | 100<br>A/E | 100<br>A/E | 100<br>A/E | 100<br>A/E | Actual<br>Deaths | 100<br>A/E | 100<br>A/E | 100<br>A/E | 100<br>A/E |
| 0                       | 41-70                       | 67               | 72         | 61         | 75         | 63         | 39               | 48         | 37         | 53         | 42         |
|                         | 71-80                       | 79               | 56         | 52         | 73         | 48         | 96               | 47         | 49         | 56         | 50         |
|                         | 81-                         | 68               | 48         | 53         | 46         | 50         | 160              | 65         | 57         | 54         | 57         |
|                         | All over 40                 | 214              | 57         | 55         | 64         | 52         | 295              | 56         | 50         | 55         | 51         |
| 1-4                     | 41-60                       | 22               | 200        | 128        | 122        | 145        | 9                | 43         | 78         | 53         | 69         |
|                         | 61-65                       | 64               | 80         | 67         | 100        | 76         | 63               | 61         | 66         | 86         | 72         |
|                         | 66-70                       | 210              | 68         | 95         | 75         | 87         | 158              | 61         | 78         | 62         | 58         |
|                         | 71-75                       | 235              | 72         | 69         | 74         | 83         | 294              | 68         | 65         | 63         | 69         |
|                         | 76-80                       | 275              | 74         | 72         | 68         | 68         | 438              | 70         | 70         | 75         | 78         |
|                         | 81-85                       | 277              | 71         | 63         | 72         | 69         | 483              | 72         | 68         | 74         | 80         |
|                         | 86-90                       | 214              | 81         | 68         | 67         | 75         | 406              | 76         | 75         | 80         | 71         |
|                         | 91-                         | 89               | 77         | 67         | 87         | 76         | 232              | 87         | 83         | 88         | 95         |
|                         | All over 40                 | 1,386            | 74         | 72         | 74         | 76         | 2,083            | 72         | 71         | 73         | 75         |
| 5 and over<br>post-1956 | 41-60                       | 14               | 156        | 125        | 194        |            | 9                | 50         | 132        | 113        |            |
|                         | 61-65                       | 46               | 102        | 83         | 88         |            | 61               | 79         | 65         | 112        |            |
|                         | 66-70                       | 201              | 85         | 88         | 93         |            | 267              | 77         | 83         | 66         |            |
|                         | 71-75                       | 472              | 78         | 92         | 73         |            | 652              | 76         | 74         | 77         |            |
|                         | 76-80                       | 649              | 78         | 81         | 78         |            | 1,203            | 82         | 80         | 80         |            |
|                         | 81-85                       | 699              | 77         | 80         | 85         |            | 1,623            | 85         | 73         | 87         |            |
|                         | 86-90                       | 579              | 82         | 86         | 69         |            | 1,584            | 87         | 80         | 86         |            |
|                         | 91-95                       | 288              | 88         | 92         | 87         |            | 803              | 91         | 84         | 79         |            |
|                         | 96-                         | 49               | 75         | 68         | 120        |            | 218              | 89         | 91         | 112        |            |
|                         | All over 40                 | 2,997            | 80         | 85         | 80         |            | 6,420            | 84         | 78         | 83         |            |

Table 1 (continued).

| Duration               | Age group<br>(nearest ages) | Males   |     |         |         |         | Females |     |         |         |         |
|------------------------|-----------------------------|---------|-----|---------|---------|---------|---------|-----|---------|---------|---------|
|                        |                             | 1971-74 |     | 1967-70 | 1963-66 | 1959-62 | 1971-74 |     | 1967-70 | 1963-66 | 1959-62 |
|                        |                             | Actual  | 100 | 100     | 100     | 100     | Actual  | 100 | 100     | 100     | 100     |
|                        |                             | Deaths  | A/E | A/E     | A/E     | A/E     | Deaths  | A/E | A/E     | A/E     | A/E     |
| 5 and over<br>pre-1957 | 41-60                       | 3       | 150 | 114     | 151     | 103     | 7       | 175 | 101     | 54      | 59      |
|                        | 61-65                       | 8       | 160 | 182     | 133     | 94      | 15      | 115 | 82      | 105     | 101     |
|                        | 66-70                       | 19      | 127 | 197     | 104     | 109     | 31      | 60  | 95      | 99      | 94      |
|                        | 71-75                       | 40      | 103 | 103     | 94      | 121     | 168     | 102 | 102     | 91      | 94      |
|                        | 76-80                       | 117     | 115 | 96      | 91      | 91      | 454     | 87  | 101     | 97      | 98      |
|                        | 81-85                       | 218     | 94  | 94      | 89      | 99      | 1,096   | 90  | 89      | 97      | 107     |
|                        | 86-90                       | 269     | 84  | 95      | 99      | 94      | 1,635   | 91  | 93      | 100     | 105     |
|                        | 91-95                       | 158     | 80  | 101     | 107     | 103     | 1,321   | 96  | 99      | 103     | 108     |
|                        | 96-                         | 38      | 78  | 85      | 78      | 97      | 551     | 92  | 89      | 98      | 104     |
|                        | All over 40                 | 870     | 90  | 98      | 95      | 99      | 5,278   | 92  | 94      | 98      | 103     |

Table 2. *Immediate annuitants, 1963-74; percentage ratios of actual to expected deaths according to the a(55) table (select for duration 0, ultimate for other durations). (Actual deaths shown for 1971-74 only)*

| Duration                | Age group<br>(nearest ages) | Males            |            |            |            | Females          |            |            |            |
|-------------------------|-----------------------------|------------------|------------|------------|------------|------------------|------------|------------|------------|
|                         |                             | 1971-74          | 1967-70    | 1963-66    | 1971-74    | 1967-70          | 1963-66    |            |            |
|                         |                             | Actual<br>Deaths | 100<br>A/E | 100<br>A/E | 100<br>A/E | Actual<br>Deaths | 100<br>A/E | 100<br>A/E | 100<br>A/E |
| 0                       | 41-70                       | 67               | 143        | 121        | 149        | 39               | 100        | 75         | 109        |
|                         | 71-80                       | 79               | 107        | 99         | 140        | 96               | 89         | 91         | 106        |
|                         | 81-                         | 68               | 79         | 88         | 77         | 160              | 108        | 96         | 92         |
|                         | All over 40                 | 214              | 103        | 100        | 117        | 295              | 100        | 91         | 100        |
| 1-4                     | 41-60                       | 22               | 220        | 149        | 143        | 9                | 60         | 103        | 70         |
|                         | 61-65                       | 64               | 97         | 80         | 120        | 63               | 78         | 83         | 109        |
|                         | 66-70                       | 210              | 81         | 114        | 89         | 158              | 73         | 94         | 74         |
|                         | 71-75                       | 235              | 85         | 81         | 87         | 294              | 79         | 75         | 73         |
|                         | 76-80                       | 275              | 84         | 83         | 78         | 438              | 79         | 80         | 85         |
|                         | 81-85                       | 277              | 80         | 71         | 81         | 483              | 84         | 78         | 85         |
|                         | 86-90                       | 214              | 90         | 74         | 74         | 406              | 87         | 86         | 91         |
|                         | 91-                         | 89               | 84         | 73         | 95         | 232              | 94         | 91         | 97         |
|                         | All over 40                 | 1,386            | 85         | 83         | 84         | 2,083            | 82         | 82         | 85         |
| 5 and over<br>post-1956 | 41-60                       | 14               | 175        | 146        | 226        | 9                | 64         | 174        | 148        |
|                         | 61-65                       | 46               | 124        | 100        | 105        | 61               | 100        | 82         | 141        |
|                         | 66-70                       | 201              | 101        | 105        | 111        | 267              | 92         | 99         | 79         |
|                         | 71-75                       | 472              | 92         | 109        | 86         | 652              | 88         | 86         | 89         |
|                         | 76-80                       | 649              | 90         | 93         | 89         | 1,203            | 94         | 91         | 91         |
|                         | 81-85                       | 699              | 87         | 90         | 96         | 1,623            | 97         | 84         | 101        |
|                         | 86-90                       | 579              | 90         | 94         | 76         | 1,584            | 99         | 92         | 99         |
|                         | 91-95                       | 288              | 95         | 100        | 95         | 803              | 101        | 92         | 87         |
|                         | 96-                         | 49               | 80         | 73         | 127        | 218              | 95         | 97         | 119        |
|                         | All over 40                 | 2,997            | 91         | 97         | 91         | 6,420            | 96         | 90         | 95         |



Table 2 (continued).

| Duration               | Age group<br>(nearest ages) | Males            |            |            |            | Females          |            |            |            |
|------------------------|-----------------------------|------------------|------------|------------|------------|------------------|------------|------------|------------|
|                        |                             | 1971-74          | 1967-70    | 1963-66    | 1971-74    | 1967-70          | 1963-66    |            |            |
|                        |                             | Actual<br>Deaths | 100<br>A/E | 100<br>A/E | 100<br>A/E | Actual<br>Deaths | 100<br>A/E | 100<br>A/E | 100<br>A/E |
| 5 and over<br>pre-1957 | 41-60                       | 3                | 150        | 133        | 173        | 7                | 233        | 133        | 71         |
|                        | 61-65                       | 8                | 200        | 219        | 159        | 15               | 136        | 104        | 133        |
|                        | 66-70                       | 19               | 158        | 235        | 124        | 31               | 72         | 114        | 118        |
|                        | 71-75                       | 40               | 121        | 121        | 111        | 168              | 117        | 117        | 105        |
|                        | 76-80                       | 117              | 131        | 111        | 105        | 454              | 98         | 115        | 110        |
|                        | 81-85                       | 218              | 105        | 106        | 100        | 1,096            | 103        | 103        | 111        |
|                        | 86-90                       | 269              | 92         | 104        | 109        | 1,635            | 105        | 107        | 115        |
|                        | 91-95                       | 158              | 86         | 109        | 116        | 1,321            | 106        | 109        | 113        |
|                        | 96-                         | 38               | 84         | 91         | 84         | 551              | 98         | 95         | 104        |
|                        | All over 40                 | 870              | 100        | 110        | 107        | 5,278            | 104        | 107        | 112        |

**Table 3. Immediate annuitants, 1967-74; percentage ratios of actual to expected deaths according to the aeg 1967-70 table (select for duration 0, ultimate for other durations). (Actual deaths shown for 1971-74 only).**

| Duration                | Age group<br>(nearest ages) | Males            |         |         | Females          |         |         |
|-------------------------|-----------------------------|------------------|---------|---------|------------------|---------|---------|
|                         |                             | 1971-74          | 1967-70 | 1967-70 | 1971-74          | 1967-70 | 1967-70 |
|                         |                             | Actual<br>deaths | 100 A/E | 100 A/E | Actual<br>deaths | 100 A/E | 100 A/E |
| 0                       | 51-70                       | 67               | 118     | 97      | 38               | 127     | 100     |
|                         | 71-80                       | 79               | 104     | 97      | 96               | 99      | 102     |
|                         | 81-                         | 68               | 95      | 107     | 160              | 112     | 99      |
|                         | All over 50                 | 214              | 105     | 100     | 294              | 109     | 100     |
| 1-4                     | 51-60                       | 21               | 195     | 125     | 9                | 53      | 91      |
|                         | 61-65                       | 64               | 90      | 75      | 63               | 82      | 87      |
|                         | 66-70                       | 210              | 81      | 112     | 158              | 84      | 107     |
|                         | 71-75                       | 235              | 89      | 85      | 294              | 93      | 89      |
|                         | 76-80                       | 275              | 93      | 92      | 438              | 95      | 95      |
|                         | 81-85                       | 277              | 92      | 82      | 483              | 98      | 91      |
|                         | 86-90                       | 214              | 106     | 88      | 406              | 100     | 98      |
|                         | 91-95                       | 72               | 93      | 82      | 186              | 104     | 101     |
|                         | 96-                         | 17               | 128     | 119     | 46               | 109     | 104     |
|                         | All over 50                 | 1,385            | 93      | 90      | 2,083            | 95      | 95      |
| 5 and over<br>post-1956 | 51-60                       | 12               | 148     | 124     | 8                | 54      | 150     |
|                         | 61-65                       | 46               | 115     | 93      | 61               | 106     | 86      |
|                         | 66-70                       | 201              | 100     | 104     | 267              | 105     | 114     |
|                         | 71-75                       | 472              | 96      | 114     | 652              | 104     | 101     |
|                         | 76-80                       | 649              | 100     | 103     | 1,203            | 111     | 108     |
|                         | 81-85                       | 699              | 101     | 105     | 1,623            | 114     | 99      |
|                         | 86-90                       | 579              | 106     | 112     | 1,584            | 113     | 105     |
|                         | 91-95                       | 288              | 112     | 118     | 803              | 112     | 102     |
|                         | 96-                         | 49               | 91      | 78      | 218              | 105     | 101     |
|                         | All over 50                 | 2,995            | 102     | 108     | 6,419            | 111     | 104     |
| 5 and over<br>pre-1957  | 51-60                       | 3                | 152     | 126     | 6                | 186     | 111     |
|                         | 61-65                       | 8                | 177     | 204     | 15               | 147     | 109     |
|                         | 66-70                       | 19               | 154     | 232     | 31               | 82      | 130     |
|                         | 71-75                       | 40               | 128     | 127     | 168              | 140     | 139     |
|                         | 76-80                       | 117              | 147     | 123     | 454              | 117     | 137     |
|                         | 81-85                       | 218              | 121     | 123     | 1,096            | 121     | 120     |
|                         | 86-90                       | 269              | 109     | 124     | 1,635            | 119     | 122     |
|                         | 91-95                       | 158              | 101     | 130     | 1,321            | 118     | 121     |
|                         | 96-                         | 38               | 93      | 93      | 551              | 108     | 103     |
|                         | All over 50                 | 870              | 116     | 126     | 5,277            | 118     | 123     |

## MORTALITY OF PENSIONERS UNDER LIFE OFFICE PENSION SCHEMES

### EXPERIENCE FOR 1971-74 (including separate investigation of 'Works' Pension Schemes)

THIS report covers the experience of the years 1971-74. The previous report on the mortality of pensioners was on the experience of the years 1967-70 and appeared in *C.M.I.R.* 1, 35, and the graduation of that experience was published in *C.M.I.R.* 2, 57.

Comparisons on the basis of E.L.T. No. 11, which were included in the last report to facilitate comparison with previous experiences, have been discontinued now that the experiences of three quadrennia can be compared on the basis of E.L.T. No. 12. Comparisons on two annuitant mortality tables, the 1947 experience table printed on p. xviii of the *a(55) Tables for Annuitants* and the *a(55)* itself, have again been shown, partly to facilitate comparison with previous periods and partly to compare with the mortality experience of immediate annuitants during the same period of investigation. Comparisons based on the Peg 1967-70 tables have been made for the experience of pensioners who retired at or after the normal age, and it must be remembered that the latter tables give different mortality rates for 'lives' and 'amounts'.

Tables 1 and 2 compare, on bases of 'lives' and 'amounts' respectively, the mortality of pensioners who retired at or after the normal age with all the tables mentioned above. Tables 3 and 4 make similar comparisons for those who retired before the normal age, but do not employ the Peg 1967-70 tables which did not include sections based on the experience of pensioners who retired early; this class of lives shows relatively heavy mortality on almost any standard applicable to annuitants or pensioners, and as it seems that the three standards already used in previous reports are more than necessary it has been decided not to add a fourth; however, if Peg 1967-70 becomes an accepted standard it will be used for all classes in future reports.

The mortality of male pensioners who retired at or after the normal age only decreased marginally between 1967-70 and 1971-74, whether examined on a 'lives' or an 'amounts' basis. For female pensioners who retired at or after the normal age a similar small improvement was shown at some ages when examined on a 'lives' basis, but not over the age range 76-85; on an 'amounts' basis the progression from quadrennium to quadrennium was somewhat irregular.

The mortality of male pensioners who retired before the normal age decreased between 1967-70 and 1971-74; for the females who retired before the normal

age the trend was upwards at ages over 60 on a 'lives' basis and over 65 on an 'amounts' basis.

For males, the percentage ratios based on 'amounts' were lower than those based on 'lives' at every age group; for the females the comparison was irregular, indicating that the weighting by amounts made no consistent difference to the mortality rates.

To compare the different distributions of data by age groups, percentages of the all ages totals are given in Table 5 on bases of both 'lives' and 'amounts'. This table also shows the 'index of average pension' calculated by finding the actual average pension for each subgroup and expressing it as a percentage of the average pension amongst the male exposed-to-risk (all ages) who had retired at or after the normal age. The average pensions almost invariably decreased with increasing age, were lower for females than for males, and lower when calculated for the deaths than for the exposed-to-risk.

As was observed at earlier investigations, the mortality experienced by pensioners who retired early has been relatively heavy, the proportional extra mortality decreasing as age increases. Table 6 compares the mortality of those who retired early with those who retired at or after the normal age; besides illustrating the feature just mentioned it also shows the tendency for the proportional extra mortality to decrease from quadrennium to quadrennium.

A comparison is given below of the percentages of actual to expected deaths at the more important age groups, for pensioners who retired at or after the normal age (based on 'lives') and for immediate annuitants (durations 5 and over) calculated on the 1947 table of annuitant mortality. As previously, the figures relating to annuities purchased before 1957 were omitted for the purpose of this comparison.

| Age group      | Pensioners |         |         | Annuitants |         |         |
|----------------|------------|---------|---------|------------|---------|---------|
|                | 1971-74    | 1967-70 | 1963-66 | 1971-74    | 1967-70 | 1963-66 |
| <b>Males</b>   |            |         |         |            |         |         |
| 66-70          | 107        | 112     | 115     | 85         | 88      | 93      |
| 71-75          | 106        | 107     | 106     | 78         | 92      | 73      |
| 76-80          | 100        | 97      | 102     | 78         | 81      | 78      |
| <b>Females</b> |            |         |         |            |         |         |
| 61-65          | 82         | 83      | 92      | 79         | 65      | 112     |
| 66-70          | 83         | 92      | 90      | 77         | 83      | 66      |
| 71-75          | 87         | 93      | 94      | 76         | 74      | 77      |

Table 7 shows a comparison between the mortality of 'works' schemes and 'non-works' schemes experienced by the five offices contributing data to this section of the investigation. For the males, mortality was heavier throughout for 'works' than for 'non-works'; and also heavier for 'lives' than for 'amounts' except in the lowest age group of the 'non-works'. For females the comparisons varied from age group to age group; the fact that the ratios for all ages com-

bined show (as for the males) 'lives' mortality heavier than 'amounts' and 'works' mortality heavier than 'non-works' may indicate a very slight tendency for female mortality, as well as male mortality, to be heavier for those with smaller pensions.

It must be remembered that mixed schemes for both 'works' and 'non-works' employees have been included in the 'non-works' data.

One of the five offices is having to withdraw from the 'works' investigation for part of the period 1975-78, and as the investigation to a large extent duplicates the work of the 'lives' and 'amounts' comparison it is doubtful whether it will be worth continuing to collect 'works' data from the remaining offices.

Hitherto the results for those who retired early from 'works' schemes have been based on data too small to be worth publishing; this is still the case for the females; for the males the numbers are becoming larger, but they do not disclose anything new, merely that the mortality of those who retired early has been much heavier than that of those who retired at or after the normal age.

For the whole of the pensioners' investigation it might, in future, be worth while additionally to show 'all pensioners combined' as the latter would be an aggregate group of all those who were originally 'selected' as members of certain employments and who are now on pension; some of these would have fallen into ill-health at times other than the historical point of retirement, and the aggregate experience could well be more informative than that of the early retirement data in isolation. The experience of 'pensioners who retired at or after the normal age' would then be a guide for purposes of calculating premium rates and that of 'all pensioners combined' would be appropriate for valuation purposes.

Table 1. Pensioners who retired at or after the normal age. Experience 1971-74 on a basis of 'lives'

| Age group<br>(nearest ages) | Actual<br>deaths<br>1971-74 | 100 A/E<br>E.L.T. No. 12 |         |         | 100 A/E<br>1947 Table |         |         | 100 A/E<br>a(55) |         |         | 100 A/E<br>Peg 1967-70<br>(Lives tables) |
|-----------------------------|-----------------------------|--------------------------|---------|---------|-----------------------|---------|---------|------------------|---------|---------|--|
|                             |                             | 1971-74                  | 1967-70 | 1963-66 | 1971-74               | 1967-70 | 1963-66 | 1971-74          | 1967-70 | 1963-66 | 1971-74                                  |
| <i>Males</i>                |                             |                          |         |         |                       |         |         |                  |         |         |  |
| -65                         | 1,805                       | 87                       | 95      | 107     | 117                   | 128     | 143     | 140              | 153     | 172     | 97                                       |
| 66-70                       | 19,704                      | 84                       | 87      | 90      | 107                   | 112     | 115     | 128              | 134     | 138     | 95                                       |
| 71-75                       | 19,485                      | 88                       | 88      | 88      | 106                   | 107     | 106     | 125              | 126     | 125     | 101                                      |
| 76-80                       | 12,190                      | 86                       | 84      | 88      | 100                   | 97      | 102     | 115              | 112     | 117     | 102                                      |
| 81-85                       | 7,131                       | 87                       | 82      | 89      | 98                    | 92      | 101     | 110              | 103     | 113     | 105                                      |
| 86-90                       | 2,550                       | 84                       | 81      | 91      | 91                    | 88      | 98      | 100              | 97      | 108     | 101                                      |
| 91-                         | 616                         | 90                       | 91      | 83      | 92                    | 93      | 85      | 99               | 101     | 93      | 103                                      |
| All ages                    | 63,481                      | 86                       | 86      | 89      | 104                   | 105     | 108     | 121              | 122     | 126     | 100                                      |
| <i>Females</i>              |                             |                          |         |         |                       |         |         |                  |         |         |  |
| -60                         | 77                          | 126                      | 115     | 78      | 118                   | 109     | 73      | 171              | 150     | 103     | 142                                      |
| 61-65                       | 842                         | 80                       | 81      | 90      | 82                    | 83      | 92      | 103              | 104     | 116     | 97                                       |
| 66-70                       | 1,299                       | 75                       | 83      | 82      | 83                    | 92      | 90      | 100              | 110     | 108     | 92                                       |
| 71-75                       | 1,402                       | 74                       | 78      | 80      | 87                    | 93      | 94      | 101              | 107     | 109     | 94                                       |
| 76-80                       | 1,200                       | 77                       | 73      | 80      | 95                    | 89      | 99      | 108              | 102     | 112     | 102                                      |
| 81-85                       | 657                         | 74                       | 74      | 75      | 91                    | 90      | 92      | 104              | 103     | 105     | 100                                      |
| 86-                         | 314                         | 77                       | 82      | 80      | 91                    | 97      | 95      | 104              | 111     | 109     | 100                                      |
| All ages                    | 5,791                       | 76                       | 79      | 82      | 88                    | 90      | 92      | 104              | 107     | 111     | 97                                       |

Mortality of Pensioners

Table 2. Pensioners who retired at or after the normal age. Experience 1971-74 on a basis of 'amounts'

| Age group<br>(nearest ages) | Actual<br>deaths | 100 A/E       |         |         | 100 A/E    |         |         | 100 A/E |         |         | 100 A/E                     |
|-----------------------------|------------------|---------------|---------|---------|------------|---------|---------|---------|---------|---------|-----------------------------|
|                             | 1971-74          | E.L.T. No. 12 |         |         | 1947 Table |         |         | a(55)   |         |         | Peg 1967-70                 |
|                             | (£ per<br>annum) | 1971-74       | 1967-70 | 1963-66 | 1971-74    | 1967-70 | 1963-66 | 1971-74 | 1967-70 | 1963-66 | (Amounts tables)<br>1971-74 |
| <i>Males</i>                |                  |               |         |         |            |         |         |         |         |         |                             |
| -65                         | 388,252          | 77            | 80      | 88      | 103        | 107     | 118     | 123     | 128     | 141     | 101                         |
| 66-70                       | 2,997,524        | 72            | 74      | 82      | 92         | 96      | 105     | 110     | 114     | 125     | 95                          |
| 71-75                       | 2,788,064        | 78            | 79      | 78      | 94         | 95      | 94      | 111     | 112     | 111     | 102                         |
| 76-80                       | 1,649,920        | 78            | 76      | 77      | 91         | 88      | 89      | 104     | 101     | 102     | 102                         |
| 81-85                       | 900,230          | 79            | 76      | 83      | 87         | 86      | 93      | 100     | 96      | 105     | 102                         |
| 86-90                       | 308,927          | 78            | 78      | 90      | 85         | 84      | 98      | 94      | 93      | 125     | 99                          |
| 91-                         | 60,986           | 87            | 94      | 82      | 88         | 94      | 84      | 96      | 102     | 91      | 101                         |
| All ages                    | 9,093,903        | 76            | 76      | 80      | 92         | 93      | 98      | 108     | 109     | 115     | 99                          |
| <i>Females</i>              |                  |               |         |         |            |         |         |         |         |         |                             |
| -60                         | 9,027            | 102           | 114     | 64      | 97         | 108     | 61      | 134     | 149     | 84      | 133                         |
| 61-65                       | 93,266           | 78            | 71      | 76      | 79         | 72      | 71      | 100     | 91      | 97      | 106                         |
| 66-70                       | 118,566          | 70            | 76      | 76      | 77         | 84      | 83      | 93      | 101     | 100     | 94                          |
| 71-75                       | 120,903          | 77            | 67      | 78      | 91         | 79      | 92      | 106     | 91      | 106     | 106                         |
| 76-80                       | 80,295           | 73            | 76      | 74      | 90         | 93      | 91      | 102     | 106     | 103     | 102                         |
| 81-85                       | 46,924           | 79            | 75      | 78      | 97         | 92      | 95      | 111     | 105     | 109     | 110                         |
| 86-                         | 20,909           | 71            | 77      | 67      | 84         | 91      | 79      | 95      | 104     | 90      | 93                          |
| All ages                    | 489,890          | 75            | 73      | 75      | 85         | 82      | 84      | 101     | 98      | 101     | 102                         |

Mortality of Pensioners

Table 3. *Pensioners who retired before the normal age. Experience 1971-74 on a basis of 'lives'*

| Age group<br>(nearest ages) | Actual<br>deaths<br>1971-74 | 100 A/E<br>E.L.T. No. 12 |         |         | 100 A/E<br>1947 table |         |         | 100 A/E<br>a(55) |         |         |
|-----------------------------|-----------------------------|--------------------------|---------|---------|-----------------------|---------|---------|------------------|---------|---------|
|                             |                             | 1971-74                  | 1967-70 | 1963-66 | 1971-74               | 1967-70 | 1963-66 | 1971-74          | 1967-70 | 1963-66 |
| <i>Males</i>                |                             |                          |         |         |                       |         |         |                  |         |         |
| -65                         | 5,462                       | 141                      | 173     | 220     | 190                   | 233     | 297     | 228              | 281     | 358     |
| 66-70                       | 5,226                       | 109                      | 122     | 135     | 141                   | 158     | 173     | 168              | 189     | 207     |
| 71-                         | 3,441                       | 98                       | 99      | 109     | 113                   | 116     | 128     | 132              | 135     | 148     |
| All ages                    | 14,129                      | 116                      | 134     | 156     | 147                   | 171     | 198     | 174              | 202     | 235     |
| <i>Females</i>              |                             |                          |         |         |                       |         |         |                  |         |         |
| -60                         | 173                         | 160                      | 203     | 230     | 150                   | 192     | 215     | 208              | 267     | 297     |
| 61-65                       | 247                         | 120                      | 115     | 120     | 123                   | 118     | 123     | 155              | 149     | 155     |
| 66-                         | 609                         | 88                       | 80      | 92      | 103                   | 92      | 106     | 120              | 108     | 124     |
| All ages                    | 1,029                       | 103                      | 102     | 116     | 113                   | 112     | 126     | 137              | 137     | 154     |



Table 4. Pensioners who retired before the normal age. Experience 1971-74 on a basis of 'amounts'

| Age group<br>(nearest ages) | Actual<br>deaths            | 100 A/E       |         |         | 100 A/E    |         |         | 100 A/E |         |     |
|-----------------------------|-----------------------------|---------------|---------|---------|------------|---------|---------|---------|---------|-----|
|                             | 1971-74<br>(£ per<br>annum) | E.L.T. No. 12 |         |         | 1947 table |         |         | a(55)   |         |     |
|                             | 1971-74                     | 1967-70       | 1963-66 | 1971-74 | 1967-70    | 1963-66 | 1971-74 | 1967-70 | 1963-66 |     |
| <i>Males</i>                |                             |               |         |         |            |         |         |         |         |     |
| -65                         | 1,100,966                   | 109           | 124     | 151     | 148        | 167     | 204     | 177     | 201     | 246 |
| 66-70                       | 920,768                     | 90            | 99      | 110     | 117        | 128     | 142     | 139     | 153     | 170 |
| 71-                         | 495,130                     | 90            | 92      | 109     | 107        | 109     | 128     | 125     | 127     | 149 |
| All ages                    | 2,516,864                   | 98            | 108     | 127     | 126        | 140     | 163     | 150     | 167     | 194 |
| <i>Females</i>              |                             |               |         |         |            |         |         |         |         |     |
| -60                         | 19,641                      | 144           | 187     | 181     | 136        | 177     | 171     | 188     | 244     | 236 |
| 61-65                       | 21,141                      | 94            | 95      | 100     | 95         | 97      | 102     | 121     | 123     | 129 |
| 66-                         | 39,472                      | 92            | 70      | 99      | 106        | 80      | 114     | 124     | 94      | 134 |
| All ages                    | 80,254                      | 101           | 99      | 113     | 109        | 106     | 121     | 134     | 131     | 150 |

Table 5. *Pensioners, exposed-to-risk and deaths expressed as percentages of figures for all ages 1971-74, and index of average pension*

| Age group<br>(nearest ages)                       | Exposed to Risk       |                         |                                 | Deaths                |                         |                                 |
|---|-----------------------|-------------------------|---------------------------------|-----------------------|-------------------------|---------------------------------|
|   | Lives<br>(% of total) | Amounts<br>(% of total) | Index of<br>average<br>pension* | Lives<br>(% of total) | Amounts<br>(% of total) | Index of<br>average<br>pension* |
| <i>Males who retired at or after normal age</i>   |                       |                         |                                 |                       |                         |                                 |
| -65   | 5.62                  | 8.44                    | 150                             | 2.84                  | 4.27                    | 126                             |
| 66-70   | 46.17                 | 47.91                   | 104                             | 31.04                 | 32.96                   | 89                              |
| 71-75   | 29.48                 | 27.80                   | 94                              | 30.70                 | 30.66                   | 84                              |
| 76-80   | 12.38                 | 10.80                   | 87                              | 19.20                 | 18.14                   | 79                              |
| 81-85   | 4.86                  | 3.95                    | 81                              | 11.23                 | 9.90                    | 74                              |
| 86-90   | 1.28                  | .97                     | 76                              | 4.02                  | 3.40                    | 71                              |
| 91-   | .21                   | .13                     | 60                              | .97                   | .67                     | 58                              |
| All ages  | 100.00                | 100.00                  | 100                             | 100.00                | 100.00                  | 84                              |
| <i>Females who retired at or after normal age</i> |                       |                         |                                 |                       |                         |                                 |
| -60   | 3.01                  | 4.47                    | 85                              | 1.33                  | 1.84                    | 68                              |
| 61-65   | 31.61                 | 37.04                   | 67                              | 14.54                 | 19.04                   | 65                              |
| 66-70   | 31.16                 | 31.36                   | 58                              | 22.43                 | 24.20                   | 53                              |
| 71-75   | 20.20                 | 17.14                   | 49                              | 24.21                 | 24.68                   | 50                              |
| 76-80   | 9.70                  | 7.00                    | 41                              | 20.72                 | 16.39                   | 39                              |
| 81-85   | 3.39                  | 2.31                    | 39                              | 11.35                 | 9.58                    | 42                              |
| 86-   | .93                   | .68                     | 42                              | 5.42                  | 4.27                    | 39                              |
| All ages  | 100.00                | 100.00                  | 57                              | 100.00                | 100.00                  | 49                              |
| <i>Males who retired before normal age</i>        |                       |                         |                                 |                       |                         |                                 |
| -65   | 47.91                 | 54.39                   | 151                             | 38.66                 | 43.74                   | 118                             |
| 66-70   | 36.79                 | 34.72                   | 125                             | 36.99                 | 36.59                   | 103                             |
| 71-   | 15.30                 | 10.89                   | 95                              | 24.35                 | 19.67                   | 84                              |
| All ages  | 100.00                | 100.00                  | 133                             | 100.00                | 100.00                  | 104                             |
| <i>Females who retired before normal age</i>      |                       |                         |                                 |                       |                         |                                 |
| -60   | 28.91                 | 36.21                   | 73                              | 16.81                 | 24.47                   | 66                              |
| 61-65   | 32.24                 | 36.05                   | 65                              | 24.01                 | 26.34                   | 50                              |
| 66-   | 38.85                 | 27.74                   | 41                              | 59.18                 | 49.19                   | 38                              |
| All ages  | 100.00                | 100.00                  | 58                              | 100.00                | 100.00                  | 46                              |

\*Based on index for male normal retirements, exposed to risk, all ages = 100.

Table 6. *Comparison between experience of pensioners who retired before the normal age and that of pensioners who retired at or after the normal age (expected deaths according to E.L.T. No. 12)*

| Age group<br>(nearest ages) | Lives before<br>normal age<br>100 A/E |             |             | Lives<br>at or after<br>normal age<br>100 A/E |             |             | Lives 100 A/E<br>(early retirement)<br>÷ Lives 100 A/E<br>(normal or late<br>retirement) |             |             | Amounts<br>before<br>normal age<br>100 A/E |             |             | Amounts<br>at or after<br>normal age<br>100 A/E |             |             | Amounts 100 A/E<br>(early retirement)<br>÷ Amounts 100 A/E<br>(normal or late<br>retirement) |             |             |
|-----------------------------|---------------------------------------|-------------|-------------|---|-------------|-------------|--|-------------|-------------|--|-------------|-------------|---|-------------|-------------|--|-------------|-------------|
|                             | 1971<br>-74                           | 1967<br>-70 | 1963<br>-66 | 1971<br>-74                                   | 1967<br>-70 | 1963<br>-66 | 1971<br>-74  | 1967<br>-70 | 1963<br>-66 | 1971<br>-74                                | 1967<br>-70 | 1963<br>-66 | 1971<br>-74                                     | 1967<br>-70 | 1963<br>-66 | 1971<br>-74  | 1967<br>-70 | 1963<br>-66 |
| <i>Males</i>                |                                       |             |             |   |             |             |  |             |             |  |             |             |   |             |             |  |             |             |
| -65                         | 141                                   | 173         | 220         | 87  | 95          | 107         | 1.62   | 1.82        | 2.06        | 109  | 124         | 151         | 77  | 80          | 88          | 1.42   | 1.55        | 1.72        |
| 66-70                       | 109                                   | 122         | 135         | 84  | 87          | 90          | 1.30   | 1.40        | 1.50        | 90   | 99          | 110         | 72  | 74          | 82          | 1.25   | 1.34        | 1.34        |
| 71-                         | 98                                    | 99          | 109         | 87  | 85          | 88          | 1.13   | 1.16        | 1.24        | 90   | 92          | 109         | 78  | 77          | 79          | 1.15   | 1.19        | 1.38        |
| All ages                    | 116                                   | 134         | 156         | 86  | 86          | 89          | 1.35   | 1.56        | 1.75        | 98   | 108         | 127         | 76  | 76          | 80          | 1.29   | 1.42        | 1.59        |
| <i>Females</i>              |                                       |             |             |   |             |             |  |             |             |  |             |             |   |             |             |  |             |             |
| -60                         | 160                                   | 203         | 230         | 126   | 115         | 78          | 1.27   | 1.77        | 2.95        | 144  | 187         | 181         | 102   | 114         | 64          | 1.41   | 1.64        | 2.83        |
| 61-65                       | 120                                   | 115         | 120         | 80  | 81          | 90          | 1.50   | 1.42        | 1.33        | 94   | 95          | 100         | 78  | 71          | 76          | 1.21   | 1.34        | 1.32        |
| 66-                         | 88                                    | 80          | 92          | 75  | 78          | 80          | 1.17   | 1.03        | 1.15        | 92   | 70          | 99          | 75  | 73          | 76          | 1.23   | .96         | 1.30        |
| All ages                    | 103                                   | 102         | 116         | 76  | 79          | 82          | 1.36   | 1.29        | 1.41        | 101  | 99          | 113         | 75  | 73          | 75          | 1.35   | 1.36        | 1.51        |

Table 7. *Mortality of pensioners under works and non-works schemes in five offices during 1971-74. Retirements at or after normal age; (expected deaths according to E.L.T. No. 12)*

| Age group<br>(nearest ages) | Actual<br>deaths<br>1971-74 | 'Works' schemes    |                   |                    |                    |                    | 'Non-works' schemes |                    |                    |           |    |        |
|-----------------------------|-----------------------------|--------------------|-------------------|--------------------|--------------------|--------------------|---------------------|--------------------|--------------------|-----------|----|--------|
|                             |                             | Lives              | Actual<br>deaths* | Amounts            |                    | Lives              | Actual<br>deaths*   | Amounts            |                    |           |    |        |
|                             |                             | 100 A/E<br>1971-74 |                   | 100 A/E<br>1967-70 | 100 A/E<br>1971-74 | 100 A/E<br>1967-70 |                     | 100 A/E<br>1971-74 | 100 A/E<br>1967-70 |           |    |        |
| <i>Males</i>                |                             |                    |                   |                    |                    |                    |                     |                    |                    |           |    |        |
| -65                         | 211                         | 100                | 113               | 11,851             | 97                 | 106                | 505                 | 83                 | 108                | 151,389   | 84 | 95     |
| 66-70                       | 3,387                       | 98                 | 102               | 182,894            | 93                 | 101                | 6,441               | 82                 | 92                 | 1,348,080 | 72 | 80     |
| 71-75                       | 3,549                       | 98                 | 95                | 176,819            | 96                 | 94                 | 6,861               | 85                 | 90                 | 1,315,207 | 78 | 82     |
| 76-80                       | 1,780                       | 94                 | 89                | 89,385             | 92                 | 85                 | 5,236               | 86                 | 84                 | 788,389   | 79 | 77     |
| 81-                         | 1,058                       | 96                 | 89                | 37,806             | 94                 | 93                 | 4,738               | 84                 | 83                 | 602,046   | 79 | 78     |
| All ages                    | 9,985                       | 97                 | 97                | 498,755            | 94                 | 96                 | 23,781              | 84                 | 89                 | 4,205,111 | 77 | 80     |
| <i>Females</i>              |                             |                    |                   |                    |                    |                    |                     |                    |                    |           |    |        |
| -60                         | 1                           | 50                 | 50                | 34                 | 37                 | 100                | 27                  | 89                 | 115                | 3,453     | 93 | 128    |
| 61-65                       | 45                          | 92                 | 76                | 1,982              | 82                 | 78                 | 332                 | 76                 | 85                 | 39,477    | 72 | 75     |
| 66-70                       | 71                          | 76                 | 99                | 2,878              | 67                 | 81                 | 598                 | 76                 | 88                 | 54,766    | 70 | 82     |
| 71-75                       | 75                          | 76                 | } 93 {            | 3,075              | 83                 | } 79 {             | 744                 | 77                 | } 78 {             | 55,757    | 75 | } 72 { |
| 76-                         | 70                          | 97                 |                   | 1,329              | 81                 |                    | 1,153               | 78                 |                    | 65,103    | 79 |        |
| All ages                    | 262                         | 83                 | 91                | 9,298              | 77                 | 80                 | 2,854               | 77                 | 83                 | 218,556   | 75 | 77     |

\*£ per annum

## **MORTALITY EXPERIENCED DURING THE PERIOD 1971-74 BY PURCHASERS OF RETIREMENT ANNUITIES UNDER THE PROVISIONS OF THE FINANCE ACT 1956**

THE previous report on the experience of purchasers of retirement annuities under the Finance Act, 1956, related to the period 1967-70 and appeared in *C.M.I.R.* 1, 45. It was observed in that report that mortality under these policies started, at the youngest ages, at a level between assured lives' mortality and population mortality for males, moving closer to assured lives' mortality with increasing age during the period of deferment, and to annuitant mortality when in course of payment. For females, there is no appropriate assured lives' table as yet, and mortality was lighter than under the national mortality table (though nearer to that table than the males) during the period of deferment; during the course of payment female mortality, on the evidence of somewhat scant data, appeared to be rather lower than annuitant mortality.

Hitherto (*i.e.* up to the year of experience 1974) the data have been subdivided, not only by age and sex and between the period of deferment and the period of payment, but also between medically examined lives and non-medical data and, in the case of observations during the course of payment, between retirements at or after age 60 and retirements before age 60, the latter presumably including a high proportion of ill-health retirements. In subsequent years not yet examined (*i.e.* 1975 onward) subdivision between medical and non-medical data has been discontinued, and keeping in view the need in four years' time to make comparisons with the present report, rather more detail of the medical experience is given than the size of the data would normally justify, to enable the two classes to be easily combined.

It has also been observed that the 'in course of payment' data excluding retirements before age 60 nevertheless includes some exposure before age 60; this is presumably because some of the contributing offices are unable to keep separate records of the types of retirement. The exposures under age 60 have been transferred to the subdivision of retirements before age 60, but clearly there must be some exposures and deaths at age 60 or later resulting from the early retirements in the data of the same offices; these cannot be separately identified. In the circumstances it is doubtful whether it is worth the offices' keeping separate records of whether or not retirement occurred before age 60 bearing in mind (1) that some offices are not doing so, (2) that under this class of policy there could be some continuous selective element operating between retirement and non-retirement at the higher ages, although the evidence of this is not strong, and (3) that the exclusion of the known early retirements, although the relative data are small, gives an artificial lightness to the mortality of the remaining lives whose annuities are in course of payment.

Table 1 compares the actual deaths in all the subdivisions with the deaths expected according to the E.L.T. No. 12; ratios of actual to expected are shown where the data are large enough, and for the combined data (all classes subdivided only according to sex and age) the corresponding ratios for 1967-70 are shown for comparative purposes. Table 2 makes comparisons based on the standard tables used in the last report, i.e. A1949-52 ultimate for the male lives during deferment, E.L.T. No. 12 for the female lives during deferment, and *a*(55) ultimate for the male and female lives in course of payment; to enable comparisons to be made with the two previous quadrennia the cases known to have been retirements before age 60 have been excluded. Table 3 combines the medical and non-medical data and, with a view to comparisons which may be required in four years' time, shows the expected deaths for male lives during deferment on the basis of A 1967-70 ultimate, and for male and female lives in course of payment on the basis of *aeg* 1967-70 ultimate; female lives during deferment have again been compared on the basis of E.L.T. No. 12; the data for lives in course of payment have again excluded those known to have retired before age 60 as this subdivision is already being made in the data for 1975-78.

The previous report observed that in the combined data mortality tended to diverge from E.L.T. No. 12 with advancing age; Table 1 shows that in 1971-74 this was still a feature of the female experience, but for the males it was limited to the age range 41-70; there was no marked upward or downward trend for either sex between 1967-70 and 1971-74. Table 2 however indicates a downward trend for the males in the period of deferment, only one age group showing a rise; and although this trend is not obvious for the females in the period of deferment when observed in quinary age groups it shows faintly when the data are combined into the two broad age groups, up to 50, and 51 and over. The medical data were too small for any conclusion to be drawn, and the cases in course of payment showed broadly similar mortality to 1967-70, while remaining lighter than in 1963-66.

Table 3 shows that male mortality in deferment was similar to A 1967-70 ultimate up to age 60, lighter thereafter; no corresponding comparison is yet available for the females. Male mortality during the course of payment was lighter than *aeg* 1967-70 ultimate between ages 66 and 80, female mortality lighter at all ages where the data were large enough to be significant; from the financial point of view this could be the most important conclusion of the investigation.

Table 1. *Retirement annuity policies, medical and non-medical, during deferment and after retirement, separately and combined. Actual and ratios of actual deaths 1971-74 to expected deaths according to E.L.T. No. 12*

| Age<br>group<br>(nearest ages) | In deferment<br>non-medical |     | In deferment<br>medical |    | In payment<br>non-medical |    | In payment<br>medical |     | Retirements<br>before age 60 |    |     |                 | All classes combined |    |    |
|--------------------------------|-----------------------------|-----|-------------------------|----|---------------------------|----|-----------------------|-----|------------------------------|----|-----|-----------------|----------------------|----|----|
|                                | A 100 A/E                   |     | A 100 A/E               |    | A 100A/E                  |    | A 100 A/E             |     | non-med. med.                |    | A   | A 100 A/E       |                      |    |    |
|                                |                             |     |                         |    |                           |    |                       |     |                              |    |     | 1971-74 1967-70 |                      |    |    |
| <i>Males</i>                   |                             |     |                         |    |                           |    |                       |     |                              |    |     |                 |                      |    |    |
| -30                            | 33                          | 81  |                         |    |                           |    |                       |     |                              |    |     |                 | 33                   | 81 |    |
| 31-35                          | 33                          | 49  |                         |    |                           |    |                       |     |                              |    |     |                 | 33                   | 49 |    |
| 36-40                          | 78                          | 53  |                         |    |                           |    |                       |     |                              | 6  |     |                 | 84                   | 57 |    |
| 41-45                          | 223                         | 67  | 1                       |    |                           |    |                       |     |                              | 3  |     |                 | 227                  | 67 | 76 |
| 46-50                          | 470                         | 66  | 4                       | 43 |                           |    |                       |     |                              | 1  |     |                 | 475                  | 66 | 74 |
| 51-55                          | 927                         | 66  | 7                       | 37 |                           |    |                       |     |                              | 10 |     |                 | 944                  | 66 | 64 |
| 56-60                          | 1,505                       | 60  | 21                      | 50 | 9                         | 51 | 2                     |     |                              | 21 |     | 1               | 1,559                | 60 | 65 |
| 61-65                          | 1,632                       | 55  | 23                      | 44 | 433                       | 69 | 10                    | 105 |                              | 17 |     |                 | 2,115                | 58 | 59 |
| 66-70                          | 505                         | 51  | 7                       | 33 | 1,415                     | 61 | 29                    | 62  |                              | 4  |     |                 | 1,960                | 58 | 59 |
| 71-75                          | 10                          | 105 |                         |    | 1,142                     | 63 | 20                    | 53  |                              | 1  |     |                 | 1,173                | 63 | 56 |
| 76-80                          |                             |     |                         |    | 380                       | 55 | 5                     | 38  |                              |    |     |                 | 385                  | 55 | 56 |
| 81-85                          |                             |     |                         |    | 112                       | 73 | 4                     |     |                              |    |     |                 | 116                  | 75 | 48 |
| 86-                            | 1                           |     |                         |    | 8                         | 75 |                       |     |                              |    |     |                 | 9                    | 82 |    |
| All ages                       | 5,417                       | 59  | 63                      | 42 | 3,499                     | 62 | 70                    | 64  |                              | 63 | 232 | 1               | 9,113                | 60 | 62 |

Table 1 (continued)

| Age group<br>(nearest ages) | In deferment<br>non-medical |         | In deferment<br>medical |         | In payment<br>non-medical |         | In payment<br>medical |         | Retirements<br>before age 60 |      |   | All classes combined |         |                 |
|-----------------------------|-----------------------------|---------|-------------------------|---------|---------------------------|---------|-----------------------|---------|------------------------------|------|---|----------------------|---------|-----------------|
|                             | A                           | 100 A/E | A                       | 100 A/E | A                         | 100 A/E | A                     | 100 A/E | non-med.                     | med. | A | A                    | 100 A/E | 1971-74 1967-70 |
| <i>Females</i>              |                             |         |                         |         |                           |         |                       |         |                              |      |   |                      |         |                 |
| -30                         |                             |         |                         |         |                           |         |                       |         |                              |      |   |                      |         |                 |
| 31-35                       |                             |         |                         |         |                           |         |                       |         |                              |      |   |                      |         |                 |
| 36-40                       | 2                           |         |                         |         |                           |         |                       |         |                              |      |   | 2                    |         |                 |
| 41-45                       | 13                          | 80      |                         |         |                           |         |                       |         |                              |      |   | 13                   | 80      | 95              |
| 46-50                       | 29                          | 73      | 1                       |         |                           |         |                       |         | 1                            |      |   | 31                   | 78      | 65              |
| 51-55                       | 59                          | 78      |                         |         |                           |         |                       |         |                              |      |   | 59                   | 78      | 84              |
| 56-60                       | 88                          | 74      | 1                       |         | 2                         |         |                       |         |                              |      |   | 91                   | 74      | 65              |
| 61-65                       | 58                          | 53      |                         |         | 45                        | 66      |                       |         | 3                            |      |   | 106                  | 59      | 68              |
| 66-70                       | 19                          | 60      |                         |         | 97                        | 61      | 2                     |         |                              |      |   | 118                  | 61      | 51              |
| 71-75                       | 2                           |         |                         |         | 65                        | 52      | 2                     |         | 1                            |      |   | 70                   | 55      | 51              |
| 76-80                       |                             |         |                         |         | 21                        | 46      |                       |         |                              |      |   | 21                   | 46      | 52              |
| 81-85                       |                             |         |                         |         | 4                         | 64      |                       |         |                              |      |   | 4                    |         |                 |
| 86-                         |                             |         |                         |         | 1                         |         |                       |         |                              |      |   | 1                    |         |                 |
| All ages                    | 270                         | 68      | 2                       |         | 235                       | 58      | 4                     |         | 5                            | 161  | 0 | 516                  | 63      | 65              |

*Note:* In the above table, A = Actual deaths 1971-74 and E = Expected deaths according to E.L.T. No. 12. 100 A/E has been omitted from individual age groups under retirements before age 60, and from all other age groups where E < 5.



Table 2. *Retirement annuity policies, medical and non-medical separately, excluding retirements before age 60. Actual and ratios of actual to expected deaths in 1971-74 compared with corresponding ratios in 1967-70 and 1963-66*

| Age group<br>(nearest ages)      | Actual<br>deaths<br>1971-74 | Males              |                    |                    | Actual<br>deaths<br>1971-74 | Females            |                    |                    |
|----------------------------------|-----------------------------|--------------------|--------------------|--------------------|-----------------------------|--------------------|--------------------|--------------------|
|                                  |                             | 100 A/E<br>1971-74 | 100 A/E<br>1967-70 | 100 A/E<br>1963-66 |                             | 100 A/E<br>1971-74 | 100 A/E<br>1967-70 | 100 A/E<br>1963-66 |
| <i>In deferment, non-medical</i> |                             |                    |                    |                    |                             |                    |                    |                    |
| -30                              | 33                          | 75                 | 75                 | 147                | 2                           | 26                 | 81                 | 206                |
| 31-35                            | 33                          | 53                 | 83                 | 90                 |                             |                    |                    |                    |
| 36-40                            | 78                          | 66                 | 83                 | 96                 |                             |                    |                    |                    |
| 41-45                            | 223                         | 82                 | 94                 | 91                 | 13                          | 80                 | 87                 | 74                 |
| 46-50                            | 470                         | 80                 | 90                 | 90                 | 29                          | 73                 | 65                 | 84                 |
| 51-55                            | 927                         | 83                 | 80                 | 97                 | 59                          | 78                 | 85                 | 53                 |
| 56-60                            | 1,505                       | 79                 | 85                 | 86                 | 88                          | 74                 | 69                 | 89                 |
| 61-65                            | 1,632                       | 73                 | 76                 | 86                 | 58                          | 53                 | 65                 | 65                 |
| 66-70                            | 505                         | 65                 | 65                 | 72                 | 21                          | 64                 | 53                 | 57                 |
| 71-                              | 11                          | 132                |                    |                    |                             |                    |                    |                    |
| -50                              | 837                         | 77                 | 90                 | 92                 | 44                          | 69                 | 72                 | 96                 |
| 51-                              | 4,580                       | 76                 | 79                 | 87                 | 226                         | 67                 | 70                 | 71                 |
| All ages                         | 5,417                       | 76                 | 80                 | 88                 | 270                         | 68                 | 70                 | 75                 |

Table 2 (continued)

| Age group<br>(nearest ages)              | Actual<br>deaths<br>1971-74 | Males              |                    |                    | Actual<br>deaths<br>1971-74 | Females            |                    |                    |
|--|-----------------------------|--------------------|--------------------|--------------------|-----------------------------|--------------------|--------------------|--------------------|
|  |                             | 100 A/E<br>1971-74 | 100 A/E<br>1967-70 | 100 A/E<br>1963-66 |                             | 100 A/E<br>1971-74 | 100 A/E<br>1967-70 | 100 A/E<br>1963-66 |
|  |                             |                    |                    |                    |                             |                    |                    |                    |
| <i>In deferment, medical</i>             |                             |                    |                    |                    |                             |                    |                    |                    |
| -50                                      | 5                           | 42                 | 56                 | 61                 | 1                           |                    |                    |                    |
| 51-                                      | 58                          | 56                 | 48                 | 60                 | 1                           |                    |                    |                    |
| All ages                                 | 63                          | 54                 | 49                 | 60                 | 2                           |                    |                    |                    |
| <i>In course of payment, non-medical</i> |                             |                    |                    |                    |                             |                    |                    |                    |
| -65                                      | 442                         | 110                | 110                | 131                | 47                          | 85                 | 97                 | 134                |
| 66-70                                    | 1,415                       | 94                 | 99                 | 101                | 97                          | 81                 | 67                 | 93                 |
| 71-75                                    | 1,142                       | 90                 | 81                 | 80                 | 65                          | 71                 | } 67               |                    |
| 76-80                                    | 380                         | 73                 | } 74               |                    |                             |                    |                    |                    |
| 81-85                                    | 112                         | 93                 |                    | 85                 | 26                          | 68                 |                    |                    |
| 86-                                      | 8                           | 89                 |                    |                    |                             |                    |                    |                    |
| All ages                                 | 3,499                       | 92                 | 92                 | 97                 | 235                         | 77                 | 75                 | 100                |
| <i>In course of payment, medical</i>     |                             |                    |                    |                    |                             |                    |                    |                    |
| All ages                                 | 70                          | 94                 |                    |                    | 4                           |                    |                    |                    |

NOTE: In the above table the following bases have been used for expected deaths:

*Males during deferment:* A 1949-52 ultimate;

*Females during deferment:* E.L.T. No. 12;

*Males and females in course of payment:* a(55) ultimate.

Table 3. Retirement annuity policies, medical and non-medical combined, excluding retirements before age 60. Actual and ratios of actual to expected deaths, 1971-74

| Age group<br>(nearest ages) | Males            |         | Females          |         |
|-----------------------------|------------------|---------|------------------|---------|
|                             | Actual<br>deaths | 100 A/E | Actual<br>deaths | 100 A/E |
| <i>In deferment</i>         |                  |         |                  |         |
| ~30                         | 33               | 125     | } 2              | 26      |
| 31-35                       | 33               | 89      |                  |         |
| 36-40                       | 78               | 91      |                  |         |
| 41-45                       | 224              | 103     | 13               | 80      |
| 46-50                       | 474              | 99      | 30               | 76      |
| 51-55                       | 934              | 102     | 59               | 78      |
| 56-60                       | 1,526            | 95      | 89               | 75      |
| 61-65                       | 1,655            | 86      | 58               | 53      |
| 66-70                       | 512              | 75      | 19               | 60      |
| 71~                         | 11               | 150     | 2                | 180     |
| ~50                         | 842              | 100     | 45               | 71      |
| 51~                         | 4,638            | 90      | 227              | 67      |
| All ages                    | 5,480            | 91      | 272              | 68      |
| <i>In course of payment</i> |                  |         |                  |         |
| ~65                         | 454              | 104     | 47               | 89      |
| 66-70                       | 1,444            | 93      | 99               | 93      |
| 71-75                       | 1,162            | 93      | 67               | 86      |
| 76-80                       | 385              | 80      | 21               | 76      |
| 81-85                       | 116              | 109     | 4                | } 103   |
| 86-90                       | 3                | } 104 { | 1                |         |
| 91~                         | 5                |         | —                |         |
| All ages                    | 3,569            | 93      | 239              | 89      |

NOTE: In the above table the following bases have been used for expected deaths:

*Males during deferment:* A 1967-70 ultimate;

*Females during deferment:* E.L.T. No. 12;

*Males and females in course of payment:* aeg 1967-70 ultimate.

## MORTALITY OF ASSURED LIVES 1971-74 ACCORDING TO CAUSE OF DEATH

THIS follows the similar report on the years 1967-70 which appeared in *C.M.I.R.* 1, 49.

The same method as before has been used, with the cause specific rates of mortality being applied to an adjusted exposed to risk to allow for the proportion of 'cause unknown' cases in each age and duration group; many of the latter were due to consular or foreign death certificates not having any space for cause of death.

Up to 1973 the national statistics of England and Wales, from which the cause specific rates were calculated, came from the *Registrar General's Annual Estimate of the Population of England and Wales* (Table 1, Home Population) and from Table 17 of the *Registrar General's Statistical Reviews* (Part 1 or Part 1a, Tables, Medical). In 1974 both the Home Populations and the distribution of deaths by cause are to be found in a new publication *Mortality Statistics - Cause* (Series DH2 No. 1); and the same coding system has been used as was used by the Office of Population Censuses and Surveys, viz. the *Eighth Revision* of the *Manual of the International Statistical Classification of Diseases Injuries and Causes of Death* (W.H.O.).

When comparing with the national data it must be remembered that the assured lives experience excludes industrial business and does not generally include members of social classes 4 and 5. The latest available standardization factors for social class are still those given in *C.M.I.R.* 1, 64.

The comparisons with the national statistics are shown in Tables 1-4, Table 1 showing the neoplasm groups, Table 2 the circulatory diseases, Table 3 suicide, accident and violence, and Table 4 other causes and all causes combined. Comments on the percentages rates of actual to expected deaths are given in tabular form in the following schedule.

## SCHEDULE

| I.C.D.<br>Nos. | Cause Group<br><br>Description                                |         | Comparison<br>with all<br>causes<br>pattern | Apparent<br>duration<br>of initial<br>selection<br>(see <i>Note 2</i> ) | Whether<br>percentages<br>tend to<br>increase<br>with age | Comparison<br>with 1967-70      | Comparison<br>with<br>standardized<br>national percentages<br>(see <i>Note 3</i> )                          |
|----------------|---|---------|---|---|---|---------------------------------|---|
| 150-159        | Malignant neoplasms of<br>digestive system                    | Med     | Generally<br>higher than<br>all causes      | 1 year  | No  | No clear pattern                | Some figures greater<br>than national<br>standardized figures<br>but wide variations<br>in group            |
|                |   | Non-med |   | 1 year  | Yes   | No clear pattern                |   |
| 160-163        | Malignant neoplasms<br>of respiratory system                  | Med     | Nearly always<br>lower than<br>all causes   | 3 years   | Yes   | Generally lower<br>than 1967-70 |   |
|                |   | Non-med |   | 1 year  | Yes   |                                 |   |
| 170-174        | Malignant neoplasms<br>of bone, connective<br>tissue and skin | Med     | Nearly always<br>higher than<br>all causes  | 3 years   | No  | No clear pattern                |   |
|                |   | Non-med |   | 3 years   | Not clear   | No clear pattern                |   |
| 180-189        | Malignant neoplasms<br>of genito-urinary<br>organs            | Med     | Nearly always<br>higher than<br>all causes  | 5 years   | No  | Generally lower<br>than 1967-70 |   |
|                |   | Non-med |   | 1 year  | No  |                                 |   |
| 190-192        | Malignant neoplasms<br>of nervous system                      | Med     | Nearly always<br>higher than<br>all causes  | 1 year  | Yes   | See <i>Note 1</i>               | Generally higher<br>than national<br>standardized<br>figures at the older<br>ages of duration 5<br>and over |
|                |   | Non-med |   | 1 year  | Yes   |                                 |   |

# SCHEDULE (cont.)

|             |  |                |  |                        |                               |  |   |
|-------------|--|----------------|--|------------------------|-------------------------------|--|---|
| 140-149     | Malignant neoplasms  | Med            | No clear pattern                             | 3 years                | Not clear                     | No clear pattern                                 |   |
| 193-194     | of buccal cavity, pharynx and endocrine glands   | Non-med        | No clear pattern                             | 3 years                | No                            | No clear pattern                                 |   |
| 200-209     | Neoplasms of lymphatic and haematopoietic tissue   | Med<br>Non-med | Generally higher than all causes             | {<br>1 year<br>1 year  | No<br>Yes                     | No clear pattern<br>No clear pattern             | Oldest age group in the duration 5 and over is higher than the national standardized figure |
| 140-239     | All neoplasms (including ill-defined and unspecified sites not included in the sub groups) | Med<br>Non-med |  |                        | Not clear<br>Not clear        | No clear pattern<br>Generally lower than 1967-70 |   |
| 410.0       | Acute myocardial infarction, with mention of hypertension                                  | Med            | Generally lower than all causes              | > 5 years              | Yes                           | New grouping                                     |   |
|             |  | Non-med        | Lower for durations < 5, higher for $\geq 5$ | 5 years                | Yes                           | New grouping                                     |   |
| 410-9       | Acute myocardial infarction, without mention of hypertension                               | Med<br>Non-med | Generally higher than all causes             | {<br>3 years<br>1 year | Yes<br>Yes                    | New grouping<br>New grouping                     |   |
| 411-0-414-0 | Other forms of ischaemic heart disease, with mention of hypertension                       | Med            |  |                        | Not clear (numbers are small) | New grouping                                     |   |
|             |  | Non-med        | Generally lower than all causes              | 5 years                | Yes                           | New grouping                                     |   |
| 411-9-414-9 | Other forms of ischaemic heart disease without mention of hypertension                     | Med            | No clear pattern                             | 0 years                | Yes                           | New grouping                                     |   |
|             |  | Non-med        | Generally lower than all causes              | 1 year                 | Yes                           | New grouping                                     |   |

According to Cause of Death

SCHEDULE (cont.)

80

| I.C.D. Nos.         | Cause Group Description  |                | Comparison with all causes pattern                                      | Apparent duration of initial selection (See Note 2) | Whether percentages tend to increase with age | Comparison with 1967-70      | Comparison with standardized national percentages (See Note 3)                                       |
|---------------------|--|----------------|---|---|---|------------------------------|--|
| 400-404             | Hypertensive disease (excluding ischaemic heart disease and cerebrovascular disease) | Med<br>Non-med | Always lower than all causes  | { > 5 years<br>> 5 years                            | Yes<br>Yes                                    | Generally lower than 1967-70 |  |
| 430-0-438-0         | Cerebrovascular disease, with mention of hypertension                                | Med<br>Non-med | Generally lower than all causes   | { > 5 years<br>> 5 years                            | Yes<br>Yes                                    | New grouping<br>New grouping | Oldest age group in the medical duration 5 and over is greater than the national standardized figure |
| 430-9-438-9         | Cerebrovascular disease, without mention of hypertension                             | Med<br>Non-med | Nearly always lower than all causes<br>No clear pattern                 | > 5 years<br>1 year                                 | Yes<br>Yes                                    | New grouping<br>New grouping |  |
| 390-398 and 420-429 | Other diseases of the heart  | Med<br>Non-med | Nearly always lower than all causes                                     | { > 5 years<br>5 years                              | Yes<br>Yes                                    | Generally lower than 1967-70 |  |
| 440-458             | Other diseases of the circulatory system   | Med<br>Non-med | With the exception of the younger ages generally higher than all causes | { 3 years<br>3 years                                | Yes<br>Yes                                    | Generally lower than 1967-70 |  |

Mortality of Assured Lives 1971-74

# SCHEDULE (cont.)

|                                  |   |         |   |                                   |           |                              |  |
|----------------------------------|---|---------|---|-----------------------------------|-----------|------------------------------|--|
| 390-458                          | All diseases of the circulatory system (combined)   | Med     | With the exception of the younger ages generally higher than all causes | 5 years                           | Yes       | Generally lower than 1967-70 | —  |
|                                  |   | Non-med |   | 5 years                           | Yes       |                              |  |
| E810-823                         | Motor vehicle accidents                             | Med     | With the exception of the oldest ages, generally higher than all causes | 0 years                           | No        | No clear pattern             | —  |
|                                  |   | Non-med |   | 0 years                           | No        |                              |  |
| E950-959                         | Suicide   | Med     | Generally higher than all causes  | 1 year                            | Not clear | No clear pattern             | —  |
|                                  |   | Non-med | Generally lower than all causes   | 3 years                           | Not clear | No clear pattern             | —  |
| E800-807<br>E825-949<br>E960-999 | All other accidental and violent causes             | Med     | Generally higher than all causes  | 0 years                           | No        | No clear pattern             | Medical and Non-medical figures at the shorter durations tend to be higher than the national standardized figure |
|                                  |   | Non-med |   | 0 years                           | No        | No clear pattern             |  |
| E800-999                         | All accidental and violent causes                   | Med     | With the exception of the oldest ages, generally higher than all causes | 0 years                           | No        | No clear pattern             | —  |
|                                  |   | Non-med |   | 0 years                           | No        | No clear pattern             | —  |
| 000-136<br>470-474               | Infective & parasitic diseases, including influenza | Med     | Generally lower than all causes   | 5 years                           | No        | No clear pattern             | —  |
|                                  |   | Non-med |   | 3 years                           | No        | No clear pattern             | —  |
| 250                              | Diabetes mellitus                                   | Med     | Generally lower than all causes   | > 5 years (shorter at young ages) | Yes       | See Note 1                   | —  |
|                                  |   | Non-med |   | 5 years                           | Yes       |                              | —  |

According to Cause of Death



## SCHEDULE (cont.)

| I.C.D.<br>Nos.          | Cause Group<br>Description                  |                    | Comparison<br>with all<br>causes pattern  | Apparent<br>duration<br>of initial<br>selection<br>(see Note 2) | Whether<br>percentages<br>tend to<br>increase<br>with age | Comparison<br>with<br>1967-70                        | Comparison<br>with<br>standardized<br>national<br>percentages<br>(see Note 3)  |
|-------------------------|---|--------------------|---|---|---|--|--|
| 291 }<br>303 }<br>571 } | Cirrhosis of the liver<br>and/or alcoholism | Med }<br>Non-med } | Generally lower<br>at the younger<br>ages and higher<br>at the older<br>than all causes | { 5 years<br>5 years  | Yes<br>Yes  | No clear pattern<br>Generally higher<br>than 1967-70 | Although there is<br>no direct comparison<br>with the<br>standardized<br>national figures, it<br>seems likely that at<br>the older ages<br>these are higher<br>than the national |
| 480-486                 | Pneumonia                                   | Med }<br>Non-med } | Always lower<br>than all causes   | { 5 years<br>5 years<br>(shorter<br>at the<br>youngest<br>ages) | Yes<br>Yes  | No clear pattern<br>No clear pattern                 |  |
| 490-493                 | Bronchitis                                  | Med }<br>Non-med } | Always lower<br>than all causes   | { 5 years<br>5 years  | Yes<br>No   | No clear pattern<br>No clear pattern                 |  |
| 460-466 }<br>500-519 }  | Other respiratory<br>diseases               | Med }<br>Non-med } | Always lower<br>than all causes   | { 5 years<br>5 years  | Yes<br>Yes  | Generally lower<br>than 1967-70                      |  |

# SCHEDULE (cont.)

|   |   |                |   |   |            |  |   |
|---|---|----------------|---|---|------------|--|---|
| 520-577<br>(excluding 571)                      | Diseases of the digestive system other than cirrhosis | Med<br>Non-med | } Nearly always lower than all causes   | { 5 years<br>5 years                            | Yes<br>Yes | Generally lower than 1967-70           |   |
| 580-584   | Nephritis   | Med<br>Non-med |   |   | Yes<br>Yes | No clear pattern<br>No clear pattern   | Oldest age group in the non-medical duration 5 and over tends to be greater than the national standardized figure |
|   |   |                | } Generally lower at the younger and higher at the older ages than all causes | { 5 years<br>5 years                            |            |  |   |
|   |   |                |   |   |            |  |   |
| 590-678   | Other diseases of the genito-urinary system           | Med<br>Non-med | No clear pattern<br>No clear pattern  | Not clear<br>5 years                            | No<br>No   | No clear pattern<br>No clear pattern   |   |
| 240-389<br>680-779<br>(excluding 250, 291, 303) | All other specified causes                            | Med<br>Non-med | } Nearly always lower than all causes   | { 5 years<br>3 years                            | Yes<br>Yes | No clear pattern<br>No clear pattern   |   |
|   |   |                |   |   |            |  |   |
| All causes                                      |   | Med<br>Non-med |   | 5 years<br>5 years<br>(1 year at youngest ages) | Yes<br>Yes | Generally lower at duration 5 and over |   |

*Note:* 1 After the examination of the 1969 sample by the O.P.C.S., the instructions to coders about groups 190-192, and 250 were altered. Thus no comparison with 1967-70 is possible.

2. The yearly reports given to the offices indicated that 1973 was a comparatively light mortality year and this lightness particularly affected the duration 5 and over rates, with the result that the duration effects became somewhat masked for certain causes.

3. Comments are only included in the final column of the schedule for those cause-groups where the mortality experienced, at some or all ages, was greater than the standardized national rates.

Table 1. *Actual deaths reported in 1971-74 due to neoplasms, and percentages of actual to expected deaths from these causes*

| Duration   | Age group | 150-159<br>Malignant neoplasms<br>of digestive system |            |         |            | 160-163<br>Malignant neoplasms<br>of respiratory system  |            |         |            | 170-174<br>Malignant neoplasms<br>of bone, connective<br>tissue and skin |            |         |            | 180-189<br>Malignant neoplasms<br>of genito-urinary<br>organs  |            |         |            |
|------------|-----------|---|------------|---------|------------|--|------------|---------|------------|--|------------|---------|------------|--|------------|---------|------------|
|            |           | Med   |            | Non-med |            | Med  |            | Non-med |            | Med  |            | Non-med |            | Med  |            | Non-med |            |
|            |           | A   | 100<br>A/E | A       | 100<br>A/E | A  | 100<br>A/E | A       | 100<br>A/E | A  | 100<br>A/E | A       | 100<br>A/E | A  | 100<br>A/E | A       | 100<br>A/E |
| 0          | All ages  | 18  | 22         | 46      | 23         | 22   | 19         | 82      | 33         | 1  | 13         | 5       | 15         | 1  | 4          | 22      | 28         |
| 1-2        | All ages  | 103   | 53         | 284     | 63         | 98   | 35         | 289     | 50         | 9  | 58         | 45      | 74         | 24   | 42         | 99      | 64         |
| 3-4        | All ages  | 173   | 77         | 315     | 67         | 148  | 45         | 341     | 53         | 11   | 71         | 40      | 79         | 30   | 46         | 94      | 63         |
| 5 and over | -44       | 105   | 68         | 316     | 63         | 41   | 29         | 171     | 39         | 33   | 129        | 94      | 96         | 43   | 89         | 162     | 85         |
|            | 45-59     | 962   | 68         | 1,986   | 67         | 968  | 44         | 2,281   | 51         | 74   | 89         | 181     | 102        | 231  | 68         | 547     | 78         |
|            | 60-74     | 1,242   | 65         | 1,378   | 71         | 1,476  | 49         | 1,815   | 58         | 60   | 83         | 62      | 84         | 470  | 74         | 403     | 66         |
|            | 75-       | 532   | 78         | 170     | 79         | 418  | 74         | 167     | 85         | 22   | 74         | 11      | 124        | 396  | 92         | 121     | 92         |
|            | All ages  | 2,841   | 68         | 3,850   | 68         | 2,903  | 49         | 4,434   | 53         | 189  | 90         | 348     | 97         | 1,140  | 79         | 1,233   | 76         |
| Duration   | Age group | 190-192<br>Malignant neoplasms<br>of nervous system   |            |         |            | 140-149 and 193-194<br>Malignant neoplasms<br>of buccal cavity,<br>pharynx and<br>endocrine glands |            |         |            | 200-209<br>Neoplasms of<br>lymphatic and<br>haematopoietic<br>tissue     |            |         |            | 140-239<br>All neoplasms<br>(including ill-defined<br>and unspecified sites<br>not included in<br>the seven subgroups) |            |         |            |
|            |           | Med   |            | Non-med |            | Med  |            | Non-med |            | Med  |            | Non-med |            | Med  |            | Non-med |            |
|            |           | A   | 100<br>A/E | A       | 100<br>A/E | A  | 100<br>A/E | A       | 100<br>A/E | A  | 100<br>A/E | A       | 100<br>A/E | A  | 100<br>A/E | A       | 100<br>A/E |
| 0          | All ages  | 4   | 28         | 23      | 40         | 2  | 37         | 2       | 13         | 7  | 24         | 42      | 34         | 60   | 20         | 242     | 30         |
| 1-2        | All ages  | 21  | 69         | 81      | 74         | 3  | 24         | 14      | 43         | 46   | 77         | 167     | 73         | 328  | 48         | 1,043   | 61         |
| 3-4        | All ages  | 27  | 88         | 89      | 91         | 8  | 58         | 17      | 52         | 45   | 75         | 172     | 89         | 466  | 60         | 1,146   | 67         |
| 5 and over | -44       | 43  | 88         | 154     | 85         | 2  | 17         | 26      | 65         | 76   | 83         | 289     | 80         | 365  | 66         | 1,302   | 68         |
|            | 45-59     | 186   | 99         | 463     | 115        | 56   | 61         | 111     | 58         | 292  | 93         | 539     | 81         | 2,936  | 61         | 6,517   | 65         |
|            | 60-74     | 155   | 148        | 152     | 124        | 59   | 65         | 43      | 47         | 258  | 86         | 285     | 90         | 3,926  | 62         | 4,389   | 67         |
|            | 75-       | 9   | 188        | 1       | 59         | 24   | 60         | 4       | 33         | 110  | 128        | 38      | 137        | 1,583  | 83         | 552     | 89         |
|            | All ages  | 393   | 113        | 770     | 109        | 141  | 60         | 184     | 55         | 736  | 93         | 1,151   | 84         | 8,810  | 64         | 12,760  | 67         |

Notes: A = Actual Deaths. E = Deaths expected according to 1971-74 national experience of England and Wales (males) calculated from tables published by the Registrar General.

Table 2 Actual deaths reported in 1971-74 from diseases of the circulatory system, and percentages of actual to expected deaths from these causes

| Duration   | Age group | 410-0<br>Acute myocardial<br>infarction, with<br>mention of<br>hypertension                                    |            |         |            | 410-9<br>Acute myocardial<br>infarction, without<br>mention of<br>hypertension |            |         |            | 411-0-414-0<br>Other forms of<br>ischaemic heart<br>disease, with<br>mention of<br>hypertension |            |         |            | 411-9-414-9<br>Other forms of<br>ischaemic heart<br>disease, without<br>mention of<br>hypertension |            |         |            |
|------------|-----------|--|------------|---------|------------|--|------------|---------|------------|---|------------|---------|------------|--|------------|---------|------------|
|            |           | Med  |            | Non-med |            | Med  |            | Non-med |            | Med   |            | Non-med |            | Med  |            | Non-med |            |
|            |           | A  | 100<br>A/E | A       | 100<br>A/E | A  | 100<br>A/E | A       | 100<br>A/E | A   | 100<br>A/E | A       | 100<br>A/E | A  | 100<br>A/E | A       | 100<br>A/E |
| 0          | All ages  | 6  | 25         | 14      | 27         | 94   | 34         | 320     | 47         | —   | (9)        | 5       | 26         | 24   | 40         | 47      | 33         |
| 1-2        | All ages  | 8  | 14         | 50      | 41         | 245  | 39         | 865     | 57         | 7   | 35         | 11      | 25         | 51   | 36         | 175     | 54         |
| 3-4        | All ages  | 19   | 29         | 64      | 48         | 399  | 55         | 1,031   | 64         | 5   | 21         | 21      | 44         | 48   | 29         | 171     | 50         |
| 5 and over | —44       | 16   | 48         | 46      | 45         | 260  | 49         | 843     | 51         | 6   | 47         | 12      | 30         | 43   | 39         | 171     | 49         |
|            | 45-59     | 242  | 54         | 600     | 64         | 3,251  | 66         | 7,317   | 70         | 54  | 35         | 157     | 49         | 516  | 50         | 1,205   | 56         |
|            | 60-74     | 329  | 60         | 488     | 84         | 4,008  | 73         | 4,481   | 79         | 98  | 48         | 115     | 55         | 744  | 52         | 891     | 63         |
|            | 75-       | 94   | 81         | 29      | 74         | 1,733  | 92         | 518     | 87         | 43  | 66         | 18      | 85         | 934  | 78         | 246     | 72         |
|            | All ages  | 681  | 59         | 1,163   | 70         | 9,252  | 72         | 13,159  | 72         | 201   | 46         | 302     | 51         | 2,237  | 60         | 2,513   | 59         |
| Duration   | Age group | 400-404<br>Hypertensive<br>disease (excluding<br>ischaemic heart<br>disease and<br>cerebrovascular<br>disease) |            |         |            | 430-0-438-0<br>Cerebrovascular<br>disease, with<br>mention of<br>hypertension  |            |         |            | 430-9-438-9<br>Cerebrovascular<br>disease, without<br>mention of<br>hypertension                |            |         |            | 390-398 and 420-429<br>Other diseases<br>of the heart  |            |         |            |
|            |           | Med  |            | Non-med |            | Med  |            | Non-med |            | Med   |            | Non-med |            | Med  |            | Non-med |            |
|            |           | A  | 100<br>A/E | A       | 100<br>A/E | A  | 100<br>A/E | A       | 100<br>A/E | A   | 100<br>A/E | A       | 100<br>A/E | A  | 100<br>A/E | A       | 100<br>A/E |
| 0          | All ages  | 1  | 6          | 8       | 19         | 4  | 17         | 20      | 36         | 8   | 16         | 67      | 54         | 4  | 10         | 27      | 22         |
| 1-2        | All ages  | 5  | 14         | 27      | 30         | 9  | 17         | 60      | 49         | 33  | 28         | 151     | 57         | 17   | 19         | 80      | 33         |
| 3-4        | All ages  | 3  | 9          | 43      | 46         | 12   | 19         | 66      | 50         | 47  | 34         | 135     | 50         | 25   | 25         | 91      | 38         |
| 5 and over | —44       | 7  | 21         | 26      | 24         | 9  | 23         | 57      | 46         | 43  | 50         | 170     | 55         | 34   | 34         | 118     | 34         |
|            | 45-59     | 107  | 41         | 286     | 53         | 230  | 57         | 483     | 57         | 351   | 53         | 783     | 57         | 217  | 40         | 483     | 42         |
|            | 60-74     | 147  | 43         | 218     | 63         | 303  | 57         | 378     | 69         | 854   | 55         | 886     | 62         | 362  | 45         | 420     | 54         |
|            | 75-       | 95   | 58         | 33      | 65         | 111  | 75         | 63      | 130        | 1,456   | 80         | 422     | 81         | 688  | 73         | 184     | 71         |
|            | All ages  | 356  | 45         | 563     | 54         | 653  | 58         | 981     | 63         | 2,704   | 66         | 2,261   | 62         | 1,301  | 55         | 1,205   | 48         |

According to Cause of Death

Table 2 (cont.)

| Duration   | Age group | 440-458<br>Other diseases<br>of the circulatory<br>system |            |         |            | 390-458<br>All diseases of the<br>circulatory system<br>(combined) |            |         |            |
|------------|-----------|---|------------|---------|------------|--|------------|---------|------------|
|            |           | Med   |            | Non-med |            | Med  |            | Non-med |            |
|            |           | A   | 100<br>A/E | A       | 100<br>A/E | A  | 100<br>A/E | A       | 100<br>A/E |
| 0          | All ages  | 2   | 8          | 19      | 31         | 143  | 27         | 527     | 41         |
| 1-2        | All ages  | 22  | 37         | 45      | 34         | 397  | 33         | 1,464   | 51         |
| 3-4        | All ages  | 44  | 63         | 82      | 60         | 602  | 43         | 1,704   | 57         |
| 5 and over | -44       | 18  | 43         | 71      | 49         | 436  | 44         | 1,514   | 48         |
|            | 45-59     | 218   | 58         | 501     | 65         | 5,186  | 59         | 11,815  | 64         |
|            | 60-74     | 502   | 69         | 530     | 76         | 7,347  | 63         | 8,407   | 72         |
|            | 75-       | 651   | 86         | 165     | 78         | 5,805  | 82         | 1,678   | 81         |
|            | All ages  | 1,389   | 73         | 1,267   | 69         | 18,774   | 66         | 23,414  | 66         |

Notes: A = Actual Deaths. E = Deaths expected according to 1971-74 national experience of England and Wales (males) calculated from tables published by the Registrar General.

Where A = 0 or E = 1 or less, the figure shown in brackets is E calculated to the nearer integer.

Table 3. *Actual deaths reported in 1971-74 due to suicide, accident and violence, and percentages of actual to expected deaths from these causes*

| Duration   | Age group | E810-E823<br>Motor vehicle<br>accidents |            |         |            | E950-E959<br>Suicide |            |         |            | E800-E807, E825-E949<br>and E960-E999<br>All other accidental<br>and violent causes |            |         |            | E800-E999<br>All accidental<br>and violent<br>causes |            |         |            |
|------------|-----------|---|------------|---------|------------|----------------------|------------|---------|------------|---|------------|---------|------------|--|------------|---------|------------|
|            |           | Med                                     |            | Non-med |            | Med                  |            | Non-med |            | Med   |            | Non-med |            | Med  |            | Non-med |            |
|            |           | A                                       | 100<br>A/E | A       | 100<br>A/E | A                    | 100<br>A/E | A       | 100<br>A/E | A   | 100<br>A/E | A       | 100<br>A/E | A  | 100<br>A/E | A       | 100<br>A/E |
| 0          | All ages  | 54                                      | 90         | 368     | 91         | 14                   | 38         | 76      | 39         | 55  | 95         | 311     | 95         | 123  | 80         | 755     | 82         |
| 1-2        | All ages  | 95                                      | 90         | 563     | 88         | 51                   | 72         | 130     | 38         | 98  | 90         | 531     | 96         | 244  | 86         | 1,224   | 80         |
| 3-4        | All ages  | 84                                      | 100        | 350     | 80         | 40                   | 64         | 127     | 47         | 83  | 87         | 370     | 88         | 207  | 86         | 847     | 75         |
| 5 and over | -44       | 147                                     | 77         | 579     | 63         | 96                   | 64         | 275     | 45         | 204   | 93         | 734     | 78         | 447  | 80         | 1,588   | 64         |
|            | 45-59     | 240                                     | 89         | 412     | 71         | 220                  | 84         | 317     | 55         | 333   | 87         | 564     | 68         | 793  | 87         | 1,293   | 65         |
|            | 60-74     | 115                                     | 75         | 111     | 66         | 72                   | 59         | 98      | 72         | 178   | 90         | 142     | 67         | 365  | 77         | 351     | 68         |
|            | 75-       | 27                                      | 55         | 8       | 52         | 8                    | 47         | 3       | 53         | 106   | 72         | 27      | 68         | 141  | 66         | 38      | 62         |
|            | All ages  | 529                                     | 80         | 1,110   | 66         | 396                  | 72         | 693     | 52         | 821   | 87         | 1,467   | 72         | 1,746  | 81         | 3,270   | 65         |

Notes: A = Actual Deaths. E = Deaths expected according to 1971-74 national experience of England and Wales (males) calculated from tables published by the Registrar General.

Table 4. *Actual deaths reported in 1971-74 from miscellaneous causes, and from all causes combined, and percentages of actual to expected deaths.*

|            |           | 000-136 and 470-474<br>Infective and parasitic<br>diseases, including<br>influenza |            |         |            | 250<br>Diabetes<br>mellitus                          |            |         |            | 571, 291, and 303<br>Cirrhosis of the liver<br>and/or alcoholism                  |            |         |            | 480-486<br>Pneumonia |            |         |            |
|------------|-----------|--|------------|---------|------------|--|------------|---------|------------|---|------------|---------|------------|----------------------|------------|---------|------------|
|            |           | Med  |            | Non-med |            | Med  |            | Non-med |            | Med   |            | Non-med |            | Med                  |            | Non-med |            |
| Duration   | Age group | A  | 100<br>A/E | A       | 100<br>A/E | A  | 100<br>A/E | A       | 100<br>A/E | A   | 100<br>A/E | A       | 100<br>A/E | A                    | 100<br>A/E | A       | 100<br>A/E |
| 0          | All ages  | 2  | 14         | 11      | 20         | 2  | 25         | 5       | 19         | —   | (9)        | 5       | 16         | 2                    | 6          | 15      | 15         |
| 1-2        | All ages  | 5  | 16         | 29      | 28         | 2  | 11         | 5       | 10         | 5   | 25         | 23      | 35         | 18                   | 23         | 48      | 24         |
| 3-4        | All ages  | 8  | 25         | 29      | 32         | —  | (20)       | 8       | 16         | 10  | 47         | 28      | 46         | 17                   | 19         | 61      | 32         |
| 5 and over | -44       | 13   | 32         | 57      | 38         | 2  | 8          | 15      | 18         | 12  | 40         | 40      | 38         | 13                   | 19         | 61      | 25         |
|            | 45-59     | 48   | 25         | 113     | 28         | 29   | 28         | 85      | 39         | 123   | 84         | 183     | 58         | 119                  | 27         | 290     | 32         |
|            | 60-74     | 56   | 31         | 70      | 38         | 52   | 34         | 84      | 56         | 88  | 108        | 68      | 74         | 309                  | 34         | 327     | 39         |
|            | 75-       | 55   | 61         | 11      | 40         | 87   | 105        | 25      | 97         | 17  | 144        | 5       | 128        | 775                  | 50         | 238     | 56         |
|            | All ages  | 172  | 34         | 251     | 33         | 170  | 47         | 209     | 43         | 240   | 89         | 296     | 57         | 1,216                | 41         | 916     | 38         |
|            |           | 490-493<br>Bronchitis  |            |         |            | 460-466 and 500-519<br>Other respiratory<br>diseases |            |         |            | 520-577 excluding 571<br>Diseases of the digestive<br>system other than cirrhosis |            |         |            | 580-584<br>Nephritis |            |         |            |
|            |           | Med  |            | Non-med |            | Med  |            | Non-med |            | Med   |            | Non-med |            | Med                  |            | Non-med |            |
| Duration   | Age group | A  | 100<br>A/E | A       | 100<br>A/E | A  | 100<br>A/E | A       | 100<br>A/E | A   | 100<br>A/E | A       | 100<br>A/E | A                    | 100<br>A/E | A       | 100<br>A/E |
| 0          | All ages  | 2  | 4          | 11      | 10         | 1  | 10         | 4       | 13         | 7   | 29         | 29      | 36         | 1                    | 11         | 8       | 22         |
| 1-2        | All ages  | 13   | 11         | 41      | 17         | —  | (22)       | 12      | 20         | 18  | 34         | 67      | 42         | 6                    | 31         | 18      | 26         |
| 3-4        | All ages  | 16   | 11         | 50      | 19         | 5  | 20         | 30      | 51         | 17  | 29         | 73      | 48         | 3                    | 15         | 28      | 46         |
| 5 and over | -44       | 11   | 22         | 45      | 26         | 5  | 22         | 27      | 33         | 24  | 35         | 96      | 39         | 11                   | 35         | 44      | 38         |
|            | 45-59     | 150  | 18         | 424     | 25         | 41   | 30         | 106     | 38         | 139   | 43         | 331     | 48         | 54                   | 49         | 152     | 65         |
|            | 60-74     | 454  | 26         | 600     | 35         | 82   | 38         | 101     | 48         | 252   | 59         | 241     | 57         | 71                   | 70         | 76      | 70         |
|            | 75-       | 423  | 44         | 178     | 59         | 88   | 63         | 31      | 76         | 180   | 65         | 63      | 77         | 46                   | 87         | 17      | 110        |
|            | All ages  | 1,038  | 29         | 1,247   | 32         | 216  | 42         | 265     | 43         | 595   | 54         | 731     | 51         | 182                  | 62         | 289     | 61         |

Table 4 (continued)

| Duration   | Age group | 590-678<br>Other diseases<br>of the genito-<br>urinary system |            |         |            | 240-389 and 680-779<br>excluding 250, 291, and 303<br>All other<br>specified causes |            |         |            | All causes<br>(including ill-defined<br>causes not tabulated<br>elsewhere) |            |         |            |
|------------|-----------|---|------------|---------|------------|---|------------|---------|------------|--|------------|---------|------------|
|            |           | Med   |            | Non-med |            | Med   |            | Non-med |            | Med  |            | Non-med |            |
|            |           | A   | 100<br>A/E | A       | 100<br>A/E | A   | 100<br>A/E | A       | 100<br>A/E | A  | 100<br>A/E | A       | 100<br>A/E |
| 0          | All ages  | —   | (6)        | 3       | 18         | 5   | 12         | 27      | 14         | 356  | 30         | 1,697   | 45         |
| 1-2        | All ages  | —   | (13)       | 7       | 21         | 16  | 19         | 66      | 19         | 1,068  | 40         | 4,132   | 55         |
| 3-4        | All ages  | 5   | 35         | 8       | 24         | 23  | 28         | 80      | 29         | 1,407  | 48         | 4,151   | 58         |
| 5 and over | —44       | 7   | 56         | 19      | 41         | 46  | 34         | 126     | 23         | 1,425  | 54         | 5,057   | 53         |
|            | 45-59     | 32  | 46         | 91      | 62         | 181   | 45         | 414     | 48         | 10,013   | 57         | 22,181  | 60         |
|            | 60-74     | 84  | 60         | 99      | 78         | 262   | 64         | 245     | 59         | 13,542   | 59         | 15,253  | 66         |
|            | 75-       | 160   | 73         | 43      | 71         | 172   | 69         | 51      | 69         | 9,776  | 74         | 2,968   | 77         |
|            | All ages  | 283   | 64         | 242     | 64         | 661   | 55         | 836     | 44         | 34,756   | 62         | 45,459  | 62         |

Notes: A = Actual Deaths. E = Deaths expected according to 1971-74 national experience of England and Wales (males) calculated from tables published by the Registrar General  
Where A = 0 or E = 1 or less the figure shown in brackets is E calculated to the nearer integer.



## INVESTIGATION OF SICKNESS STATISTICS

### INDIVIDUAL POLICIES 1974 AND 1975

TABLES showing the experience in respect of individual policies in 1974 and 1975 are appended to this note. Late notified claims have been included for both years.

Users of these tables should note the comments about the 1972 experience (*C.M.I.R.* 2, 21) and should further observe that the tables showing the 1973 experience (*C.M.I.R.* 2, 35) do not include late notifications (which would have added about 1% to the figures shown).

The percentages of actual sickness to expected by M.U. (A.H.J.) experienced by 12 offices which submitted Males data for 1975 excluding late notifications ranged from 13% to 48%; the percentages are for all ages combined, all deferred periods combined and all sickness periods combined. One office had no claims. The percentages show a rather surprising tendency to range steadily from the minimum to the maximum with no clusters.

These figures conceal greater variations between the corresponding figures for sections of the data and the following table gives an indication of the possible range.

| Defer period | Sickness period | Actual/Expected % |                |
|--------------|-----------------|-------------------|----------------|
|              |                 | Lowest office     | Highest office |
| All          | 0/1             | 24                | 50             |
|              | 1/2             | 28                | 82             |
|              | 3/3             | 16                | 48             |
|              | 6/6             | 22                | 54             |
|              | 12/12           | 7                 | 80             |
|              | 24/all          | 6                 | 55             |
| 26 weeks     | 6/6             | 4                 | 30             |
|              | 12/12           | 2                 | 94             |
|              | 24/all          | 9                 | 75             |

The figures for 'lowest office' are for the offices which had claims data in the relevant sub-section. Offices for which A/E = 0 were not included.

Almost certainly the main reason for the extreme values of the ratio of actual/expected deaths is that the numbers of exposed to risk and claims contributed by some offices to the sub-groups shown are still too small to give a reasonably reliable indication of the likely experience which will result from their underwriting and claims' settlement policies. Their results, whether they appear favourable or unfavourable at this stage, will be more a reflection of the smallness of the business included in the group than anything else.

*Individual P.H.I. Policies (1974 experience)**All offices—including late notified claims*Table 1. *Males—Deferred period 1 week*

| Age group                  | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | All ages |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 0/4        |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | —     | 367   | 2,713 | 2,768 | 2,925 | 3,096 | 3,504 | 3,093 | 2,377 | 1,660 | 22,503   |
| Actual weeks of sickness   | —     | 71    | 474   | 461   | 614   | 677   | 932   | 815   | 711   | 726   | 5,481    |
| Expected weeks of sickness | —     | 180   | 1,264 | 1,302 | 1,430 | 1,619 | 1,967 | 1,903 | 1,655 | 1,310 | 12,630   |
| Actual sickness rate       | —     | ·193  | ·175  | ·167  | ·210  | ·219  | ·266  | ·263  | ·299  | ·437  |          |
| Actual/expected %          | —     | 39    | 38    | 35    | 43    | 42    | 47    | 43    | 43    | 55    | 43       |
| Sickness period 4/9        |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | —     | 341   | 2,659 | 2,741 | 2,906 | 3,080 | 3,494 | 3,089 | 2,367 | 1,660 | 22,337   |
| Actual weeks of sickness   | —     | 27    | 322   | 291   | 344   | 505   | 893   | 846   | 698   | 808   | 4,734    |
| Expected weeks of sickness | —     | 51    | 454   | 526   | 646   | 867   | 1,214 | 1,369 | 1,358 | 1,198 | 7,683    |
| Actual sickness rate       | —     | ·079  | ·121  | ·106  | ·118  | ·164  | ·256  | ·274  | ·295  | ·487  |          |
| Actual/expected %          | —     | 53    | 71    | 55    | 53    | 58    | 74    | 62    | 51    | 67    | 62       |
| Sickness period 13/13      |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | —     | 294   | 2,553 | 2,690 | 2,871 | 3,051 | 3,475 | 3,081 | 2,373 | 1,660 | 22,048   |
| Actual weeks of sickness   | —     | —     | 164   | 110   | 142   | 191   | 382   | 522   | 255   | 632   | 2,398    |
| Expected weeks of sickness | —     | 23    | 218   | 259   | 349   | 486   | 712   | 883   | 975   | 982   | 4,887    |
| Actual sickness rate       | —     | —     | ·064  | ·041  | ·049  | ·063  | ·110  | ·169  | ·107  | ·381  |          |
| Actual expected %          | —     | —     | 75    | 42    | 41    | 39    | 54    | 59    | 26    | 64    | 49       |
| Sickness period 26/26      |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | —     | 233   | 2,396 | 2,613 | 2,819 | 3,010 | 3,449 | 3,070 | 2,369 | 1,660 | 21,619   |
| Actual weeks of sickness   | —     | —     | 40    | 56    | 86    | 191   | 329   | 405   | 337   | 685   | 2,129    |
| Expected weeks of sickness | —     | 12    | 145   | 184   | 257   | 378   | 578   | 759   | 980   | 1,096 | 4,389    |
| Actual sickness rate       | —     | —     | ·017  | ·021  | ·031  | ·063  | ·095  | ·132  | ·142  | ·413  |          |
| Actual expected %          | —     | —     | 28    | 30    | 33    | 51    | 57    | 53    | 34    | 63    | 49       |

Table 1 (continued)

| Age group                  | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | All ages |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 52/52      |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | —     | 146   | 2,089 | 2,463 | 2,723 | 2,940 | 3,404 | 3,047 | 2,360 | 1,658 | 20,830   |
| Actual weeks of sickness   | —     | —     | —     | —     | 13    | 136   | 294   | 278   | 565   | 816   | 2,102    |
| Expected weeks of sickness | —     | 5     | 83    | 131   | 186   | 293   | 476   | 669   | 969   | 1,232 | 4,044    |
| Actual sickness rate       | —     | —     | —     | —     | ·005  | ·046  | ·086  | ·091  | ·239  | ·492  |          |
| Actual expected %          | —     | —     | —     | —     | 7     | 46    | 62    | 42    | 58    | 66    | 52       |
| Sickness period 104/all    |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | —     | 56    | 1,493 | 2,149 | 2,542 | 2,784 | 3,304 | 2,993 | 2,336 | 1,653 | 19,310   |
| Actual weeks of sickness   | —     | —     | 16    | 2     | 104   | 596   | 569   | 1,187 | 1,688 | 2,604 | 6,766    |
| Expected weeks of sickness | —     | 2     | 77    | 178   | 380   | 729   | 1,342 | 2,166 | 3,058 | 3,809 | 11,741   |
| Actual sickness rate       | —     | —     | ·011  | ·001  | ·041  | ·214  | ·172  | ·397  | ·723  | 1·575 |          |
| Actual/expected %          | —     | —     | 21    | 1     | 27    | 82    | 42    | 55    | 55    | 68    | 58       |

*Individual P.H.I. policies (1974 experience)**All offices—including late notified claims**Table 2. Males—Deferred period 4 weeks*

| Age group                    | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | All ages |
|------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| <b>Sickness period 4/9</b>   |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk              | 38    | 1,371 | 5,437 | 5,919 | 5,910 | 5,288 | 4,150 | 2,612 | 1,155 | 424   | 32,304   |
| Actual weeks of sickness     | —     | 106   | 497   | 554   | 570   | 869   | 739   | 542   | 311   | 199   | 4,387    |
| Expected weeks of sickness   | 5     | 203   | 927   | 1,136 | 1,315 | 1,476 | 1,427 | 1,153 | 650   | 302   | 8,594    |
| Actual sickness rate         | —     | ·077  | ·091  | ·094  | ·096  | ·164  | ·178  | ·208  | ·269  | ·469  |          |
| Actual/expected %            | —     | 52    | 54    | 49    | 43    | 59    | 52    | 47    | 48    | 66    | 51       |
| <b>Sickness period 13/13</b> |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk              | 33    | 1,239 | 5,182 | 5,731 | 5,781 | 5,208 | 4,115 | 2,594 | 1,152 | 424   | 31,459   |
| Actual weeks of sickness     | —     | 27    | 178   | 262   | 295   | 376   | 440   | 407   | 174   | 146   | 2,305    |
| Expected weeks of sickness   | 2     | 96    | 442   | 553   | 704   | 824   | 831   | 739   | 463   | 245   | 4,899    |
| Actual sickness rate         | —     | ·022  | ·034  | ·046  | ·051  | ·072  | ·107  | ·157  | ·151  | ·344  |          |
| Actual/expected %            | —     | 28    | 40    | 47    | 42    | 46    | 53    | 55    | 38    | 60    | 47       |
| <b>Sickness period 26/26</b> |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk              | 26    | 1,055 | 4,813 | 5,452 | 5,591 | 5,088 | 4,059 | 2,567 | 1,147 | 424   | 30,222   |
| Actual weeks of sickness     | —     | 4     | 145   | 214   | 156   | 218   | 216   | 371   | 224   | 147   | 1,695    |
| Expected weeks of sickness   | 1     | 52    | 291   | 385   | 509   | 631   | 670   | 630   | 460   | 272   | 3,901    |
| Actual sickness rate         | —     | ·004  | ·030  | ·039  | ·028  | ·043  | ·053  | ·145  | ·195  | ·347  |          |
| Actual/expected %            | —     | 8     | 50    | 56    | 31    | 35    | 32    | 59    | 49    | 54    | 43       |
| <b>Sickness period 52/52</b> |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk              | 17    | 734   | 4,123 | 4,907 | 5,218 | 4,844 | 3,943 | 2,510 | 1,137 | 423   | 27,856   |
| Actual weeks of sickness     | —     | 3     | 35    | 134   | 148   | 201   | 300   | 319   | 217   | 254   | 1,611    |
| Expected weeks of sickness   | —     | 22    | 162   | 260   | 357   | 477   | 543   | 545   | 449   | 303   | 3,118    |
| Actual sickness rate         | —     | ·004  | ·008  | ·027  | ·028  | ·041  | ·076  | ·127  | ·191  | ·600  |          |
| Actual/expected %            | —     | 14    | 22    | 52    | 41    | 42    | 55    | 59    | 48    | 84    | 52       |

Table 2 (*continued*)

| Age group                  | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | All ages |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 104/all    |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 7     | 332   | 2,858 | 3,851 | 4,445 | 4,320 | 3,674 | 2,375 | 1,107 | 420   | 23,389   |
| Actual weeks of sickness   | —     | —     | 50    | 46    | —     | 476   | 764   | 458   | 883   | 328   | 3,005    |
| Expected weeks of sickness | —     | 9     | 145   | 321   | 669   | 1,116 | 1,461 | 1,700 | 1,408 | 928   | 7,757    |
| Actual sickness rate       | —     | —     | ·017  | ·012  | —     | ·110  | ·208  | ·193  | ·798  | ·781  |          |
| Actual/expected %          | —     | —     | 34    | 14    | —     | 43    | 52    | 27    | 63    | 35    | 39       |

*Individual P.H.I. policies (1974 experience)**All offices—including late notified claims*Table 3. *Males—Deferred period 13 weeks*

| Age group                  | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | All ages |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 13/13      |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 27    | 698   | 4,306 | 6,137 | 6,422 | 6,058 | 4,866 | 3,062 | 1,586 | 665   | 33,827   |
| Actual weeks of sickness   | —     | —     | 116   | 146   | 288   | 203   | 271   | 275   | 280   | 185   | 1,764    |
| Expected weeks of sickness | 2     | 54    | 368   | 593   | 785   | 960   | 984   | 869   | 642   | 387   | 5,644    |
| Actual sickness rate       | —     | —     | ·027  | ·024  | ·045  | ·034  | ·056  | ·090  | ·177  | ·278  |          |
| Actual/expected %          | —     | —     | 32    | 25    | 37    | 21    | 28    | 32    | 44    | 48    | 31       |
| Sickness period 26/26      |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 22    | 599   | 3,975 | 5,839 | 6,198 | 5,914 | 4,791 | 3,030 | 1,579 | 665   | 32,612   |
| Actual weeks of sickness   | —     | —     | 73    | 56    | 260   | 177   | 145   | 306   | 295   | 231   | 1,543    |
| Expected weeks of sickness | 1     | 30    | 242   | 413   | 566   | 737   | 792   | 740   | 641   | 430   | 4,592    |
| Actual sickness rate       | —     | —     | ·018  | ·010  | ·042  | ·030  | ·030  | ·101  | ·187  | ·347  |          |
| Actual/expected %          | —     | —     | 30    | 14    | 46    | 24    | 18    | 41    | 46    | 54    | 34       |
| Sickness period 52/52      |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 14    | 441   | 3,355 | 5,233 | 5,748 | 5,621 | 4,636 | 2,968 | 1,564 | 663   | 30,243   |
| Actual weeks of sickness   | —     | —     | 48    | 32    | 113   | 97    | 17    | 241   | 393   | 203   | 1,144    |
| Expected weeks of sickness | —     | 13    | 133   | 278   | 395   | 556   | 639   | 642   | 627   | 480   | 3,763    |
| Actual sickness rate       | —     | —     | ·014  | ·006  | ·020  | ·017  | ·004  | ·081  | ·251  | ·306  |          |
| Actual/expected %          | —     | —     | 36    | 12    | 29    | 17    | 3     | 38    | 63    | 42    | 30       |
| Sickness period 104/all    |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 5     | 231   | 2,240 | 4,039 | 4,850 | 4,965 | 4,228 | 2,812 | 1,519 | 658   | 25,547   |
| Actual weeks of sickness   | —     | —     | 65    | 47    | 105   | 207   | 469   | 628   | 593   | 1,057 | 3,171    |
| Expected weeks of sickness | —     | 6     | 116   | 336   | 733   | 1,288 | 1,686 | 2,004 | 1,952 | 1,472 | 9,593    |
| Actual sickness rate       | —     | —     | ·029  | ·012  | ·022  | ·042  | ·111  | ·223  | ·390  | ·606  |          |
| Actual/expected %          | —     | —     | 56    | 14    | 14    | 16    | 28    | 31    | 30    | 72    | 33       |

*Individual P.H.I. policies (1974 experience)**All offices—including late notified claims*Table 4. *Males—Deferred period 26 weeks*

| Age group                  | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | All ages |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 26/26      |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 22    | 1,906 | 9,124 | 9,405 | 8,855 | 8,104 | 6,663 | 4,973 | 2,813 | 1,316 | 53,181   |
| Actual weeks of sickness   | —     | 61    | 17    | 139   | 62    | 71    | 165   | 283   | 328   | 351   | 1,477    |
| Expected weeks of sickness | 1     | 96    | 551   | 663   | 807   | 1,010 | 1,102 | 1,231 | 1,145 | 854   | 7,460    |
| Actual sickness rate       | —     | ·032  | ·002  | ·015  | ·007  | ·009  | ·025  | ·057  | ·117  | ·267  |          |
| Actual/expected %          | —     | 64    | 3     | 21    | 8     | 7     | 15    | 23    | 29    | 41    | 20       |
| Sickness period 52/52      |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 13    | 1,593 | 8,204 | 8,669 | 8,317 | 7,740 | 6,470 | 4,878 | 2,790 | 1,314 | 49,988   |
| Actual weeks of sickness   | —     | 16    | 8     | 146   | 29    | 177   | 195   | 306   | 461   | 447   | 1,785    |
| Expected weeks of sickness | —     | 49    | 321   | 459   | 569   | 765   | 892   | 1,072 | 1,123 | 955   | 6,205    |
| Actual sickness rate       | —     | ·010  | ·001  | ·017  | ·003  | ·023  | ·030  | ·063  | ·165  | ·340  |          |
| Actual/expected %          | —     | 33    | 2     | 32    | 5     | 23    | 22    | 29    | 41    | 47    | 29       |
| Sickness period 104/all    |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 4     | 937   | 5,942 | 6,862 | 7,002 | 6,833 | 5,966 | 4,627 | 2,728 | 1,307 | 42,208   |
| Actual weeks of sickness   | —     | —     | 104   | —     | 224   | 225   | 331   | 1,335 | 1,600 | 1,399 | 5,218    |
| Expected weeks of sickness | —     | 25    | 299   | 566   | 1,053 | 1,775 | 2,379 | 3,358 | 3,519 | 2,936 | 15,910   |
| Actual sickness rate       | —     | —     | ·018  | —     | ·032  | ·033  | ·055  | ·289  | ·587  | 1·070 |          |
| Actual/expected %          | —     | —     | 35    | —     | 21    | 13    | 14    | 40    | 45    | 48    | 33       |

*Individual P.H.I. policies (1974 experience)**All offices—including late notified claims*Table 5. *Males—Deferred period 52 weeks*

| Age group                  | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | All ages |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 52/52      |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 6     | 133   | 1,096 | 2,106 | 2,785 | 3,149 | 2,618 | 1,715 | 712   | 220   | 14,540   |
| Actual weeks of sickness   | —     | —     | —     | —     | —     | —     | 138   | 109   | 22    | 12    | 281      |
| Expected weeks of sickness | —     | 4     | 44    | 112   | 192   | 312   | 361   | 371   | 281   | 154   | 1,831    |
| Actual sickness rate       | —     | —     | —     | —     | —     | —     | ·053  | ·064  | ·031  | ·055  |          |
| Actual/expected %          | —     | —     | —     | —     | —     | —     | 38    | 29    | 8     | 8     | 15       |
| Sickness period 104/all    |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 2     | 78    | 736   | 1,625 | 2,294 | 2,722 | 2,325 | 1,575 | 681   | 215   | 12,253   |
| Actual weeks of sickness   | —     | —     | —     | —     | —     | —     | 387   | 91    | 161   | 52    | 691      |
| Expected weeks of sickness | —     | 2     | 38    | 138   | 349   | 710   | 926   | 1,123 | 866   | 464   | 4,616    |
| Actual sickness rate       | —     | —     | —     | —     | —     | —     | ·166  | ·058  | ·236  | ·242  |          |
| Actual/expected %          | —     | —     | —     | —     | —     | —     | 42    | 8     | 19    | 11    | 15       |



*Individual P.H.I. policies (1974 experience)*

*All offices—including late notified claims*

Table 6. *Males—All deferred periods combined*

| Age group                  | 18-19 | 20-24 | 25-29  | 30-34  | 35-39  | 40-44  | 45-49  | 50-54  | 55-59 | 60-64 | All ages | <i>Investigation of Sickness Statistics</i> |
|----------------------------|-------|-------|--------|--------|--------|--------|--------|--------|-------|-------|----------|---|
| Sickness period 0/4        |       |       |        |        |        |        |        |        |       |       |          |   |
| Exposed to risk            | —     | 367   | 2,713  | 2,768  | 2,925  | 3,096  | 3,504  | 3,093  | 2,377 | 1,660 | 22,503   |   |
| Actual weeks of sickness   | —     | 71    | 474    | 461    | 614    | 677    | 932    | 815    | 711   | 726   | 5,481    |   |
| Expected weeks of sickness | —     | 180   | 1,264  | 1,302  | 1,430  | 1,619  | 1,967  | 1,903  | 1,655 | 1,310 | 12,630   |   |
| Actual sickness rate       | —     | ·193  | ·175   | ·167   | ·210   | ·219   | ·266   | ·263   | ·299  | ·437  |          |   |
| Actual/expected %          | —     | 39    | 38     | 35     | 43     | 42     | 47     | 43     | 43    | 55    | 43       |   |
| Sickness period 4/9        |       |       |        |        |        |        |        |        |       |       |          |   |
| Exposed to risk            | 39    | 1,712 | 8,096  | 8,661  | 8,816  | 8,369  | 7,645  | 5,702  | 3,532 | 2,084 | 54,656   |   |
| Actual weeks of sickness   | —     | 133   | 819    | 845    | 914    | 1,374  | 1,632  | 1,388  | 1,009 | 1,006 | 9,120    |   |
| Expected weeks of sickness | 5     | 254   | 1,382  | 1,662  | 1,962  | 2,343  | 2,641  | 2,522  | 2,008 | 1,499 | 16,278   |   |
| Actual sickness rate       | —     | ·078  | ·101   | ·098   | ·104   | ·164   | ·213   | ·243   | ·286  | ·483  |          |   |
| Actual/expected %          | —     | 52    | 59     | 51     | 47     | 59     | 62     | 55     | 50    | 67    | 56       |   |
| Sickness period 13/13      |       |       |        |        |        |        |        |        |       |       |          |   |
| Exposed to risk            | 62    | 2,232 | 12,042 | 14,558 | 15,075 | 14,318 | 12,457 | 8,739  | 5,112 | 2,750 | 87,345   |   |
| Actual weeks of sickness   | —     | 27    | 458    | 518    | 724    | 769    | 1,093  | 1,204  | 709   | 963   | 6,465    |   |
| Expected weeks of sickness | 4     | 173   | 1,028  | 1,405  | 1,839  | 2,270  | 2,527  | 2,491  | 2,080 | 1,615 | 15,432   |   |
| Actual sickness rate       | —     | ·012  | ·308   | ·306   | ·048   | ·054   | ·088   | ·138   | ·139  | ·350  |          |   |
| Actual/expected %          | —     | 16    | 45     | 37     | 39     | 34     | 43     | 48     | 34    | 60    | 42       |   |
| Sickness period 26/26      |       |       |        |        |        |        |        |        |       |       |          |   |
| Exposed to risk            | 72    | 3,797 | 20,308 | 23,311 | 23,465 | 22,118 | 18,964 | 13,642 | 7,910 | 4,066 | 137,653  |   |
| Actual weeks of sickness   | —     | 65    | 276    | 465    | 564    | 657    | 855    | 1,365  | 1,184 | 1,414 | 6,845    |   |
| Expected weeks of sickness | 2     | 190   | 1,228  | 1,645  | 2,139  | 2,756  | 3,143  | 3,360  | 3,225 | 2,652 | 20,340   |   |
| Actual sickness rate       | —     | ·017  | ·014   | ·020   | ·024   | ·030   | ·045   | ·100   | ·150  | ·348  |          |   |
| Actual/expected %          | —     | 34    | 22     | 28     | 26     | 24     | 27     | 41     | 37    | 53    | 34       |   |

Table 6 (*continued*)

| Age group                  | 18-19 | 20-24 | 25-29  | 30-34  | 35-39  | 40-44  | 45-49  | 40-54  | 55-59  | 60-64 | All ages |
|----------------------------|-------|-------|--------|--------|--------|--------|--------|--------|--------|-------|----------|
| Sickness period 52/52      |       |       |        |        |        |        |        |        |        |       |          |
| Exposed to risk            | 50    | 3,050 | 18,869 | 23,380 | 24,794 | 24,296 | 21,072 | 15,119 | 8,564  | 4,280 | 143,474  |
| Actual weeks of sickness   | —     | 19    | 91     | 312    | 302    | 611    | 943    | 1,254  | 1,658  | 1,732 | 6,992    |
| Expected weeks of sickness | —     | 94    | 743    | 1,240  | 1,697  | 2,402  | 2,911  | 3,299  | 3,449  | 3,124 | 19,009   |
| Actual sickness rate       | —     | ·006  | ·005   | ·013   | ·012   | ·025   | ·045   | ·083   | ·194   | ·405  |          |
| Actual/expected %          | —     | 20    | 12     | 25     | 18     | 25     | 32     | 38     | 47     | 55    | 36       |
| Sickness period 104/all    |       |       |        |        |        |        |        |        |        |       |          |
| Exposed to risk            | 18    | 1,636 | 13,271 | 18,528 | 21,135 | 21,625 | 19,499 | 14,383 | 8,373  | 4,254 | 122,722  |
| Actual weeks of sickness   | —     | —     | 236    | 94     | 432    | 1,503  | 2,520  | 3,699  | 4,925  | 5,440 | 18,849   |
| Expected weeks of sickness | —     | 43    | 675    | 1,540  | 3,184  | 5,618  | 7,794  | 10,352 | 10,803 | 9,609 | 49,618   |
| Actual sickness rate       | —     | —     | ·018   | ·005   | ·020   | ·070   | ·129   | ·257   | ·588   | 1·279 |          |
| Actual/expected %          | —     | —     | 35     | 6      | 14     | 27     | 32     | 36     | 46     | 57    | 38       |

*Individual P.H.I. policies (1974) experience)*

*All offices—including late notified claims*

**Table 7. Females—Deferred period 1 week**

| Age group                    | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | All ages |
|------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| <b>Sickness period 0/4</b>   |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk              | —     | 43    | 141   | 95    | 106   | 82    | 156   | 131   | 65    | 819      |
| Actual weeks of sickness     | —     | 12    | 41    | 35    | 55    | 37    | 50    | 38    | 22    | 290      |
| Expected weeks of sickness   | —     | 21    | 66    | 45    | 52    | 43    | 88    | 81    | 45    | 441      |
| Actual sickness rate         | —     | ·279  | ·291  | ·368  | ·519  | ·451  | ·321  | ·290  | ·338  |          |
| Actual/expected %            | —     | 57    | 62    | 78    | 106   | 86    | 57    | 47    | 49    | 66       |
| <b>Sickness period 4/9</b>   |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk              | —     | 40    | 138   | 93    | 104   | 82    | 155   | 131   | 65    | 808      |
| Actual weeks of sickness     | —     | 5     | 33    | 14    | 40    | 23    | 48    | 50    | 34    | 247      |
| Expected weeks of sickness   | —     | 6     | 23    | 18    | 24    | 23    | 54    | 48    | 37    | 243      |
| Actual sickness rate         | —     | ·125  | ·239  | ·151  | ·385  | ·280  | ·310  | ·382  | ·523  |          |
| Actual/expected %            | —     | 83    | 143   | 78    | 167   | 100   | 89    | 86    | 92    | 102      |
| <b>Sickness period 13/13</b> |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk              | —     | 33    | 132   | 90    | 102   | 81    | 154   | 130   | 65    | 787      |
| Actual weeks of sickness     | —     | 0     | 13    | 14    | 39    | 0     | 16    | 2     | 4     | 88       |
| Expected weeks of sickness   | —     | 3     | 11    | 9     | 13    | 13    | 32    | 37    | 26    | 144      |
| Actual sickness rate         | —     | —     | ·098  | ·156  | ·382  | —     | ·104  | ·015  | ·062  |          |
| Actual/expected %            | —     | —     | 118   | 156   | 300   | —     | 50    | 5     | 15    | 61       |
| <b>Sickness period 26/26</b> |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk              | —     | 25    | 122   | 85    | 100   | 79    | 152   | 129   | 65    | 757      |
| Actual weeks of sickness     | —     | 0     | 1     | 0     | 11    | 0     | 5     | 0     | 0     | 17       |
| Expected weeks of sickness   | —     | 1     | 7     | 6     | 9     | 10    | 26    | 31    | 27    | 117      |
| Actual sickness rate         | —     | —     | ·008  | —     | ·110  | —     | ·033  | —     | —     |          |
| Actual/expected %            | —     | —     | 14    | —     | 122   | —     | 19    | —     | —     | 15       |

Table 7 (continued)

| Age group                  | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | All ages |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 52/52      |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 0     | 14    | 104   | 76    | 96    | 78    | 150   | 128   | 64    | 710      |
| Actual weeks of sickness   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | —        |
| Expected weeks of sickness | 0     | 0     | 4     | 4     | 7     | 8     | 21    | 27    | 26    | 97       |
| Actual sickness rate       | —     | —     | —     | —     | —     | —     | —     | —     | —     | —        |
| Actual/expected %          | —     | —     | —     | —     | —     | —     | —     | —     | —     | —        |
| Sickness period 104/all    |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 0     | 4     | 69    | 61    | 86    | 70    | 146   | 126   | 63    | 625      |
| Actual weeks of sickness   | 0     | 0     | 0     | 0     | 0     | 0     | 117   | 52    | 209   | 378      |
| Expected weeks of sickness | 0     | 0     | 3     | 5     | 13    | 18    | 60    | 89    | 82    | 270      |
| Actual sickness rate       | —     | —     | —     | —     | —     | —     | ·801  | ·413  | 3·317 | —        |
| Actual/expected %          | —     | —     | —     | —     | —     | —     | 195   | 58    | 255   | 140      |

*Individual P.H.I. policies (1974 experience)*

*All offices—including late notified claims*

**Table 8. Females—Deferred period 4 weeks**

| Age group                  | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | All ages |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period            |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 9     | 126   | 303   | 208   | 219   | 203   | 185   | 115   | 37    | 1,405    |
| Actual weeks of sickness   | —     | 4     | 30    | 36    | 22    | 53    | 47    | 17    | 9     | 218      |
| Expected weeks of sickness | 1     | 19    | 51    | 40    | 49    | 57    | 64    | 51    | 21    | 353      |
| Actual sickness rate       | —     | ·032  | ·099  | ·173  | ·100  | ·261  | ·254  | ·148  | ·243  |          |
| Actual/expected %          | —     | 21    | 59    | 90    | 45    | 93    | 73    | 33    | 43    | 62       |
| Sickness period            |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 8     | 113   | 290   | 200   | 214   | 199   | 182   | 114   | 37    | 1,357    |
| Actual weeks of sickness   | —     | —     | 3     | 2     | 5     | 20    | 21    | 11    | 13    | 75       |
| Expected weeks of sickness | —     | 9     | 25    | 20    | 26    | 32    | 37    | 32    | 15    | 196      |
| Actual sickness rate       | —     | —     | ·010  | ·010  | ·023  | ·101  | ·115  | ·096  | ·351  |          |
| Actual/expected %          | —     | —     | 12    | 10    | 19    | 63    | 57    | 34    | 87    | 38       |
| Sickness period            |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 6     | 95    | 271   | 190   | 208   | 194   | 179   | 112   | 36    | 1,291    |
| Actual weeks of sickness   | —     | —     | —     | 5     | —     | 9     | 49    | —     | 2     | 65       |
| Expected weeks of sickness | —     | 5     | 16    | 14    | 19    | 24    | 30    | 28    | 15    | 151      |
| Actual sickness rate       | —     | —     | —     | ·026  | —     | ·046  | ·274  | —     | ·056  |          |
| Actual/expected %          | —     | —     | —     | 36    | —     | 38    | 163   | —     | 13    | 43       |
| Sickness period            |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 3     | 64    | 234   | 171   | 197   | 186   | 172   | 108   | 35    | 1,170    |
| Actual weeks of sickness   | —     | —     | —     | —     | 80    | —     | 45    | —     | —     | 125      |
| Expected weeks of sickness | —     | 2     | 9     | 9     | 14    | 18    | 24    | 24    | 14    | 114      |
| Actual sickness rate       | —     | —     | —     | —     | ·406  | —     | ·262  | —     | —     |          |
| Actual/expected %          | —     | —     | —     | —     | 571   | —     | 187   | —     | —     | 110      |

Table 8 (*continued*)

| Age group                  | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | All ages |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period            |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | —     | 25    | 162   | 135   | 173   | 169   | 158   | 100   | 35    | 957      |
| Actual weeks of sickness   | —     | —     | —     | —     | 25    | —     | 104   | 104   | 52    | 285      |
| Expected weeks of sickness | —     | 1     | 8     | 12    | 26    | 44    | 64    | 72    | 45    | 272      |
| Actual sickness rate       | —     | —     | —     | —     | ·145  | —     | ·658  | 1·040 | 1·486 |          |
| Actual/expected %          | —     | —     | —     | —     | 96    | —     | 162   | 144   | 116   | 105      |

*Individual P.H.I. policies (1974 experience)*

*All offices—including late notified claims*

**Table 9. Females—Deferred period 13 weeks**

| Age group                      | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | All ages |
|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| <b>Sickness period 13/13</b>   |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 1     | 56    | 209   | 250   | 264   | 278   | 275   | 166   | 74    | 1,573    |
| Actual weeks of sickness       | —     | —     | 5     | 13    | 7     | 65    | —     | 50    | 26    | 166      |
| Expected weeks of sickness     | —     | 4     | 18    | 24    | 32    | 44    | 56    | 47    | 29    | 254      |
| Actual sickness rate           | —     | —     | ·024  | ·052  | ·027  | ·234  | —     | ·301  | ·351  |          |
| Actual/expected %              | —     | —     | 28    | 54    | 22    | 148   | —     | 106   | 90    | 65       |
| <b>Sickness period 26/26</b>   |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | —     | 48    | 192   | 236   | 252   | 269   | 270   | 163   | 73    | 1,503    |
| Actual weeks of sickness       | —     | —     | —     | 11    | 9     | 61    | —     | 21    | 51    | 153      |
| Expected weeks of sickness     | —     | 2     | 12    | 17    | 23    | 34    | 45    | 40    | 29    | 202      |
| Actual sickness rate           | —     | —     | —     | ·047  | ·036  | ·227  | —     | ·129  | ·699  |          |
| Actual/expected %              | —     | —     | —     | 65    | 39    | 179   | —     | 53    | 176   | 76       |
| <b>Sickness period 52/52</b>   |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | —     | 35    | 160   | 210   | 228   | 251   | 258   | 158   | 73    | 1,373    |
| Actual weeks of sickness       | —     | —     | —     | —     | 3     | 48    | 47    | —     | 52    | 150      |
| Expected weeks of sickness     | —     | 1     | 6     | 11    | 16    | 25    | 36    | 34    | 28    | 157      |
| Actual sickness rate           | —     | —     | —     | —     | ·013  | ·191  | ·182  | —     | ·712  |          |
| Actual/expected %              | —     | —     | —     | —     | 19    | 192   | 131   | —     | 186   | 96       |
| <b>Sickness period 104/all</b> |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | —     | 18    | 103   | 152   | 183   | 218   | 232   | 148   | 69    | 1,123    |
| Actual weeks of sickness       | —     | —     | —     | —     | 50    | 26    | 109   | 52    | 107   | 344      |
| Expected weeks of sickness     | —     | —     | 5     | 12    | 28    | 57    | 94    | 105   | 86    | 387      |
| Actual sickness rate           | —     | —     | —     | —     | ·273  | ·119  | ·470  | ·351  | 1·551 |          |
| Actual/expected %              | —     | —     | —     | —     | 179   | 46    | 116   | 50    | 124   | 89       |

*Individual P.H.I. policies (1974 experience)**All offices—including late notified claims*Table 10. *Females—Deferred period 26 weeks*

| Age group                  | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | All ages |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 26/26      |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 1     | 53    | 168   | 255   | 371   | 430   | 395   | 261   | 102   | 2,036    |
| Actual weeks of sickness   | —     | —     | —     | —     | 41    | —     | 46    | 54    | —     | 141      |
| Expected weeks of sickness | —     | 3     | 10    | 18    | 34    | 54    | 65    | 64    | 42    | 290      |
| Actual sickness rate       | —     | —     | —     | —     | ·111  | —     | ·116  | ·207  | —     |          |
| Actual/expected %          | —     | —     | —     | —     | 121   | —     | 71    | 84    | —     | 49       |
| Sickness period 52/52      |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 1     | 40    | 139   | 228   | 336   | 403   | 379   | 254   | 102   | 1,882    |
| Actual weeks of sickness   | —     | —     | —     | —     | 60    | 17    | 16    | 50    | —     | 143      |
| Expected weeks of sickness | —     | 1     | 5     | 12    | 23    | 40    | 52    | 55    | 42    | 230      |
| Actual sickness rate       | —     | —     | —     | —     | ·179  | ·042  | ·042  | ·197  | —     |          |
| Actual/expected %          | —     | —     | —     | —     | 261   | 43    | 31    | 91    | —     | 62       |
| Sickness period 104/all    |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 1     | 22    | 85    | 165   | 256   | 339   | 338   | 232   | 100   | 1,538    |
| Actual weeks of sickness   | —     | —     | —     | —     | —     | 36    | —     | —     | —     | 36       |
| Expected weeks of sickness | —     | 1     | 4     | 14    | 39    | 88    | 133   | 166   | 131   | 576      |
| Actual sickness rate       | —     | —     | —     | —     | —     | ·106  | —     | —     | —     |          |
| Actual/expected %          | —     | —     | —     | —     | —     | 41    | —     | —     | —     | 6        |





## Individual P.H.I. policies (1974 experience)

## All offices—including late notified claims

Table 12. Females—All deferred period combined

| Age group                  | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | All ages |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 0/4        |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | —     | 43    | 141   | 95    | 106   | 82    | 156   | 131   | 65    | 819      |
| Actual weeks of sickness   | —     | 12    | 41    | 35    | 55    | 37    | 50    | 38    | 22    | 290      |
| Expected weeks of sickness | —     | 21    | 66    | 45    | 52    | 43    | 88    | 81    | 45    | 441      |
| Actual sickness rate       | —     | ·279  | ·291  | ·368  | ·519  | ·451  | ·321  | ·290  | ·338  |          |
| Actual/expected %          | —     | 57    | 62    | 78    | 106   | 86    | 57    | 47    | 49    | 66       |
| Sickness period 4/9        |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 9     | 166   | 441   | 302   | 324   | 285   | 341   | 246   | 102   | 2,216    |
| Actual weeks of sickness   | —     | 9     | 63    | 50    | 62    | 76    | 96    | 67    | 44    | 467      |
| Expected weeks of sickness | 1     | 25    | 75    | 58    | 73    | 80    | 118   | 108   | 58    | 596      |
| Actual sickness rate       | —     | ·054  | ·143  | ·166  | ·191  | ·267  | ·282  | ·272  | ·431  |          |
| Actual/expected %          | —     | 36    | 84    | 86    | 85    | 95    | 81    | 62    | 76    | 78       |
| Sickness period 13/13      |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 9     | 203   | 631   | 541   | 582   | 559   | 613   | 411   | 176   | 3,725    |
| Actual weeks of sickness   | —     | —     | 20    | 29    | 51    | 85    | 37    | 63    | 43    | 328      |
| Expected weeks of sickness | 1     | 16    | 54    | 52    | 71    | 89    | 125   | 116   | 71    | 595      |
| Actual sickness rate       | —     | —     | ·032  | ·054  | ·088  | ·152  | ·060  | ·153  | ·244  |          |
| Actual/expected %          | —     | —     | 37    | 56    | 72    | 96    | 30    | 54    | 61    | 55       |
| Sickness period 26/26      |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 8     | 223   | 754   | 768   | 932   | 974   | 997   | 667   | 278   | 5,601    |
| Actual weeks of sickness   | —     | —     | 1     | 16    | 61    | 70    | 100   | 75    | 53    | 376      |
| Expected weeks of sickness | —     | 11    | 45    | 54    | 86    | 122   | 165   | 163   | 113   | 759      |
| Actual sickness rate       | —     | —     | ·001  | ·021  | ·065  | ·072  | ·100  | ·112  | ·191  |          |
| Actual/expected %          | —     | —     | 2     | 30    | 71    | 57    | 61    | 46    | 47    | 50       |

Table 12 (*continued*)

| Age group                  | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | All ages |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 52/52      |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 5     | 163   | 670   | 754   | 968   | 1,061 | 1,076 | 735   | 306   | 5,738    |
| Actual weeks of sickness   | —     | —     | —     | —     | 142   | 65    | 108   | 50    | 52    | 417      |
| Expected weeks of sickness | —     | 5     | 26    | 40    | 67    | 105   | 149   | 159   | 122   | 673      |
| Actual sickness rate       | —     | —     | —     | —     | ·147  | ·061  | ·100  | ·068  | ·169  |          |
| Actual/expected %          | —     | —     | —     | —     | 212   | 62    | 72    | 31    | 43    | 62       |
| Sickness period 104/all    |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk            | 1     | 74    | 440   | 564   | 782   | 909   | 977   | 682   | 297   | 4,726    |
| Actual weeks of sickness   | —     | —     | —     | —     | 74    | 61    | 331   | 209   | 421   | 1,096    |
| Expected weeks of sickness | —     | 2     | 22    | 47    | 120   | 237   | 391   | 486   | 381   | 1,686    |
| Actual sickness rate       | —     | —     | —     | —     | ·095  | ·067  | ·339  | ·306  | 1·418 |          |
| Actual expected %          | —     | —     | —     | —     | 62    | 26    | 85    | 43    | 110   | 65       |

*Individual P.H.I. policies (1974 experience)**All offices—including late notified claims*Table 13. *Male claim inception rates per thousand exposed to risk*

| Age group                | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | All ages |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Deferred period 1 week   | —     | 128   | 122   | 120   | 131   | 132   | 132   | 127   | 150   | 216   | 137      |
| Deferred period 4 weeks  | —     | 18    | 15    | 16    | 17    | 28    | 28    | 33    | 50    | 77    | 23       |
| Deferred period 13 weeks | —     | —     | 2     | 3     | 5     | 4     | 7     | 9     | 18    | 24    | 5        |
| Deferred period 26 weeks | —     | 2     | —     | 1     | 1     | 1     | 1     | 3     | 3     | 13    | 1        |
| Deferred period 52 weeks | —     | —     | —     | —     | —     | —     | 1     | 1     | 5     | —     | —        |



*Individual P.H.I. policies (1975 experience)**All offices—including late notified claims*Table 1. *Males—Deferred period 1 week*

| Age group                      | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | All ages |
|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 0/4            |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 1     | 376   | 2,918 | 3,144 | 2,999 | 3,122 | 3,530 | 3,285 | 2,412 | 1,662 | 23,449   |
| Actual weeks of sickness       | 0     | 70    | 397   | 446   | 546   | 595   | 845   | 768   | 678   | 676   | 5,021    |
| Expected weeks of sickness     | 0     | 183   | 1,358 | 1,480 | 1,467 | 1,631 | 1,979 | 2,019 | 1,677 | 1,312 | 13,106   |
| Actual claim rate              | 0     | ·186  | ·136  | ·142  | ·182  | ·191  | ·239  | ·234  | ·281  | ·407  |          |
| Actual weeks sickness/expected | —     | 38·3  | 29·2  | 30·1  | 37·2  | 36·5  | 42·7  | 38·0  | 40·4  | 51·5  | 38·3     |
| Sickness period 4/9            |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                |       | 350   | 2,858 | 3,112 | 2,979 | 3,106 | 3,515 | 3,279 | 2,409 | 1,661 | 23,269   |
| Actual weeks of sickness       |       | 63    | 154   | 165   | 306   | 402   | 748   | 694   | 815   | 840   | 4,187    |
| Expected weeks of sickness     |       | 52    | 489   | 597   | 663   | 872   | 1,219 | 1,451 | 1,374 | 1,202 | 7,919    |
| Actual claim rate              |       | ·180  | ·054  | ·053  | ·103  | ·129  | ·213  | ·212  | ·338  | ·506  |          |
| Actual weeks sickness/expected | —     | 121·2 | 31·5  | 27·6  | 46·2  | 46·1  | 61·4  | 47·8  | 59·3  | 69·9  | 52·9     |
| Sickness period 13/13          |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                |       | 306   | 2,740 | 3,050 | 2,938 | 3,076 | 3,488 | 3,268 | 2,404 | 1,661 | 22,931   |
| Actual weeks of sickness       |       | 26    | 61    | 36    | 113   | 122   | 381   | 299   | 528   | 623   | 2,189    |
| Expected weeks of sickness     |       | 24    | 234   | 293   | 358   | 489   | 712   | 936   | 984   | 987   | 5,017    |
| Actual claim rate              |       | ·085  | ·022  | ·012  | ·038  | ·040  | ·109  | ·091  | ·220  | ·375  |          |
| Actual weeks sickness/expected | —     | 108·3 | 26·1  | 12·3  | 31·6  | 24·9  | 53·5  | 31·9  | 53·7  | 63·1  | 43·6     |

Table 1 (*continued*)

|                                |      |       |       |       |       |       |       |       |       |        |      |
|--------------------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|--------|------|
| Sickness period 26/26          |      |       |       |       |       |       |       |       |       |        |      |
| Exposed to risk                | 245  | 2,567 | 2,956 | 2,879 | 3,029 | 3,448 | 3,252 | 2,397 | 1,661 | 22,434 |      |
| Actual weeks of sickness       | 52   | 88    | 52    | 204   | 123   | 454   | 456   | 539   | 709   | 2,677  |      |
| Expected weeks of sickness     | 13   | 156   | 208   | 263   | 379   | 576   | 802   | 986   | 1,105 | 4,488  |      |
| Actual claim rate              | ·212 | ·304  | ·018  | ·071  | ·041  | ·132  | ·140  | ·225  | ·427  |        |      |
| Actual weeks sickness/expected | —    | 400·0 | 56·4  | 25·0  | 77·6  | 32·5  | 78·8  | 56·9  | 54·7  | 64·2   | 59·6 |
| Sickness period 52/52          |      |       |       |       |       |       |       |       |       |        |      |
| Exposed to risk                | 144  | 2,234 | 2,773 | 2,762 | 2,935 | 3,376 | 3,221 | 2,386 | 1,660 | 21,491 |      |
| Actual weeks of sickness       | 5    | 67    | 22    | 33    | 93    | 278   | 689   | 606   | 829   | 2,622  |      |
| Expected weeks of sickness     | 5    | 89    | 147   | 190   | 290   | 472   | 705   | 976   | 1,243 | 4,117  |      |
| Actual claim rate              | ·035 | ·030  | ·008  | ·012  | ·032  | ·082  | ·214  | ·254  | ·499  |        |      |
| Actual weeks sickness/expected | —    | 100·0 | 75·3  | 15·0  | 17·4  | 32·1  | 58·9  | 97·7  | 62·1  | 66·7   | 63·7 |
| Sickness period 104/all        |      |       |       |       |       |       |       |       |       |        |      |
| Exposed to risk                | 38   | 1,615 | 2,419 | 2,564 | 2,770 | 3,265 | 3,162 | 2,363 | 1,654 | 19,850 |      |
| Actual weeks of sickness       | 0    | 0     | 0     | 0     | 495   | 642   | 1,256 | 1,623 | 2,455 | 6,471  |      |
| Expected weeks of sickness     | 1    | 85    | 200   | 386   | 721   | 1,323 | 2,285 | 3,083 | 3,848 | 11,932 |      |
| Actual claim rate              | ·000 | ·000  | ·000  | ·000  | ·179  | ·197  | ·397  | ·687  | 1·484 |        |      |
| Actual weeks sickness/expected | —    | —     | —     | —     | 68·7  | 48·5  | 55·0  | 52·6  | 63·8  | 54·2   |      |

*Individual P.H.I. policies (1975 experience)**All offices—including late notified claims*Table 2. *Males—Deferred period 4 weeks*

| Age group                      | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | All ages |
|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 4/9            |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 57    | 1,474 | 6,516 | 7,274 | 6,924 | 6,047 | 4,716 | 3,010 | 1,358 | 505   | 37,881   |
| Actual weeks of sickness       | 15    | 124   | 581   | 686   | 742   | 1,047 | 711   | 633   | 371   | 240   | 5,150    |
| Expected weeks of sickness     | 8     | 217   | 1,114 | 1,395 | 1,541 | 1,689 | 1,622 | 1,329 | 760   | 358   | 10,033   |
| Actual claim rate              | ·263  | ·084  | ·089  | ·094  | ·107  | ·173  | ·151  | ·210  | ·273  | ·475  |          |
| Actual weeks sickness/expected | 187·5 | 57·1  | 52·2  | 49·2  | 48·2  | 62·0  | 43·8  | 47·6  | 48·8  | 67·0  | 51·3     |
| Sickness period 13/13          |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 49    | 1,341 | 6,230 | 7,041 | 6,770 | 5,952 | 4,659 | 2,986 | 1,354 | 504   | 36,886   |
| Actual weeks of sickness       | 3     | 48    | 303   | 358   | 282   | 460   | 427   | 264   | 270   | 235   | 2,650    |
| Expected weeks of sickness     | 3     | 103   | 531   | 679   | 826   | 941   | 942   | 852   | 539   | 291   | 5,707    |
| Actual claim rate              | ·061  | ·036  | ·057  | ·043  | ·042  | ·077  | ·092  | ·088  | ·199  | ·466  |          |
| Actual weeks sickness/expected | 100·0 | 46·6  | 67·4  | 44·6  | 34·1  | 48·9  | 45·3  | 31·0  | 50·1  | 80·8  | 46·4     |



Table 2 (*continued*)

|                                |    |       |       |       |       |       |       |       |       |       |        |
|--------------------------------|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| Sickness period 26/26          |    |       |       |       |       |       |       |       |       |       |        |
| Exposed to risk                | 37 | 1,155 | 5,796 | 6,690 | 6,541 | 5,806 | 4,579 | 2,951 | 1,345 | 503   | 35,403 |
| Actual weeks of sickness       | 0  | 80    | 239   | 190   | 269   | 321   | 343   | 254   | 282   | 251   | 2,229  |
| Expected weeks of sickness     | 1  | 57    | 351   | 471   | 596   | 721   | 758   | 724   | 533   | 322   | 4,534  |
| Actual claim rate              | 0  | ·069  | ·041  | ·028  | ·041  | ·055  | ·075  | ·086  | ·210  | ·499  |        |
| Actual weeks sickness/expected | —  | 140·4 | 68·1  | 40·3  | 45·1  | 44·5  | 45·3  | 35·1  | 52·9  | 78·0  | 49·2   |
| Sickness period 52/52          |    |       |       |       |       |       |       |       |       |       |        |
| Exposed to risk                | 20 | 831   | 4,920 | 5,982 | 6,074 | 5,502 | 4,427 | 2,884 | 1,328 | 502   | 32,470 |
| Actual weeks of sickness       | 0  | 18    | 109   | 141   | 245   | 218   | 370   | 411   | 352   | 292   | 2,156  |
| Expected weeks of sickness     | 0  | 24    | 194   | 318   | 415   | 542   | 610   | 629   | 517   | 356   | 3,605  |
| Actual claim rate              | 0  | ·022  | ·022  | ·024  | ·040  | ·040  | ·084  | ·143  | ·265  | ·582  |        |
| Actual weeks sickness/expected | —  | 75·0  | 56·2  | 44·3  | 59·0  | 40·2  | 60·7  | 65·3  | 68·1  | 82·0  | 59·8   |
| Sickness period 104/all        |    |       |       |       |       |       |       |       |       |       |        |
| Exposed to risk                | 5  | 376   | 3,354 | 4,685 | 5,157 | 4,906 | 4,140 | 2,750 | 1,286 | 500   | 27,159 |
| Actual weeks of sickness       | 0  | 0     | 0     | 117   | 16    | 279   | 1,083 | 631   | 789   | 604   | 3,519  |
| Expected weeks of sickness     | 0  | 9     | 172   | 387   | 775   | 1,267 | 1,650 | 1,975 | 1,614 | 1,094 | 8,943  |
| Actual claim rate              | 0  | 0     | 0     | ·025  | ·003  | ·057  | ·262  | ·229  | ·614  | 1·208 |        |
| Actual weeks sickness/expected | —  | —     | —     | 30·2  | 2·1   | 22·0  | 65·6  | 31·9  | 48·9  | 55·2  | 39·3   |

*Individual P.H.I. policies (1975 experience)**All offices—including late notified claims*Table 3. *Males—Deferred period 13 weeks*

| Age group                      | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | All ages |
|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 13/13          |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 34    | 829   | 5,277 | 7,744 | 7,670 | 7,062 | 5,663 | 3,609 | 1,774 | 784   | 40,446   |
| Actual weeks of sickness       | 0     | 23    | 117   | 139   | 293   | 353   | 427   | 281   | 232   | 181   | 2,046    |
| Expected weeks of sickness     | 2     | 64    | 451   | 748   | 938   | 1,118 | 1,148 | 1,026 | 714   | 458   | 6,667    |
| Actual claim rate              | 0     | ·028  | ·022  | ·018  | ·038  | ·050  | ·075  | ·078  | ·131  | ·231  |          |
| Actual weeks sickness/expected | —     | 35·9  | 25·9  | 18·6  | 31·2  | 31·6  | 37·2  | 27·4  | 32·5  | 39·5  | 30·7     |
| Sickness period 26/26          |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 27    | 709   | 4,882 | 7,388 | 7,412 | 6,886 | 5,569 | 3,572 | 1,764 | 783   | 38,992   |
| Actual weeks of sickness       | 0     | 26    | 104   | 157   | 305   | 193   | 516   | 460   | 200   | 328   | 2,289    |
| Expected weeks of sickness     | 0     | 34    | 297   | 522   | 678   | 857   | 923   | 876   | 709   | 508   | 5,404    |
| Actual claim rate              | 0     | ·037  | ·021  | ·021  | ·041  | ·028  | ·093  | ·129  | ·113  | ·419  |          |
| Actual weeks sickness/expected | —     | 76·5  | 35·0  | 30·1  | 45·0  | 22·5  | 55·9  | 52·5  | 28·2  | 64·6  | 42·4     |
| Sickness period 52/52          |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 17    | 510   | 4,144 | 6,692 | 6,896 | 6,543 | 5,381 | 3,493 | 1,744 | 781   | 36,201   |
| Actual weeks of sickness       | 0     | 11    | 63    | 128   | 185   | 204   | 323   | 484   | 334   | 671   | 2,403    |
| Expected weeks of sickness     | 0     | 15    | 165   | 357   | 474   | 646   | 744   | 758   | 694   | 568   | 4,421    |
| Actual claim rate              | 0     | ·022  | ·015  | ·019  | ·027  | ·031  | ·060  | ·139  | ·192  | ·859  |          |
| Actual weeks sickness/expected | —     | 73·3  | 38·2  | 35·9  | 39·0  | 31·6  | 43·4  | 63·9  | 48·1  | 118·1 | 54·4     |
| Sickness period 104/all        |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 8     | 267   | 2,904 | 5,357 | 5,888 | 5,834 | 4,997 | 3,326 | 1,703 | 775   | 31,059   |
| Actual weeks of sickness       | 0     | 0     | 36    | 131   | 173   | 295   | 461   | 888   | 708   | 1,371 | 4,063    |
| Expected weeks of sickness     | 0     | 7     | 151   | 445   | 890   | 1,511 | 1,996 | 2,379 | 2,175 | 1,742 | 11,296   |
| Actual claim rate              | 0     | 0     | ·012  | ·024  | ·029  | ·051  | ·092  | ·267  | ·416  | 1·769 |          |
| Actual weeks sickness/expected | —     | —     | 23·8  | 29·4  | 19·4  | 19·5  | 23·1  | 37·3  | 32·6  | 78·7  | 36·0     |

*Individual P.H.I. policies (1975 experience)**All offices—including late notified claims*Table 4. *Males—Deferred period 26 weeks*

| Age group                      | 18-19 | 20-24 | 25-29 | 30-34  | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | All ages |
|--------------------------------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 26/26          |       |       |       |        |       |       |       |       |       |       |          |
| Exposed to risk                | 25    | 1,467 | 9,243 | 11,077 | 9,811 | 8,943 | 7,507 | 5,353 | 3,161 | 1,517 | 58,104   |
| Actual weeks of sickness       | 0     | 30    | 45    | 72     | 132   | 50    | 181   | 312   | 374   | 304   | 1,500    |
| Expected weeks of sickness     | 0     | 72    | 561   | 780    | 893   | 1,111 | 1,243 | 1,324 | 1,266 | 982   | 8,232    |
| Actual claim rate              | 0     | ·020  | ·005  | ·006   | ·013  | ·006  | ·024  | ·058  | ·118  | ·200  |          |
| Actual weeks sickness/expected | —     | 41·7  | 8·0   | 9·2    | 14·8  | 4·5   | 14·6  | 23·6  | 29·5  | 31·0  | 18·2     |
| Sickness period 52/52          |       |       |       |        |       |       |       |       |       |       |          |
| Exposed to risk                | 16    | 1,169 | 8,389 | 10,273 | 9,299 | 8,570 | 7,295 | 5,254 | 3,138 | 1,512 | 54,915   |
| Actual weeks of sickness       | 0     | 29    | 55    | 71     | 86    | 86    | 217   | 417   | 344   | 749   | 2,054    |
| Expected weeks of sickness     | 0     | 36    | 332   | 544    | 635   | 847   | 1,007 | 1,154 | 1,238 | 1,096 | 6,889    |
| Actual claim rate              | 0     | ·025  | ·007  | ·007   | ·009  | ·010  | ·030  | ·079  | ·110  | ·495  |          |
| Actual weeks sickness/expected | —     | 80·6  | 16·6  | 13·1   | 13·5  | 10·2  | 21·5  | 36·1  | 27·8  | 68·3  | 29·8     |
| Sickness period 104/all        |       |       |       |        |       |       |       |       |       |       |          |
| Exposed to risk                | 7     | 704   | 6,730 | 8,639  | 8,188 | 7,778 | 6,833 | 5,031 | 3,072 | 1,502 | 48,484   |
| Actual weeks of sickness       | 0     | 0     | 52    | 56     | 156   | 243   | 250   | 1,236 | 1,567 | 1,817 | 5,377    |
| Expected weeks of sickness     | 0     | 19    | 342   | 710    | 1,228 | 2,011 | 2,730 | 3,646 | 3,898 | 3,367 | 17,951   |
| Actual claim rate              | 0     | 0     | ·008  | ·006   | ·019  | ·031  | ·037  | ·246  | ·510  | 1·210 |          |
| Actual weeks sickness/expected | —     | —     | 15·2  | 7·9    | 12·7  | 12·1  | 9·2   | 33·9  | 40·2  | 54·0  | 30·0     |

*Individual P.H.I. policies (1975 experience)**All offices—including late notified claims*Table 5. *Males—Deferred period 52 weeks*

| Age group                      | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | All ages |
|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 52/52          |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 2     | 118   | 1,149 | 2,449 | 3,234 | 3,489 | 3,063 | 1,997 | 886   | 276   | 16,663   |
| Actual weeks of sickness       | 0     | 0     | 0     | 9     | 0     | 45    | 100   | 17    | 128   | 117   | 416      |
| Expected weeks of sickness     | 0     | 3     | 45    | 130   | 222   | 347   | 423   | 434   | 343   | 196   | 2,143    |
| Actual claim rate              | 0     | 0     | 0     | ·004  | 0     | ·013  | ·033  | ·009  | ·144  | ·424  |          |
| Actual weeks sickness/expected | —     | —     | —     | 6·9   | —     | 13·0  | 23·6  | 3·9   | 37·3  | 59·7  | 19·4     |
| Sickness period 104/all        |       |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 2     | 65    | 836   | 1,930 | 2,748 | 3,096 | 2,800 | 1,865 | 852   | 270   | 14,464   |
| Actual weeks of sickness       | 0     | 0     | 0     | 0     | 0     | 7     | 447   | 230   | 286   | 90    | 1,060    |
| Expected weeks of sickness     | 0     | 1     | 44    | 162   | 417   | 807   | 1,116 | 1,331 | 1,066 | 589   | 5,533    |
| Actual claim rate              | 0     | 0     | 0     | 0     | 0     | ·002  | ·160  | ·123  | ·336  | ·333  |          |
| Actual weeks sickness/expected | —     | —     | —     | —     | —     | 0·9   | 40·1  | 17·3  | 26·8  | 15·3  | 19·2     |

*Individual P.H.I. policies (1975 experience)*

*All offices—including late notified claims*

**Table 6. Males—All deferred periods combined**

| Age group                      | 18-19 | 20-24 | 25-29  | 30-34  | 35-39  | 40-44  | 45-49  | 50-54  | 55-59  | 60-64  | All ages |
|--------------------------------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|----------|
| Sickness period 0/4            |       |       |        |        |        |        |        |        |        |        |          |
| Exposed to risk                | 1     | 376   | 2,918  | 3,144  | 2,999  | 3,122  | 3,530  | 3,285  | 2,412  | 1,662  | 23,449   |
| Actual weeks of sickness       | 0     | 70    | 397    | 446    | 546    | 595    | 845    | 768    | 678    | 676    | 5,021    |
| Expected weeks of sickness     | 0     | 183   | 1,358  | 1,480  | 1,467  | 1,631  | 1,979  | 2,019  | 1,677  | 1,312  | 13,106   |
| Actual claim rate              | 0     | -186  | -136   | -142   | -182   | -191   | -239   | -234   | -281   | -407   |          |
| Actual weeks sickness/expected | —     | 38.3  | 29.2   | 30.1   | 37.2   | 36.5   | 42.7   | 38.0   | 40.4   | 51.5   | 38.3     |
| Sickness period 4/9            |       |       |        |        |        |        |        |        |        |        |          |
| Exposed to risk                | 58    | 1,823 | 9,373  | 10,385 | 9,903  | 9,152  | 8,232  | 6,288  | 3,768  | 2,166  | 61,148   |
| Actual weeks of sickness       | 15    | 187   | 733    | 849    | 1,049  | 1,448  | 1,457  | 1,328  | 1,185  | 1,080  | 9,331    |
| Expected weeks of sickness     | 8     | 270   | 1,603  | 1,992  | 2,205  | 2,560  | 2,843  | 2,780  | 2,133  | 1,561  | 17,955   |
| Actual claim rate              | -259  | -103  | -078   | -082   | -106   | -158   | -177   | -211   | -314   | -499   |          |
| Actual weeks sickness/expected | 187.5 | 69.3  | 45.7   | 42.6   | 47.6   | 56.6   | 51.2   | 47.8   | 55.6   | 69.2   | 52.0     |
| Sickness period 13/13          |       |       |        |        |        |        |        |        |        |        |          |
| Exposed to risk                | 83    | 2,477 | 14,248 | 17,834 | 17,379 | 16,087 | 13,811 | 9,863  | 5,531  | 2,950  | 100,263  |
| Actual weeks of sickness       | 3     | 98    | 536    | 477    | 689    | 934    | 1,234  | 845    | 1,029  | 1,038  | 6,883    |
| Expected weeks of sickness     | 5     | 193   | 1,217  | 1,720  | 2,120  | 2,549  | 2,804  | 2,814  | 2,237  | 1,736  | 17,395   |
| Actual claim rate              | -036  | -040  | -038   | -027   | -040   | -058   | -089   | -086   | -186   | -352   |          |
| Actual weeks sickness/expected | 60.0  | 50.8  | 44.0   | 27.7   | 32.5   | 36.6   | 44.0   | 30.0   | 46.0   | 59.8   | 39.6     |
| Sickness period 26/26          |       |       |        |        |        |        |        |        |        |        |          |
| Exposed to risk                | 89    | 3,576 | 22,488 | 28,112 | 26,641 | 24,664 | 21,103 | 15,128 | 8,666  | 4,462  | 154,929  |
| Actual weeks of sickness       | 0     | 188   | 480    | 470    | 911    | 686    | 1,495  | 1,480  | 1,396  | 1,591  | 8,697    |
| Expected weeks of sickness     | 3     | 177   | 1,365  | 1,981  | 2,428  | 3,070  | 3,500  | 3,728  | 3,495  | 2,914  | 22,661   |
| Actual claim rate              | 0     | -053  | -021   | -017   | -034   | -028   | -071   | -098   | -161   | -357   |          |
| Actual weeks sickness/expected | —     | 106.2 | 35.2   | 23.7   | 37.5   | 22.3   | 42.7   | 39.7   | 39.9   | 54.6   | 38.4     |
| Sickness period 52/52          |       |       |        |        |        |        |        |        |        |        |          |
| Exposed to risk                | 56    | 2,770 | 20,835 | 28,168 | 28,265 | 27,040 | 23,543 | 16,849 | 9,481  | 4,728  | 161,735  |
| Actual weeks of sickness       | 0     | 63    | 293    | 371    | 550    | 645    | 1,290  | 2,019  | 1,766  | 2,658  | 9,655    |
| Expected weeks of sickness     | 0     | 84    | 825    | 1,496  | 1,934  | 2,671  | 3,255  | 3,679  | 3,766  | 3,459  | 21,169   |
| Actual claim rate              | 0     | -023  | -014   | -013   | -019   | -024   | -055   | -120   | -186   | -562   |          |
| Actual weeks sickness/expected | —     | 75.0  | 35.5   | 24.8   | 28.4   | 24.1   | 39.6   | 54.9   | 46.9   | 76.8   | 45.6     |
| Sickness period 104/all        |       |       |        |        |        |        |        |        |        |        |          |
| Exposed to risk                | 21    | 1,449 | 15,439 | 23,027 | 24,544 | 24,381 | 22,032 | 16,132 | 9,273  | 4,698  | 140,996  |
| Actual weeks of sickness       | 0     | 0     | 88     | 304    | 345    | 1,319  | 2,885  | 4,241  | 4,973  | 6,337  | 20,492   |
| Expected weeks of sickness     | 0     | 38    | 792    | 1,904  | 3,693  | 6,319  | 8,816  | 11,617 | 11,835 | 10,640 | 55,654   |
| Actual claim rate              | 0     | 0     | -006   | -013   | -014   | -054   | -131   | -263   | -536   | -1,349 |          |
| Actual weeks sickness/expected | —     | —     | 11.1   | 16.0   | 9.3    | 20.9   | 32.7   | 36.5   | 42.0   | 59.6   | 36.8     |

*Individual P.H.I. policies (1975 experience)**All offices—including late notified claims*Table 7. *Females—Deferred period 1 week*

| Age group                      | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | All ages |
|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 0/4            |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 0     | 62    | 159   | 118   | 112   | 89    | 161   | 134   | 73    | 908      |
| Actual weeks of sickness       | 0     | 1     | 44    | 19    | 53    | 31    | 76    | 36    | 29    | 289      |
| Expected weeks of sickness     | 0     | 30    | 73    | 56    | 55    | 46    | 90    | 82    | 50    | 482      |
| Actual claim rate              | —     | ·016  | ·277  | ·161  | ·473  | ·348  | ·472  | ·269  | ·397  |          |
| Actual weeks sickness/expected | —     | 3·3   | 60·3  | 33·9  | 96·4  | 67·4  | 84·4  | 43·9  | 58·0  | 60·0     |
| Sickness period 4/9            |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 0     | 59    | 155   | 116   | 110   | 88    | 160   | 133   | 73    | 894      |
| Actual weeks of sickness       | 0     | 6     | 27    | 11    | 56    | 22    | 96    | 44    | 55    | 317      |
| Expected weeks of sickness     | 0     | 8     | 26    | 22    | 25    | 23    | 57    | 60    | 41    | 262      |
| Actual claim rate              | —     | ·102  | ·174  | ·095  | ·509  | ·250  | ·600  | ·331  | ·753  |          |
| Actual weeks sickness/expected | —     | 75·0  | 103·8 | 50·0  | 224·0 | 95·7  | 168·4 | 73·3  | 134·1 | 121·0    |
| Sickness period 13/13          |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 0     | 54    | 149   | 113   | 109   | 87    | 158   | 133   | 72    | 875      |
| Actual weeks of sickness       | 0     | 14    | 26    | 9     | 26    | 28    | 34    | 2     | 43    | 182      |
| Expected weeks of sickness     | 0     | 4     | 13    | 11    | 13    | 13    | 33    | 38    | 28    | 153      |
| Actual claim rate              | —     | ·259  | ·174  | ·080  | ·239  | ·322  | ·215  | ·015  | ·597  |          |
| Actual weeks sickness/expected | —     | 350·0 | 200·0 | 81·8  | 200·0 | 215·4 | 103·0 | 5·3   | 153·6 | 119·0    |

Table 7 (continued)

|                                |   |         |       |       |      |       |       |      |       |       |
|--------------------------------|---|---------|-------|-------|------|-------|-------|------|-------|-------|
| Sickness period 26/26          |   |         |       |       |      |       |       |      |       |       |
| Exposed to risk                | 0 | 45      | 139   | 106   | 105  | 87    | 156   | 133  | 72    | 843   |
| Actual weeks of sickness       | 0 | 26      | 33    | 26    | 3    | 41    | 78    | 0    | 29    | 236   |
| Expected weeks of sickness     | 0 | 2       | 8     | 7     | 11   | 10    | 27    | 32   | 29    | 126   |
| Actual claim rate              | 0 | ·578    | ·237  | ·245  | ·029 | ·471  | ·500  | 0    | ·403  |       |
| Actual weeks sickness/expected | — | 1,300·0 | 412·5 | 371·4 | 27·3 | 410·0 | 288·9 | —    | 100·0 | 187·3 |
| Sickness period 52/52          |   |         |       |       |      |       |       |      |       |       |
| Exposed to risk                | 0 | 27      | 122   | 97    | 101  | 84    | 151   | 132  | 71    | 785   |
| Actual weeks of sickness       | 0 | 2       | 26    | 18    | 0    | 0     | 34    | 0    | 13    | 93    |
| Expected weeks of sickness     | 0 | 1       | 5     | 5     | 6    | 9     | 22    | 30   | 28    | 106   |
| Actual claim rate              | 0 | ·074    | ·213  | ·186  | 0    | 0     | ·225  | 0    | ·183  |       |
| Actual weeks sickness/expected | — | 200·0   | 520·0 | 360·0 | —    | —     | 154·5 |      | 46·4  | 87·7  |
| Sickness period 104/all        |   |         |       |       |      |       |       |      |       |       |
| Exposed to risk                | 0 | 5       | 83    | 77    | 90   | 78    | 145   | 131  | 70    | 679   |
| Actual weeks of sickness       | 0 | 0       | 0     | 0     | 0    | 0     | 104   | 52   | 104   | 260   |
| Expected weeks of sickness     | 0 | 0       | 4     | 6     | 13   | 19    | 61    | 94   | 87    | 284   |
| Actual claim rate              | 0 | 0       | 0     | 0     | 0    | 0     | ·717  | ·397 | 1·486 |       |
| Actual weeks sickness/expected | — | —       | —     | —     | —    | —     | 170·5 | 55·3 | 119·5 | 91·5  |

*Individual P.H.I. policies (1975 experience)**All offices—including late notified claims***Table 8. Females—Deferred period 4 weeks**

| Age group                      | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | All ages |
|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| <b>Sickness period 4/9</b>     |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 9     | 161   | 377   | 299   | 282   | 258   | 206   | 149   | 54    | 1,795    |
| Actual weeks of sickness       | 0     | 18    | 40    | 36    | 61    | 53    | 62    | 35    | 9     | 314      |
| Expected weeks of sickness     | 1     | 23    | 64    | 58    | 63    | 72    | 70    | 64    | 30    | 445      |
| Actual claim rate              | 0     | ·112  | ·106  | ·120  | ·216  | ·205  | ·301  | ·235  | ·167  |          |
| Actual weeks sickness/expected | —     | 78·3  | 62·5  | 62·1  | 96·8  | 73·6  | 88·6  | 54·7  | 30·0  | 70·6     |
| <b>Sickness period 13/13</b>   |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 7     | 148   | 363   | 290   | 273   | 252   | 204   | 147   | 53    | 1,737    |
| Actual weeks of sickness       | 0     | 14    | 23    | 20    | 15    | 23    | 61    | 34    | 13    | 203      |
| Expected weeks of sickness     | 0     | 13    | 30    | 28    | 33    | 40    | 41    | 41    | 21    | 247      |
| Actual claim rate              | 0     | ·095  | ·063  | ·069  | ·055  | ·091  | ·299  | ·231  | ·245  |          |
| Actual weeks sickness/expected | —     | 107·7 | 76·7  | 71·4  | 45·5  | 57·5  | 148·8 | 82·9  | 61·9  | 82·2     |
| <b>Sickness period 26/26</b>   |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 5     | 128   | 341   | 274   | 260   | 244   | 197   | 146   | 53    | 1,648    |
| Actual weeks of sickness       | 0     | 0     | 23    | 0     | 20    | 38    | 16    | 12    | 28    | 137      |
| Expected weeks of sickness     | 0     | 6     | 20    | 18    | 23    | 31    | 33    | 34    | 21    | 186      |
| Actual claim rate              | 0     | 0     | ·067  | 0     | ·077  | ·156  | ·081  | ·082  | ·528  |          |
| Actual weeks sickness/expected | —     | —     | 115·0 | —     | 87·0  | 122·6 | 48·5  | 35·3  | 133·3 | 73·7     |



Table 8 (*continued*)

|                                |   |    |     |     |     |       |       |       |      |       |
|--------------------------------|---|----|-----|-----|-----|-------|-------|-------|------|-------|
| Sickness period 52/52          |   |    |     |     |     |       |       |       |      |       |
| Exposed to risk                | 4 | 92 | 298 | 244 | 237 | 230   | 185   | 141   | 50   | 1,481 |
| Actual weeks of sickness       | 0 | 0  | 0   | 0   | 0   | 36    | 22    | 45    | 0    | 103   |
| Expected weeks of sickness     | 0 | 2  | 12  | 13  | 16  | 24    | 26    | 29    | 19   | 141   |
| Actual claim rate              | 0 | 0  | 0   | 0   | 0   | ·157  | ·119  | ·319  | 0    |       |
| Actual weeks sickness/expected | — | —  | —   | —   | —   | 150·0 | 84·6  | 155·2 | —    | 73·0  |
| Sickness period 104/all        |   |    |     |     |     |       |       |       |      |       |
| Exposed to risk                | 1 | 44 | 206 | 192 | 204 | 208   | 163   | 135   | 48   | 1,201 |
| Actual weeks of sickness       | 0 | 0  | 0   | 0   | 0   | 0     | 134   | 7     | 15   | 156   |
| Expected weeks of sickness     | 0 | 1  | 10  | 15  | 30  | 54    | 65    | 93    | 59   | 327   |
| Actual claim rate              | 0 | 0  | 0   | 0   | 0   | 0     | ·822  | ·052  | ·313 |       |
| Actual weeks sickness/expected | — | —  | —   | —   | —   | —     | 206·2 | 7·5   | 25·4 | 47·7  |

*Individual P.H.I. policies (1975 experience)**All offices—including late notified claims*Table 9. *Females—Deferred period 13 weeks*

| Age group                      | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | All ages |
|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 13/13          |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 6     | 75    | 293   | 379   | 369   | 380   | 364   | 229   | 94    | 2,189    |
| Actual weeks of sickness       | 0     | 0     | 9     | 26    | 5     | 9     | 40    | 27    | 0     | 116      |
| Expected weeks of sickness     | 0     | 5     | 25    | 37    | 46    | 60    | 75    | 66    | 37    | 351      |
| Actual claim rate              | 0     | 0     | ·031  | ·069  | ·014  | ·024  | ·110  | ·118  | 0     |          |
| Actual weeks sickness/expected | —     | —     | 36·0  | 70·3  | 10·9  | 15·0  | 53·3  | 40·9  | —     | 33·0     |
| Sickness period 26/26          |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 5     | 61    | 270   | 356   | 351   | 369   | 354   | 226   | 93    | 2,085    |
| Actual weeks of sickness       | 0     | 0     | 0     | 22    | 0     | 20    | 36    | 44    | 0     | 122      |
| Expected weeks of sickness     | 0     | 3     | 16    | 25    | 32    | 46    | 60    | 56    | 35    | 273      |
| Actual claim rate              | 0     | 0     | 0     | ·062  | 0     | ·054  | ·102  | ·195  | 0     |          |
| Actual weeks sickness/expected | —     | —     | —     | 88·0  | —     | 43·5  | 60·0  | 78·6  | —     | 44·7     |
| Sickness period 52/52          |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 3     | 41    | 231   | 314   | 317   | 346   | 337   | 218   | 92    | 1,899    |
| Actual weeks of sickness       | 0     | 0     | 0     | 0     | 0     | 63    | 0     | 73    | 49    | 185      |
| Expected weeks of sickness     | 0     | 1     | 10    | 17    | 22    | 34    | 47    | 48    | 35    | 214      |
| Actual claim rate              | 0     | 0     | 0     | 0     | 0     | ·182  | 0     | ·335  | ·533  |          |
| Actual weeks sickness/expected | —     | —     | —     | —     | —     | 185·3 | —     | 152·1 | 140·0 | 86·4     |
| Sickness period 104/all        |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 0     | 20    | 164   | 246   | 255   | 297   | 307   | 206   | 88    | 1,583    |
| Actual weeks of sickness       | 0     | 0     | 0     | 0     | 0     | 22    | 208   | 52    | 107   | 389      |
| Expected weeks of sickness     | 0     | 0     | 9     | 21    | 39    | 77    | 126   | 146   | 108   | 526      |
| Actual claim rate              | 0     | 0     | 0     | 0     | 0     | ·074  | ·678  | ·252  | 1·216 |          |
| Actual weeks sickness/expected | —     | —     | —     | —     | —     | 28·6  | 165·1 | 35·6  | 99·1  | 74·0     |

*Individual P.H.I. policies (1975 experience)**All offices—including late notified claims*Table 10. *Females—Deferred period 26 weeks*

| Age group                      | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | All ages |
|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 26/26          |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 6     | 73    | 313   | 387   | 574   | 625   | 538   | 375   | 134   | 3,025    |
| Actual weeks of sickness       | 0     | 0     | 7     | 32    | 22    | 67    | 24    | 8     | 42    | 202      |
| Expected weeks of sickness     | 0     | 4     | 19    | 28    | 53    | 78    | 88    | 93    | 54    | 417      |
| Actual claim rate              | 0     | 0     | ·022  | ·083  | ·038  | ·107  | ·045  | ·021  | ·313  |          |
| Actual weeks sickness/expected | —     | —     | 36·8  | 114·3 | 41·5  | 85·9  | 27·3  | 8·6   | 77·8  | 48·4     |
| Sickness period 52/52          |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 4     | 55    | 265   | 338   | 522   | 578   | 518   | 362   | 134   | 2,776    |
| Actual weeks of sickness       | 0     | 0     | 0     | 73    | 37    | 14    | 35    | 61    | 12    | 232      |
| Expected weeks of sickness     | 0     | 1     | 11    | 18    | 35    | 58    | 72    | 80    | 52    | 327      |
| Actual claim rate              | 0     | 0     | 0     | ·216  | ·071  | ·024  | ·068  | ·169  | ·090  |          |
| Actual weeks sickness/expected | —     | —     | —     | 405·6 | 105·7 | 24·1  | 48·6  | 76·3  | 23·1  | 70·9     |
| Sickness period 104/all        |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 2     | 30    | 185   | 258   | 430   | 495   | 478   | 338   | 133   | 2,349    |
| Actual weeks of sickness       | 0     | 0     | 0     | 0     | 23    | 5     | 0     | 15    | 67    | 110      |
| Expected weeks of sickness     | 0     | 1     | 9     | 22    | 66    | 131   | 189   | 244   | 168   | 830      |
| Actual claim rate              | 0     | 0     | 0     | 0     | ·053  | ·010  | 0     | ·044  | ·504  |          |
| Actual weeks sickness/expected | —     | —     | —     | —     | 34·8  | 3·8   | —     | 6·1   | 39·9  | 13·3     |



*Individual P.H.I. policies (1975 experience)*

*All offices—including late notified claims*

Table 12. *Females—All deferred periods combined*

| Age group                      | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | All ages |
|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Sickness period 0/4            |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 0     | 62    | 159   | 118   | 112   | 89    | 161   | 134   | 73    | 908      |
| Actual weeks of sickness       | 0     | 1     | 44    | 19    | 53    | 31    | 76    | 36    | 29    | 289      |
| Expected weeks of sickness     | 0     | 30    | 73    | 56    | 55    | 46    | 90    | 82    | 50    | 482      |
| Actual claim rate              | 0     | ·016  | ·277  | ·161  | ·473  | ·348  | ·472  | ·269  | ·397  |          |
| Actual weeks sickness/expected | —     | 3·3   | 60·3  | 33·9  | 96·4  | 67·4  | 84·4  | 43·9  | 58·0  | 60·0     |
| Sickness period 4/9            |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 9     | 221   | 532   | 416   | 392   | 346   | 367   | 282   | 126   | 2,691    |
| Actual weeks of sickness       | 0     | 24    | 67    | 47    | 118   | 75    | 158   | 80    | 64    | 633      |
| Expected weeks of sickness     | 1     | 32    | 91    | 80    | 88    | 97    | 128   | 125   | 70    | 712      |
| Actual claim rate              | 0     | ·109  | ·126  | ·113  | ·301  | ·217  | ·431  | ·284  | ·508  |          |
| Actual weeks sickness/expected | —     | 75·0  | 73·6  | 58·8  | 134·1 | 77·3  | 123·4 | 64·0  | 91·4  | 88·9     |
| Sickness period 13/13          |       |       |       |       |       |       |       |       |       |          |
| Exposed to risk                | 14    | 276   | 803   | 780   | 751   | 719   | 724   | 509   | 220   | 4,796    |
| Actual weeks of sickness       | 0     | 27    | 58    | 56    | 46    | 61    | 134   | 63    | 56    | 501      |
| Expected weeks of sickness     | 0     | 22    | 68    | 75    | 91    | 114   | 150   | 144   | 87    | 751      |
| Actual claim rate              | 0     | ·098  | ·072  | ·072  | ·061  | ·085  | ·185  | ·124  | ·255  |          |
| Actual weeks sickness/expected | —     | 122·7 | 85·3  | 74·7  | 50·5  | 53·5  | 89·3  | 43·8  | 64·4  | 66·7     |

Table 12 (continued)

|                                |    |       |       |       |       |       |       |      |      |       |
|--------------------------------|----|-------|-------|-------|-------|-------|-------|------|------|-------|
| Sickness period 26/26          |    |       |       |       |       |       |       |      |      |       |
| Exposed to risk                | 16 | 305   | 1,062 | 1,124 | 1,292 | 1,325 | 1,247 | 878  | 351  | 7,600 |
| Actual weeks of sickness       | 0  | 26    | 63    | 80    | 46    | 166   | 153   | 65   | 99   | 698   |
| Expected weeks of sickness     | 0  | 15    | 65    | 80    | 120   | 166   | 208   | 215  | 140  | 1,009 |
| Actual claim rate              | 0  | ·085  | ·059  | ·071  | ·036  | ·125  | ·123  | ·074 | ·282 |       |
| Actual weeks sickness/expected | —  | 173·3 | 96·9  | 100·0 | 38·3  | 100·0 | 73·6  | 30·2 | 70·7 | 69·2  |
| Sickness period 52/52          |    |       |       |       |       |       |       |      |      |       |
| Exposed to risk                | 9  | 226   | 967   | 1,092 | 1,343 | 1,444 | 1,363 | 990  | 385  | 7,819 |
| Actual weeks of sickness       | 0  | 2     | 26    | 90    | 88    | 113   | 92    | 179  | 74   | 664   |
| Expected weeks of sickness     | 0  | 7     | 37    | 59    | 92    | 142   | 190   | 215  | 150  | 892   |
| Actual claim rate              | 0  | ·009  | ·027  | ·082  | ·066  | ·078  | ·067  | ·181 | ·192 |       |
| Actual weeks sickness/expected | —  | 28·6  | 70·3  | 152·5 | 95·7  | 79·6  | 48·4  | 83·3 | 49·3 | 74·4  |
| Sickness period 104/all        |    |       |       |       |       |       |       |      |      |       |
| Exposed to risk                | 2  | 105   | 670   | 847   | 1,109 | 1,254 | 1,246 | 927  | 371  | 6,531 |
| Actual weeks of sickness       | 0  | 0     | 0     | 0     | 23    | 27    | 446   | 126  | 292  | 914   |
| Expected weeks of sickness     | 0  | 3     | 33    | 72    | 171   | 330   | 502   | 644  | 469  | 2,244 |
| Actual claim rate              | 0  | 0     | 0     | 0     | ·021  | ·022  | ·358  | ·136 | ·787 |       |
| Actual weeks sickness/expected | —  | —     | —     | —     | 13·5  | 8·2   | 88·8  | 19·0 | 62·3 | 40·7  |

*Individual P.H.I. policies (1975 experience)**All offices—including late notified claims*Table 13. *Male claim inception rates per thousand exposed to risk*

| Age group                | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | All ages |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Deferred period 1 week   | 0     | 133   | 116   | 116   | 115   | 124   | 131   | 120   | 127   | 187   | 126      |
| Deferred period 4 weeks  | 18    | 15    | 16    | 17    | 21    | 28    | 26    | 34    | 37    | 67    | 23       |
| Deferred period 13 weeks | 0     | 4     | 3     | 2     | 4     | 6     | 7     | 7     | 13    | 18    | 5        |
| Deferred period 26 weeks | 0     | 1     | 0     | 1     | 1     | 0     | 2     | 3     | 5     | 7     | 1        |
| Deferred period 52 weeks | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 2     | 5     | 7     | 1        |

*Individual P.H.I. policies (1975 experience)*  
*All offices—including late notified claims*

Table 14. *Female claim inception rates per thousand exposed to risk*

| Age group                | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | All ages |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| Deferred period 1 week   | 0     | 65    | 176   | 119   | 295   | 202   | 224   | 127   | 151   | 177      |
| Deferred period 4 weeks  | 0     | 12    | 11    | 13    | 43    | 35    | 46    | 23    | 19    | 25       |
| Deferred period 13 weeks | 0     | 0     | 7     | 5     | 3     | 8     | 14    | 9     | 0     | 7        |
| Deferred period 26 weeks | 0     | 0     | 3     | 0     | 3     | 5     | 2     | 3     | 15    | 3        |
| Deferred period 52 weeks | 0     | 0     | 0     | 0     | 6     | 0     | 0     | 0     | 0     | 1        |



# CONTINUOUS MORTALITY INVESTIGATION REPORTS

## NUMBER 3

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