THE
REGISTRAR GENERAL'S

DECENNIAL SUPPLEMENT

ENGLAND & WALES
1961

LIFE TABLES

LONDON
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CORRECTIONS

Page 21 para 4,	line three	*for*	$x = x;$	*read*	$x = x_1$
	line four	*for*	No. 21	*read*	No. 12
Page 25 para 9,	first formula	*for*	9_{x-1}	*read*	q_{x-1}

General Register Office
November 1968

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LONDON
HER MAJESTY'S STATIONERY OFFICE
1968

The English Life Tables No. 12, together with associated additional tables and commentary, are contained in this volume which was prepared by Sir Herbert Tetley, K.B.E., C.B., the Government Actuary, at the invitation of the Registrar General for England and Wales.

The tables are based on the mortality experience in England and Wales during the years 1960, 1961 and 1962 and the present volume forms part of the Decennial Supplement 1961. It is generally in line with its predecessor, Decennial Supplement 1951, Life Tables No. 11. There are, however, some new features including an abridged Life Table for England and an improved method of estimating the population 'exposed to risk'.

The Registrar General wishes to place on record his appreciation of all the work which has been done to provide the accompanying valuable commentary and tables.

The Series of English Life Tables has continued for well over a century. The idea was conceived by Dr. William Farr, the first Medical Statistician at the General Register Office, who himself produced Numbers 1, 2 and 3 which were published between 1843 and 1864. The next three tables were also produced at the General Register Office. Number 4 was compiled by Dr. William Ogle and published in 1885 and Dr. John Tatham was responsible for Numbers 5 and 6 which appeared in 1895 and 1907 respectively. After the 1911 Census the Registrar General invited Mr. George King, a former Vice-President of the Institute of Actuaries, to prepare Tables 7 and 8 and these incorporated important advances in principles and methods. Subsequently the English Life Tables were prepared by the Government Actuary of the time at the invitation of the Registrar General. Thus Sir Alfred Watson, K.C.B., undertook the preparation of Tables 9 and 10 after the 1921 and 1931 censuses, and Table No. 11, which was based on the 1951 Census and formed part of the Decennial Supplement 1951, was the work of Sir George Maddex, K.B.E.

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REPORT ON LIFE TABLES BY THE GOVERNMENT ACTUARY

MICHAEL REED, ESQ., C.B.,
REGISTRAR GENERAL,
SOMERSET HOUSE,
W.C.2.

Sir,

In compliance with your request I have constructed Life Tables for males and females representative of the mortality experience of the population of England and Wales during the three years 1960, 1961 and 1962, the calculations being based on the deaths registered in those years and on the population enumerated at the 1961 Census. I have also examined the variations in mortality during the same three years according to marital condition and geographical area of residence.

2. The four previous sets of English Life Tables, Nos. 8, 9, 10 and 11 were based on the Censuses of 1911, 1921, 1931 and 1951 respectively and on the deaths in the three-year periods 1910 to 1912, 1920 to 1922, 1930 to 1932 and 1950 to 1952. On the present occasion, study of the data showed that in none of the three years 1960, 1961 or 1962 did the mortality experience differ very greatly from the general trend over the years 1956 to 1965 and thus the use of deaths in the period 1960 to 1962 produces rates of mortality representative of the general level around the date of the 1961 Census. There was accordingly no reason to depart from the customary three-year period.

The Construction of English Life Tables No. 12

3. **Calculation of crude death rates.** The 1961 Census was taken on the night of 23rd/24th April 1961. In my predecessor's report on the Life Tables for 1950 to 1952*, he explained how the 1951 Census population was adjusted to produce figures that could be regarded as representing the population at 30th June 1951. A similar procedure could have been adopted on this occasion but, as was pointed out in the earlier report, the ideal procedure is to divide the deaths by the number of years of exposure to risk during the period in which the deaths occurred, rather than by the population at the mid-point of the period. The 'exposed to risk' was therefore estimated as accurately as possible, using the enumerated Census population and the tabulations of registered deaths given in the *Registrar General's Statistical Reviews Part I*. The methods and formulae employed are described in Appendix I. Crude central rates of mortality (m_x) as shown in Appendix II were then obtained by dividing the 1960-62 deaths by the corresponding exposed to risk.

4. Consideration was given to the desirability of adjustments to the recorded figures of population and deaths to allow for mis-statements of age. Though it seems likely that the extent of these mis-statements is decreasing, there is little doubt that they still occur. For example, there appears to be a tendency at the Census to record ages ending in the digit 0 instead of the true age. Similarly, if the figures of deaths in 1960-62 given in Appendix II are examined, it will be found that there are considerable irregularities in the progression from age to age. Notable examples are the relatively small number of deaths recorded at ages 66 and 71 for men and at ages 61 and 66 for women compared with the numbers recorded at the adjoining ages; study of past statistics shows that this feature has persisted for very many years. It was, however, difficult to decide how the excess population at the ages ending in 0 should be distributed or what formula should be used to smooth the progression of deaths; it was therefore decided not to make adjustments at this stage but to use the graduation process referred to below to remove the irregularities from the crude mortality rates.

* *The Registrar General's Decennial Supplement, England and Wales*, 1951, *Life Tables* (1957)

5. **The Calculation of Graduated Rates of Mortality.** The crude rates of mortality given in Appendix II do not run smoothly from age to age. This is due not only to irregularities arising from the mis-statements of age mentioned in the previous paragraph, but also to random variations. The purpose of graduation is to replace the irregular progression by a series which, whilst preserving the general shape of the curve of mortality rates, proceeds smoothly throughout the range of ages covered. In constructing the English Life Tables No. 11, based on the 1951 Census, a departure was made from precedent in that the graduation at the adult ages was not carried out by King's process of osculatory interpolation between successive pivotal values. Instead, a mathematical formula was used consisting of a combination of a logistic curve with a 'normal' curve. Reasons were given in the report on those tables for preferring such a process to King's method and it was therefore decided that an attempt should be made to fit a similar mathematical formula on the present occasion if examination of the data suggested that this would be appropriate.

6. Pivotal values of m_x were accordingly calculated for ages 22, 27, 32, 37, etc., and the ratios m_{x+5}/m_x were examined. The results for women indicated that a similar formula to that used for the 1950-52 data was likely to be suitable and, by trial and error, constants for the formula were obtained that gave an excellent fit over the whole range of ages from 20 to the end of life. The results for men, however, showed considerable irregularity. It seemed probable that a mathematical formula giving a completely satisfactory fit would involve the use of a large number of constants, whereas a non-parametric method such as King's would produce a curve with a series of waves. It was finally decided to use the same type of formula as for 1950-52 with constants that gave a reasonable degree of fit for ages 27 and over, though the differences between crude and graduated rates are rather large at ages 35 to 45 because of the wave-cutting effect of the formula. Details of the constants used and comparisons of deaths actually recorded with those 'expected' on the basis of the graduated rates are given in Appendix III.

7. To complete the graduation, it was necessary to obtain rates for the younger ages. From ages 4 to 26 (men) and 4 to 19 (women) the rates of mortality are small, never being much in excess of 1 per 1,000, and it was found possible to produce smooth series of rates over these ranges for both sexes by minor adjustments of the crude rates. For both sexes the rates fall as age increases from 4 to about 11. For females they rise continually thereafter throughout life, but for males there is a maximum at age 20 followed by a minimum at age 26 before the rates begin to rise once more. This hump in the male curve seems to be due in the main to the high accident rate amongst youths and, as it seems a genuine feature of the experience, it was not considered appropriate to remove it in the course of graduation. Rates at ages 0 to 3 were obtained from the records of births and deaths in the years 1956 to 1962 rather than from the Census enumeration.

8. **English Life Tables No. 12.** The rates of mortality derived as explained in the foregoing paragraphs and Appendix III form the basis of the new tables, the English Life Tables No. 12. These life tables for males and females separately are given in full in Appendix IV. In accordance with precedent each has been based on a radix of 100,000 at age 0 and the rates of mortality have been given throughout to five places of decimals. The use of this number of decimal places at the older ages may give the appearance of a degree of precision which is not justifiable in view of the statistical margins of error inherent in the data. It seemed preferable, however, not to round off the rates but to retain the same number of decimal places throughout, thus preserving the smooth progression resulting from the use of a mathematical formula. This should prove an advantage if, as with previous English Life Tables, monetary tables are constructed from them.

9. The main purpose of the English Life Tables is historical; they are intended to show the general level of mortality in England and Wales at the time of a Census. With this in mind, the values of p_x and q_x, the probabilities that a person aged x will survive at least one year or will die within a year, are of necessity based on this occasion on the 1960-62 experience. This means that the l_x columns, showing 'survivors' of 100,000 at age 0, and the $\mathring{e}_x$ columns, of 'expectations of life', are somewhat artificial in conception and must be interpreted with care. The l_x columns could only be interpreted as showing the survivors of 100,000 children born in the period 1960-62 if the improbable assumption were made that the 1960-62 rates of mortality will remain unaltered throughout their life times, that is until at least the year 2070. The same applies to the expectations

of life; if, in line with past experience, rates of mortality decline in future, babies born in 1961 have an expectation of life greater than $\mathring{e}_0$ as shown by the English Life Tables No. 12, which represent a snapshot of the mortality experience of the community as a whole at a particular point of time, rather than an attempt to show the probable experience of a particular generation as it moves through all ages from birth to extreme old age.

10. A generation can be followed in this way by constructing cohort life tables and such tables have been produced for England and Wales by Case *et al.** By the nature of things, however, a cohort life table can be based on actual experience only for a generation born at least a century ago. For generations born more recently, the table has to cease at their present age unless mortality rates are forecast for future years by extrapolation from past trends. Such forecasts are made for the purpose of the projections of the population prepared annually in this Department†, but it would seem inappropriate to use forecast rates in tables prepared primarily as an historical record. For this particular purpose the present form of table is thought to be the most suitable, but the imperfections of this form as a measure of generation experience should not be forgotten by users of English Life Tables No. 12. The effect on expectations of life of using forecast mortality instead of current mortality is shown by the table below; in the calculations for this table the rates of improvement given in the *Economic Trends* article† are assumed to apply throughout the future lifetime of those born in 1960-62 or earlier.

Expectations of Life

Age in 1960-62	Males		Females	
	Using forecast mortality	By English Life Tables No. 12	Using forecast mortality	By English Life Tables No. 12
0	73·15	68·09	78·88	74·00
30	43·62	41·06	48·87	46·23
60	15·56	15·06	19·74	19·11

Comparison with earlier English Life Tables

11. A comparison of English Life Tables No. 12 with the four previous sets of English Life Tables, Nos. 8, 9, 10 and 11, will present a picture of changes in mortality over a period of half a century. Table A shows the rates of mortality (q_x) for each tenth age for males and females as given in each of these five sets of Tables and in Table B the changes that have occurred in the rates since 1911 are shown by expressing the rates from the four later tables as percentages of those from English Life Tables No. 8.

**The Chester Beatty Research Institute Serial Abridged Life Tables, England and Wales*, 1841-1960 (1962)

†See, for example, 'Projecting the population of the United Kingdom' (*Economic Trends* No. 139, May 1965, Central Statistical Office).

Table A

Rates of mortality (q_x)

Age x	Males					Females				
	E.L.T.8 (1910-12)	E.L.T.9 (1920-22)	E.L.T.10 (1930-32)	E.L.T.11 (1950-52)	E.L.T.12 (1960-62)	E.L.T.8 (1910-12)	E.L.T.9 (1920-22)	E.L.T.10 (1930-32)	E.L.T.11 (1950-52)	E.L.T.12 (1960-62)
0	·12044	·08996	·07186	·03266	·02449	·09767	·06942	·05455	·02510	·01896
10	·00193	·00181	·00146	·00052	·00039	·00196	·00180	·00134	·00035	·00024
20	·00348	·00349	·00316	·00129	·00119	·00295	·00306	·00268	·00083	·00044
30	·00478	·00434	·00340	·00157	·00115	·00411	·00392	·00319	·00127	·00075
40	·00811	·00688	·00562	·00290	·00235	·00660	·00532	·00440	·00227	·00180
50	·01482	·01179	·01128	·00850	·00728	·01140	·00915	·00816	·00524	·00439
60	·03042	·02561	·02415	·02369	·02287	·02310	·01897	·01770	·01271	·01088
70	·06470	·05997	·06035	·05651	·05566	·05259	·04646	·04451	·03532	·03104
80	·14299	·14002	·14500	·13629	·12747	·12419	·11766	·11858	·10466	·09108
90	·27395	·26752	·28614	·29255	·25593	·23826	·23852	·25061	·24146	·22128

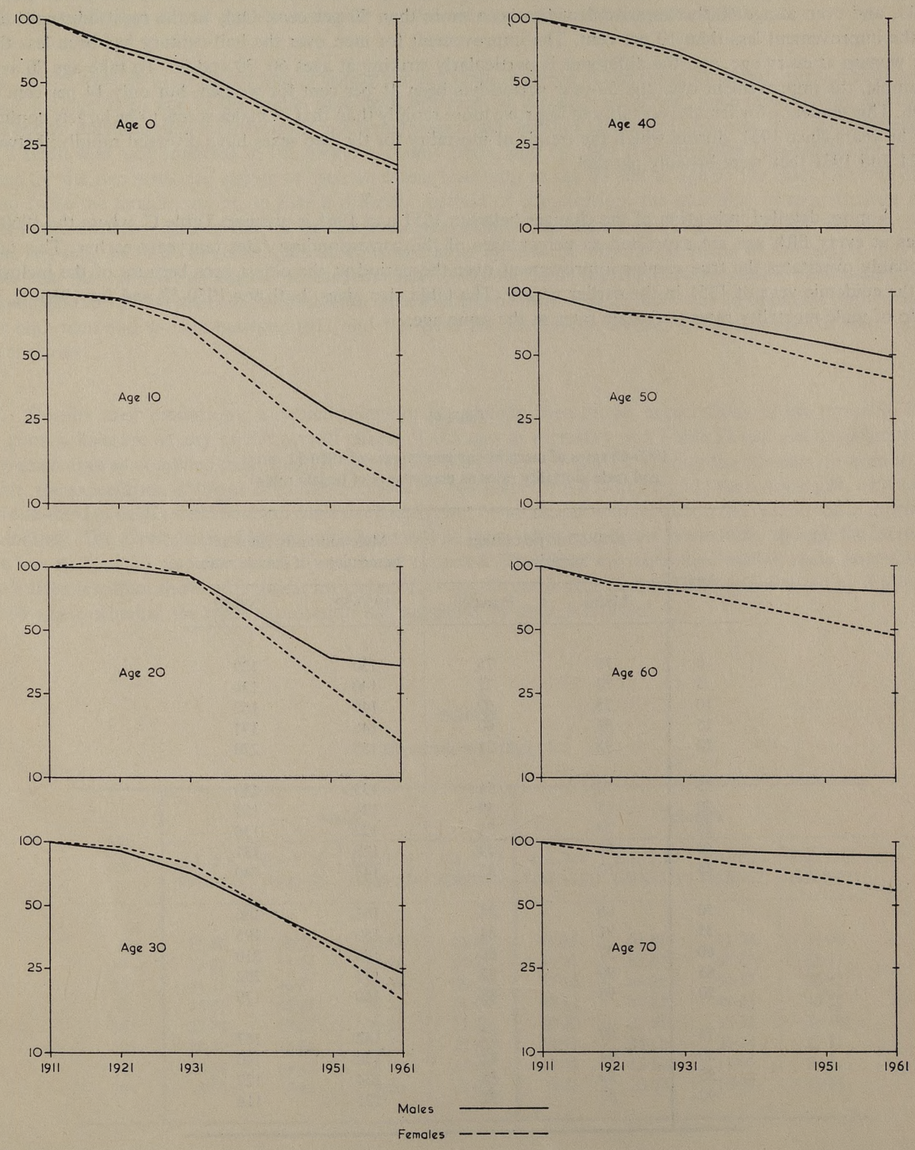
Table B

Rates of mortality expressed as percentages of English Life Table No. 8 rates

Age	Males					Females				
	E.L.T.8 (1910-12)	E.L.T.9 (1920-22)	E.L.T.10 (1930-32)	E.L.T.11 (1950-52)	E.L.T.12 (1960-62)	E.L.T.8 (1910-12)	E.L.T.9 (1920-22)	E.L.T.10 (1930-32)	E.L.T.11 (1950-52)	E.L.T.12 (1960-62)
0	100	75	60	27	20	100	71	56	26	19
10	100	94	76	27	20	100	92	68	18	12
20	100	100	91	37	34	100	104	91	28	15
30	100	91	71	33	24	100	95	78	31	18
40	100	85	69	36	29	100	81	67	34	27
50	100	80	76	57	49	100	80	72	46	39
60	100	84	79	78	75	100	82	77	55	47
70	100	93	93	87	86	100	88	85	67	59
80	100	98	101	95	89	100	95	95	84	73
90	100	98	104	107	93	100	100	105	101	93

12. At ages up to 70, the ratios in Table B, which are shown graphically in the accompanying diagram, give a broad picture of the secular trend of mortality over the 50-year period from 1911 to 1961. The rates at ages 80 and 90 should, however, be treated with some reserve, since they may be greatly affected by the incidence of epidemics or the severity of the winter weather, and even the average mortality for a three-year period may depart considerably from the general trend. Moreover, it is at the older ages that the effect of age mis-statements is likely to be most pronounced, whilst at age 90 the data are relatively scanty and the graduation method employed may have an undue effect.

Rates of mortality expressed as percentages of 1911 rates (logarithmic scale)



13. It will be seen that, without exception, the mortality rates for 1960-62 shown in English Life Tables No. 12 are lower than those for 1910-12. For both men and women the percentage improvement decreased with age, the only exceptions being male mortality at age 20, where improvement has been relatively less than at surrounding ages, mainly because of the continuing high level of accidental deaths among young men, and female infantile mortality, where the improvement, though striking, has been relatively less than at ages 10, 20 and 30. At all ages up to and including 30, female mortality in 1961 was less than one-fifth of the level of 1911, and even at age 60 the improvement has been more than 50 per cent. Only at the most advanced ages is the improvement less than 10 per cent. The improvement for men over the half-century has been less than for women at every age, and the difference is particularly striking at ages 60, 70 and 80. To take age 70 as an example, the improvement over the 50-year period has been 41 per cent for women, but only 14 per cent for men. This tendency for female mortality to improve more rapidly than that of males seems to be largely confined to the years since 1931, during which the trends of mortality for the two sexes have diverged rapidly; between 1911 and 1931 they were broadly parallel.

14. A more detailed indication of the changes between 1951 and 1961 is given in Table C, where the 1960-62 rates at every fifth age are expressed as percentages of the corresponding rates ten years earlier. This table probably overstates the true secular improvement over the period at the oldest ages because of the inclusion of the epidemic year of 1951 in the earlier period. The table also gives, both for 1950-52 and for 1960-62, the ratio of male mortality rates to female rates at the same age.

Table C

1960-62 rates of mortality as percentages of 1950-52 rates and male mortality rates as percentages of female rates

Age	1960-62 as percentage of 1950-52		Male mortality rates as percentages of female rates	
	Males	Females	1950-52	1960-62
0	75	76	130	129
5	70	72	140	136
10	75	69	149	162
15	81	60	146	197
20	92	53	155	270
25	70	51	133	183
30	73	59	124	153
35	79	70	122	136
40	81	79	128	131
45	82	83	143	140
50	86	84	162	166
55	91	84	180	195
60	97	86	186	210
65	99	87	178	202
70	98	88	160	179
75	97	87	142	157
80	94	87	130	140
85	90	88	124	127
90	87	92	121	116

15. At all ages and for both sexes, mortality rates improved between 1951 and 1961, though the decline was extremely small for males over the age range from 60 to 75. Infantile mortality rates, which were halved in the twenty years from 1931 to 1951, were reduced by a further one-quarter in the subsequent decade and there were further substantial improvements for children; for girls aged 10, the annual rate is less than 1 in 4,000. Between ages 15 and 30, rates of mortality for young women have been reduced by between 40 and 50 per cent during a single decade, but the improvement for young men has been much less, particularly around age 20, with the result that at that age the male rate in 1961 was more than $2\frac{1}{2}$ times the female rate.

16. From ages 35 to 50 improvement during the ten years has been of the order of 20 per cent for both sexes, but from age 55 to age 75 the trends have been different; as already mentioned, male mortality in this range has shown only marginal improvement, but female rates have declined by about 13 per cent. This is characteristic of a trend that was apparent in the previous twenty years, and by 1961 the difference between the mortality rates for the two sexes had grown to such an extent that both at age 60 and at age 65 the male rate was more than twice the female rate or, to take a different method of comparision, the mortality of men at these ages was approximately equal to that of women seven years older. The male rate at age 60 in 1961 was only 5 per cent less than in 1931. In general, an analysis of deaths by cause is outside the scope of this report, but it is clear that the marked increases in deaths from arteriosclerotic heart disease and lung cancer have been largely responsible for the slowness of the decline in male mortality. Above age 75 there was an apparent improvement for both men and women between 1951 and 1961, but for the reasons already given this may to some extent be spurious.

17. Despite their limitations, to which reference has already been made, expectations of life probably form as good a measure as any of the overall effects of changes in mortality and Table D sets out expectations at specimen ages as compiled from English Life Tables Nos. 8, 10, 11 and 12. During the 50 years covered by the table, the expectation of life at birth has increased by $16\frac{1}{2}$ years for a boy and by $18\frac{3}{4}$ years for a girl, or roughly by one-third in each case. These increases are largely, but by no means wholly, due to the reductions in mortality in infancy. The expectation of life has also increased at every other age shown in the table, though the increases are less spectacular than at age 0. As might be expected from what has been said earlier, male expectations have risen less than those of females; for example, at age 60 the female expectation has increased by 3·63 years in 50 years, whereas the male expectation has increased by only 1·28 years.

Table D

Expectations of life ($\mathring{e}_x$)

Age x	Males				Females			
	E.L.T.8 (1910-12)	E.L.T.10 (1930-32)	E.L.T.11 (1950-52)	E.L.T.12 (1960-62)	E.L.T.8 (1910-12)	E.L.T.10 (1930-32)	E.L.T.11 (1950-52)	E.L.T.12 (1960-62)
0	51·50	58·74	66·42	68·09	55·35	62·88	71·54	74·00
10	53·08	55·79	59·24	60·21	55·91	58·87	63·87	65·77
20	44·21	46·81	49·64	50·57	47·10	49·88	54·17	55·95
30	35·81	38·21	40·27	41·06	38·54	41·22	44·68	46·23
40	27·74	29·62	30·98	31·62	30·30	32·55	35·32	36·69
50	20·29	21·60	22·23	22·68	22·51	24·18	26·34	27·57
60	13·78	14·43	14·79	15·06	15·48	16·50	18·07	19·11
70	8·53	8·62	9·00	9·29	9·58	10·02	10·97	11·78

18. The gain in expectation of life at birth during the 1951-61 decade has been 1·67 years for a boy and 2·46 years for a girl, the 1961 expectations being 68 years and 74 years respectively. At other ages the increase for men has been less than one year and is little over a quarter of a year at ages 60 and 70. Women, on the other hand, have had a gain of between 1 and 2 years at all ages from 10 to 60 and of nearly a year at age 70. In 1961, the female expectation of life at age 60 was 19·11 years, equivalent to that of a man aged between 54 and 55. If one compares the 1961 expectations for the two sexes at the National Insurance pensionable ages of 65 (men) and 60 (women), the figures are 11·95 years for a man and 19·11 years for a woman.

Mortality Rates according to Marital Condition

19. The population enumerated at the 1961 Census has been tabulated according to marital condition and the deaths registered in 1960, 1961 and 1962 have been similarly tabulated. Any analysis based on these statistics depends, of course, on the reliability of the statements of marital condition in the Census schedules and the death registers, but there is no reason to suppose that mis-statements are frequent enough to vitiate the conclusions that can be drawn from a comparison of mortality rates according to marital condition derived from these sources.

20. One particular problem arises from registrations of deaths which do not record the marital condition. For women, this problem is negligible; the marital condition at death was recorded for 999 out of every 1,000 deaths registered in 1960-62. For men, however, the deaths for which no marital condition was stated are more numerous, and averaged 1·8 per cent of all male deaths during the three-year period. Though this percentage is less than one-half of the corresponding figure for 1950-52, it is not insignificant; this is particularly true at the younger ages where the proportion of such deaths rises to 16·4 per cent in the 20-24 age group and 12·1 per cent in the 25-29 age group. In the analysis described below the 'unstated' cases have been allotted rateably to the various marital conditions, but clearly the results for men at the younger ages must be regarded with some reserve.

21. The pivotal values of the mortality rates at ages 22, 27, 32 etc. for all men, for single men (*i.e.* bachelors), for married men and for widowers and divorced men were calculated from the 1961 Census population and the 1960-62 deaths. These rates are given in Table E and similar rates for women are shown in Table F. At the younger ages the number of widowers and divorced men, and of deaths amongst them, are so small that the rates at these ages are subject to considerable margins of statistical error. It should be noted that the pivotal values given for all men and for all women do not agree exactly with the graduated rates given in English Life Table No. 12, nor do they agree precisely with the pivotal values given in Appendix III on which the graduated rates were based; the differences are due to the use of the unadjusted Census population as a denominator in this section of the report, whereas in Appendix III the population used was the Census population adjusted to obtain the 'exposed to risk' (see Appendix I).

Table E

Rates of mortality per thousand ($10^3 q_x$) for men according to marital condition

Age x	All men	Single men	Married men	Widowers and divorced men
22	1·1	1·3	·7	
27	1·0	1·6	·8	
32	1·2	2·2	1·0	2·5
37	1·8	3·2	1·6	3·4
42	3·0	5·2	2·7	4·8
47	5·1	7·8	4·8	8·6
52	9·1	12	8·6	14
57	17	21	16	24
62	28	32	27	39
67	43	46	41	56
72	66	67	62	81
77	101	99	93	117
82	149	144	135	166
87	220	203	195	236

Table F

Rates of mortality per thousand ($10^3 q_x$) for women according to marital condition

Age x	All women	Single women	Married women	Widows and divorced women
22	·5	·6	·4	
27	·6	1·1	·5	
32	·9	1·6	·8	1·3
37	1·3	2·2	1·2	1·7
42	2·2	3·4	2·0	2·9
47	3·4	4·7	3·2	4·2
52	5·3	6·5	5·0	6·1
57	8·1	9·1	7·7	9·2
62	13	14	13	15
67	22	22	21	24
72	39	38	36	41
77	67	65	62	70
82	112	109	101	114
87	179	177	148	182

22. Turning first to the experience of women, it appears from Table F that at every age the mortality of married women is lighter than that of either spinsters or widows and divorced women. At ages up to 52 spinsters have the heaviest rates, but at older ages their rates are slightly less than those of the widowed and divorced. This is brought out in Table G which shows the rates for the single and for the widowed and divorced as percentages of those for married persons. It will be seen that the rates for spinsters are more than twice those of married women at ages 27 and 32 but that the excess declines thereafter and is less than 10 per cent at ages over 65. For widows and divorced women the excess is also greatest at the younger ages, but it remains between 10 and 15 per cent at the older ages.

Table G

Mortality rates for single and for widowed and divorced as percentages of those for married — 1960-62

Age	Men		Women	
	Rates as a percentage of those for married men		Rates as a percentage of those for married women	
	Single men	Widowers and divorced men	Single women	Widows and divorced women
22	185		166	
27	204		208	
32	219	256	205	165
37	201	214	181	138
42	195	179	175	148
47	163	180	147	132
52	144	159	131	123
57	134	154	118	119
62	119	145	111	116
67	111	136	106	113
72	108	129	107	114
77	107	126	105	114
82	107	123	108	113

Table H

Rates of mortality for each marital condition as percentages of 1950-52 rates

Age	Men			Women		
	Single men	Married men	Widowers and divorced men	Single women	Married women	Widows and divorced women
22	87	87		58	53	
27	70	74		61	52	
32	72	70	114	70	62	71
37	79	83	121	80	76	78
42	91	86	102	95	83	91
47	88	83	102	90	82	91
52	88	84	93	91	84	87
57	93	94	101	87	84	87
62	94	98	106	94	85	89
67	92	99	107	91	85	88
72	94	99	105	92	85	89
77	91	96	100	89	85	87
82	88	90	94	89	89	87

23. The 1960-62 rates are compared with the 1950-52 rates in Table H. At every age and for each marital condition the mortality rate for women fell during the decade, but throughout life the improvement has been greater for married women than for either the single or the widowed and divorced. Thus the differential between the mortality of married and other women has been widening. So far as younger women are concerned this is probably, in part at least, a reflection of the continued fall in the proportion of spinsters at these ages since 1951, as shown by the following table:

Percentages of women who were single

Age Group	1951 Census	1961 Census
20-24	52	42
25-29	22	16
30-34	15	11
35-39	13	10
40-44	14	10

24. Since those women who marry are likely to be in better health, on average, than those who remain unmarried, it is to be expected that amongst spinsters there will be a higher proportion of women with impairments of health than amongst married women, and thus that spinsters' mortality will be heavier. The proportion with impairments is likely to rise still further as the proportion remaining unmarried decreases, with a consequent worsening of spinsters' mortality relative to that of married women. The results obtained in 1951 and in the present report bear out this expectation.

25. Tables G and H also contain similar comparisons for men. Caution is necessary in interpreting the results at the younger ages, as has already been mentioned, because of the proportion of deaths for which the marital condition is not recorded. This applies particularly to the comparison with 1950-52, when the proportions of deaths with no marital condition stated were larger than in 1960-62. There seems little doubt, however, that married men have lighter mortality than either bachelors or widowers and divorced men. For bachelors, the excess over married men's mortality is of the same order as that of spinsters over married women, but the excess mortality of widowers is greater than that of widows. At almost every age the mortality of widowers is greater than that of bachelors.

26. It would appear that between 1950-52 and 1960-62 the degree of improvement in mortality rates has been about the same for bachelors and married men. For widowers and divorced men on the other hand, it seems that mortality rates worsened during the decade.

Mortality in different Geographical Areas

27. In the report on English Life Tables No. 11 an analysis was made of the differences between rates of mortality in various geographical areas. For this purpose the areas adopted were 'standard regions' as they were constituted at the time of the 1951 Census. Five of the regions were sub-divided to show separate figures for six conurbations — the Tyneside, West Yorkshire, South East Lancashire, Merseyside and West Midlands conurbations and Greater London — and for the remainder of the region, whilst Wales (including Monmouthshire) was divided into Wales I (South East) and Wales II (Remainder). There were no major changes in the constitution of the various standard regions and conurbations between 1950-52 and 1960-62 and the same areas have been used for the present analysis so that comparison with the 1950-52 results can readily be made. The constitution of each region is given in the *Registrar General's Statistical Review* for 1961 and in the various 1961 Census volumes. Table J shows the proportional distribution of the 1961 Census population over the various regions and conurbations.

Table J

Population of each region and conurbation as a percentage of that of England and Wales — 1961 Census

Region	Population as a percentage of that of England and Wales	
	Males	Females
NORTHERN	7·1	7·0
Tyneside Conurbation	1·8	1·9
Remainder	5·3	5·1
EAST AND WEST RIDINGS	9·1	9·0
West Yorkshire Conurbation	3·7	3·7
Remainder	5·4	5·3
NORTH WESTERN	14·1	14·4
South East Lancashire Conurbation	5·2	5·3
Merseyside Conurbation	3·0	3·1
Remainder	5·9	6·0
NORTH MIDLAND	8·0	7·7
MIDLAND	10·5	10·1
West Midlands Conurbation	5·2	5·0
Remainder	5·3	5·1
EASTERN	8·2	8·0
LONDON AND SOUTH EASTERN	23·6	24·6
Greater London	17·5	18·0
Remainder	6·1	6·6
SOUTHERN	6·2	6·1
SOUTH WESTERN	7·4	7·4
WALES (including Monmouthshire)	5·8	5·7
Wales I (South East)	4·2	4·1
Wales II (Remainder)	1·6	1·6
ENGLAND AND WALES	100·0	100·0

28. In the previous report, mortality comparisons were also made for (a) conurbations, (b) three sets of urban areas according to population size, and (c) rural areas. On the present occasion details of the deaths by five-year age groups were not readily available for these 'density aggregates' as constituted at the date of the 1961 Census because of boundary changes and the fact that deaths in 1960 in urban areas had been allocated according to the size of the population at the 1951 Census rather than at the 1961 Census. A disproportionate amount of work would have been needed to produce the necessary tabulations of the deaths and mortality comparisons have therefore not been provided for the 'density aggregates' in this report.

29. For each of the areas in Table J the data available consisted of the enumerated Census population and of tabulations, by 5-year age groups, of the deaths registered in 1960, 1961 and 1962; these tabulations were specially compiled for this purpose by the General Register Office. The deaths, as for 1950-52, were classified according to the place of usual residence of the deceased but, also as for 1950-52, no adjustment was made to the enumerated Census population to allow for the fact that some persons were enumerated at a place other than their usual residence. The available evidence suggested that the errors introduced in this way were negligible.

30. From these statistics, mortality rates (q_x) for 1960-62 were calculated for each sex at ages 0, 2, 7 and at quinary ages thereafter up to age 87; these rates are given in Appendix V, Table 1, together with the corresponding rates for the whole of England and Wales. The method used was first to calculate, from the recorded deaths and the enumerated Census population, pivotal values of q_x for each area. These values were then adjusted to allow for the difference between the 1961 Census population and the 1960-62 'exposed to risk'. The England and Wales rates in the table, being the ungraduated pivotal values, do not agree precisely with the graduated values of q_x in English Life Tables No. 12.

31. An alternative and, in some respects, a more convenient method of comparison has also been used. Central death rates for quinary age groups 0-4, 5-9, etc., were computed for England and Wales by dividing the average annual deaths for 1960-62 in each age group by the corresponding Census population and these rates were multiplied by the enumerated population of each area in the same age group to obtain the annual number of deaths that would have occurred had the experience of each area been identical with the national average. The ratios of the actual deaths to these 'expected' deaths were then calculated and are set out in Appendix V, Table 2, together with the ratios for four broad age groups, 0-19, 20-49, 50-69 and 70 and over, and for all ages together.

32. The results for all ages together are summarized in Table K. These ratios give, of course, greater weight to the older ages, at which the majority of deaths occur, than to the younger ages, but they are probably as good an indication of the relative level of mortality in various areas as can be shown by a single index. As the table shows, mortality varies considerably with area; the reasons for this are complex and it seems probable that a variety of interacting factors, geographical, environmental, industrial, social and economic, are involved.

Table K

Ratio of actual deaths in areas to deaths expected on the basis of the experience of the whole of England and Wales

Region	Males		Females	
	1960-62	1950-52	1960-62	1950-52
NORTHERN	1·076	1·093	1·106	1·149
Tyneside Conurbation	1·138	1·168	1·090	1·183
Remainder	1·055	1·067	1·112	1·137
EAST AND WEST RIDINGS	1·076	1·078	1·085	1·106
West Yorkshire Conurbation	1·146	1·141	1·125	1·157
Remainder	1·029	1·034	1·053	1·064
NORTH WESTERN	1·145	1·144	1·150	1·168
South East Lancashire Conurbation	1·183	1·179	1·190	1·204
Merseyside Conurbation	1·175	1·214	1·110	1·154
Remainder	1·103	1·086	1·135	1·142
NORTH MIDLAND	·962	·943	1·001	·998
MIDLAND	1·037	1·032	1·044	1·035
West Midlands Conurbation	1·076	1·086	1·049	1·054
Remainder	1·002	·984	1·040	1·016
EASTERN	·877	·859	·917	·891
LONDON AND SOUTH EASTERN	·944	·948	·914	·896
Greater London	·969	·978	·928	·914
Remainder	·888	·868	·886	·852
SOUTHERN	·905	·886	·895	·880
SOUTH WESTERN	·917	·918	·941	·930
WALES (including Monmouthshire)	1·085	1·085	1·063	1·105
Wales I (South East)	1·124	1·120	1·095	1·132
Wales II (Remainder)	·999	1·007	1·001	1·054

33. From Table K it will be seen that the regional pattern of mortality changed very little in the decade between the 1951 and 1961 Censuses, though there were some small indications of a decrease in the differences between regions. As in 1950-52, mortality in 1960-62 was heaviest in the north and west and lightest in the south and east. For both sexes, the heaviest mortality was in the North Western region, with an excess of actual over expected deaths of about 15 per cent. Mortality was also heavy in the Northern and the East and West Ridings regions and in Wales, with a smaller excess of actual deaths in the Midland region. Within these regions, particularly heavy male mortality was experienced in the conurbations and in South East Wales. In each of the conurbations mortality was heavier than in the remainder of the surrounding region, the heaviest rates being in the South East Lancashire and Merseyside conurbations with an excess of about 18 per cent over

the national average. For females, the pattern is less clear cut. Mortality was heavier than for the region as a whole in the South East Lancashire, West Yorkshire and West Midlands conurbations, though in the latter the difference was small, but in the Tyneside and Merseyside conurbations female mortality was lighter than in the remainder of the region. The heaviest female mortality was in the South East Lancashire conurbation, where it was 19 per cent above the national average.

34. The areas of lightest mortality in 1960-62 were in the south and east of England; for both sexes the Eastern, London and South Eastern, Southern and South Western regions all experienced mortality rates well below those for England and Wales as a whole. For men, the lowest mortality rates were in the Eastern region, with actual deaths 12 per cent less than expected, but for women the rates in that region were heavier than those in the Southern region (10 per cent below the national average) and also heavier than those in the South Eastern region (excluding Greater London) where actual deaths were 11 per cent less than expected. Though mortality in Greater London was heavier than in the remainder of the South Eastern region it was very much lighter than in the other five conurbations. Whereas those conurbations had, on average, mortality rates heavier by 14 per cent for males and 12 per cent for females than the national average, the Greater London rates were 3 per cent *less* for males and 7 per cent *less* for females than those for the whole of England and Wales.

35. The range of regional differences may be gauged by comparing the rates in the area with the heaviest mortality with those in the area with the most favourable experience. For men, mortality in the South East Lancashire conurbation was 35 per cent heavier than in the Eastern region. For women, the range is almost exactly the same, the rates in the South East Lancashire conurbation being 34 per cent heavier than those in the South Eastern region excluding Greater London.

36. The preceding paragraphs have dealt with the mortality of the various areas taking all ages together, but study of the tables in Appendix V will show that the general pattern is much the same for each age group when allowance is made for the random fluctuations that may arise in some age groups, particularly at the younger ages, through the small number of deaths. Some interesting features do, however, emerge from a study of the rates of mortality in the first year of life given in Table V.1. In 1950-52, it appeared that, contrary to the experience at the older ages, infant mortality in the conurbations was very little different from that of the regions in which they were situated. This is not the experience of 1960-62; with two exceptions, the conurbations had heavier infant mortality for both boys and girls than the surrounding regions. The exceptions were for boys in the West Midlands conurbation, where the rate was the same as for the remainder of the Midland region, and for girls in the Tyneside conurbation, with a rate 10 per cent less than for the rest of the Northern region. This last result is surprising, since for boys the rate in the Tyneside conurbation was 5 per cent higher than in the remainder of the region; presumably the difference in the experience for the two sexes must to some extent be due to chance fluctuations. The general pattern of infant mortality over the country is very similar to that for all ages combined, with the rates declining as one moves southwards and eastwards. For England and Wales the rates per 1,000 live births are 24·5 for boys and 19·0 for girls. The Merseyside conurbation has the heaviest rates for both boys (30·3) and girls (24·3) and the Eastern region the lightest rates (20·6 and 15·8). Thus the heaviest rates are almost 50 per cent more than those in the most favoured areas.

37. It is of interest to compare the mortality of Wales with that of England and in Table L the rates for Wales are expressed as percentages of the English rates. These percentages do not form a smooth progression from age to age because the number of deaths in Wales in some age groups was so small that fluctuations due to chance may be large, but it will be seen that at almost all ages and for both sexes mortality rates in Wales are higher than those in England. The percentage excess, taking all ages together, is about the same as in 1950-52 for males, although for females the excess appears to be smaller than it was ten years earlier. For men, the excess is greatest over the age range from 20 to 45; for females, it is greatest between the ages of 10 and 35.

Table L

Rates of mortality for Wales as percentages of those for England, 1960-62

Age	Males	Females	Age	Males	Females
0	115	115	42	126	105
2	103	100	47	110	109
7	117	100	52	110	108
12	108	121	57	111	108
17	104	122	62	108	107
22	121	123	67	113	107
27	121	98	72	109	107
32	113	124	77	106	107
37	120	109	82	104	106

38. Abridged life tables for England and for Wales have been prepared (Appendix V, Tables 3 and 4). The methods employed in their construction were the same as those described in Appendix III of the report on the 1950-52 Life Tables, as tests showed that they were still appropriate. An abridged life table has also been prepared for Greater London (Appendix V, Table 5). The expectations of life derived from these abridged life tables are compared in Table M with those on the basis of the mortality of the whole of England and Wales.

Table M

Expectations of Life ($\mathring{e}_x$), 1960-62

Age x	England and Wales	England	Wales	Greater London
		Males		
0	68·1	68·2	66·8	68·7
10	60·2	60·3	59·2	60·6
20	50·6	50·7	49·6	51·0
30	41·1	41·2	40·2	41·4
40	31·6	31·7	30·8	32·0
50	22·7	22·7	21·9	23·0
60	15·1	15·1	14·5	15·2
70	9·3	9·3	8·9	9·4
80	5·2	5·3	5·1	5·4
		Females		
0	74·0	74·1	73·2	75·0
10	65·8	65·9	65·1	66·6
20	56·0	56·0	55·3	56·7
30	46·2	46·3	45·6	47·0
40	36·7	36·8	36·1	37·5
50	27·6	27·6	27·1	28·3
60	19·1	19·2	18·7	19·8
70	11·8	11·8	11·4	12·3
80	6·4	6·4	6·2	6·8

39. Expectations of life in Wales are less than those in England; at age 0 the difference is 1·4 years for boys and 0·9 years for girls (compared with 1·8 and 1·9 years respectively in 1950-52); thereafter the difference decreases as age advances, but for men it is still 1 year at age 35. For Greater London, expectations of life are greater than in England and Wales as a whole, the excess at age 0 being 0·6 years for boys and 1·0 years for girls (0·9 and 1·5 years respectively in 1950-52). The excess persists throughout life, though for men it is very small at ages over 60.

I am, Sir,
Your obedient Servant,
HERBERT TETLEY

Government Actuary's Department,
London, S.W.1.
16th November, 1967

Appendix I. Calculation of the 'Exposed to Risk' for the years 1960-62

1. The Census was taken on the night of 23rd/24th April 1961, or ·310 years after the beginning of 1961. If one considers the enumerated population at age x last birthday, say P_x then, on the assumption of an even spread of birthdays over the year, $\cdot 31P_x$ were aged between x—1·31 and x—1 on 1st January 1960 and $\cdot 69P_x$ were aged between x—1 and x—·31 on that date. Ignoring mortality and migration, each person comprised in the first group would on average have been exposed to risk in the period 1960-62 for the following periods:

At age x—2 last birthday:	·155 years (*i.e.* $\frac{1}{2}$ of ·31)
At age x—1 last birthday:	1 year
At age x last birthday:	1 year
At age x+1 last birthday:	·845 years (*i.e.* the average of durations ranging from ·69 to 1)

This is a total of 3 years, as it clearly should be.

Similarly, the second group would on average have been exposed for the following periods:

At age x—1 last birthday:	·655 years (*i.e.* the average of durations ranging from 1 to ·31)
At age x last birthday:	1 year
At age x+1 last birthday:	1 year
At age x+2 last birthday:	·345 years (*i.e.* $\frac{1}{2}$ of ·69)

2. Thus the enumerated population P_x were exposed to risk for the following periods in years:

At age x—2 last birthday:	$\cdot 04805P_x$ (·31 x ·155)
At age x—1 last birthday:	$\cdot 76195P_x$ (·31 + ·69 x ·655)
At age x last birthday:	$1 \cdot 00000P_x$ (·31 + ·69)
At age x+1 last birthday:	$\cdot 95195P_x$ (·31 x ·845 + ·69)
At age x+2 last birthday:	$\cdot 23805P_x$ (·69 x ·345)
	$3 \cdot 00000P_x$

It follows from this that the exposed to risk for 1960-62 at age x last birthday, ignoring deaths and migration, is:

$$\cdot 04805P_{x+2} + \cdot 76195P_{x+1} + P_x + \cdot 95195P_{x-1} + \cdot 23805P_{x-2} = A_x \text{ say}$$

3. A_x is not the true exposed to risk, because it assumes that all those enumerated in the Census formed part of the population for the whole of the three years 1960-62 and that no other persons contributed to the exposed to risk. An addition has to be made for those who died between 1st January 1960 and the Census date, since they were exposed to risk up to the date of death, but are not part of the Census population; on the other hand, a deduction has to be made for those enumerated at the Census but who died before the end of 1962 and therefore did not contribute to the exposed to risk for the full three years.

4. The method of adjusting for the deaths in the period 1960-62 may be illustrated by reference to the deaths in 1960. Of the deaths in that year at age x last birthday, some were aged x—1 and some were aged x last birthday on 1st January 1960. Of deaths at time t years after the beginning of the year (when t is less than 1), the proportion aged x last birthday on 1st January may be taken as 1—t and for each such death the addition to the exposed to risk is t years all at age x last birthday. Similarly, the proportion aged x—1 on 1st January would be t, the ages at that date ranging from x—t to x; thus, of the additional t years of exposure for such deaths, $\frac{1}{2}t$, on average, relates to age x—1 and $\frac{1}{2}t$ to age x. The additional exposure per death at age x last birthday in 1960 is therefore:

At age x—1:	$\int_0^1 \frac{1}{2}t^2\,dt = \frac{1}{6}$ years
At age x:	$\int_0^1 t(1-t)dt + \int_0^1 \frac{1}{2}t^2 dt = \frac{1}{3}$ years

Thus if the deaths in 1960 at age x are θ_x^{60}, the adjustment to the exposed to risk at age x for deaths in 1960 is $\frac{1}{6}\theta_{x+1}^{60} + \frac{1}{3}\theta_x^{60}$

5. Similar methods applied to the deaths in other years, led to the following formula for the adjustment to A_x to obtain the exposed to risk:

$$\tfrac{1}{6}\theta^{60}_{x+1} + \tfrac{1}{3}\theta^{60}_{x} + \cdot 016\theta^{61a}_{x+2} + \cdot 639\theta^{61a}_{x+1} + \tfrac{1}{2}\theta^{61a}_{x} - \tfrac{1}{2}\theta^{61b}_{x} - \cdot 766\theta^{61b}_{x-1} - \cdot 079\theta^{61b}_{x-2} - \tfrac{1}{3}\theta^{62}_{x} - \tfrac{1}{6}\theta^{62}_{x-1}$$

In this formula θ^{61a}_{x} and θ^{61b}_{x} are respectively the deaths at age x in 1961 before and after the Census date. In dividing the 1961 deaths between those included in θ^{61a}_{x} and θ^{61b}_{x}, recourse was had to the quarterly tabulations of deaths: on the basis of the monthly totals of deaths at all ages which are also available it was assumed that 28 per cent of deaths in the second quarter of 1961 occurred before the Census date.

6. In theory, there should be a further adjustment for migration, but the net migration in any year is so much smaller than the number of deaths that no further correction was thought to be necessary.

Appendix II.

Crude central rates of mortality (m_x), 1960-62, England and Wales

Note: The method of Appendix I did not give the exposed to risk at ages 0, 1 and 2; at those ages mortality rates were calculated from records of births and deaths.

	Males				Females							
Age x	Exposed to risk	Deaths 1960-62	$m_x = 2 \div 1$	Age x	Exposed to risk	Deaths 1960-62	$m_x = 2 \div 1$	Age x	Exposed to risk	Deaths 1960-62	$m_x = 2 \div 1$	Age x	Exposed to risk	Deaths 1960-62	$m_x = 2 \div 1$
	1	2	3		1	2	3		1	2	3		1	2	3
3	1,084,507	755	·00070	55	889,458	11,532	·01297	3	1,030,696	644	·00062	55	945,055	6,220	·00658
4	1,054,275	641	·00061	56	868,261	13,234	·01524	4	1,001,945	472	·00047	56	928,520	6,926	·00746
				57	851,151	14,164	·01664					57	918,098	7,532	·00820
5	1,023,615	570	·00056	58	827,657	15,575	·01882	5	973,094	433	·00044	58	901,630	8,151	·00904
6	1,008,685	548	·00054	59	808,735	16,755	·02085	6	959,978	314	·00033	59	893,643	8,723	·00976
7	1,001,781	470	·00047					7	955,147	316	·00033				
8	1,001,450	423	·00042	60	764,026	17,664	·02312	8	955,230	274	·00029	60	872,819	9,615	·01102
9	1,005,239	426	·00042	61	712,388	18,197	·02554	9	958,284	243	·00025	61	846,690	9,995	·01180
				62	653,842	18,721	·02863					62	812,137	11,379	·01401
10	1,025,104	377	·00037	63	608,336	19,312	·03175	10	976,616	231	·00024	63	787,363	11,969	·01520
11	1,062,341	398	·00037	64	574,551	19,570	·03406	11	1,011,180	238	·00024	64	769,543	12,738	·01655
12	1,123,134	420	·00037					12	1,070,166	279	·00026				
13	1,190,841	481	·00040	65	544,701	20,059	·03683	13	1,135,480	276	·00024	65	746,595	13,450	·01802
14	1,176,984	550	·00047	66	516,598	20,058	·03883	14	1,123,842	308	·00027	66	722,073	14,214	·01968
				67	492,573	22,201	·04507					67	698,307	15,947	·02284
15	1,120,470	589	·00053	68	470,151	22,650	·04818	15	1,071,093	320	·00030	68	674,676	17,275	·02560
16	1,038,297	808	·00078	69	445,179	23,472	·05272	16	996,128	331	·00033	69	652,933	18,277	·02799
17	1,005,027	1,040	·00103					17	972,978	364	·00037				
18	953,727	1,056	·00111	70	414,484	23,333	·05629	18	936,637	375	·00040	70	618,881	19,542	·03158
19	892,638	1,077	·00121	71	387,186	23,497	·06069	19	889,373	382	·00043	71	592,534	20,174	·03405
				72	360,945	24,933	·06908					72	564,990	22,384	·03962
20	853,001	1,031	00121	73	337,082	25,250	·07491	20	862,254	376	·00044	73	542,894	23,985	·04418
21	847,686	970	·00114	74	310,982	25,546	·08215	21	863,700	402	·00047	74	513,696	25,381	·04941
22	862,236	1,026	·00119					22	877,280	427	·00049				
23	872,400	929	·00106	75	285,841	25,192	·08813	23	875,195	445	·00051	75	482,286	26,573	·05510
24	876,965	916	·00104	76	259,311	25,593	·09870	24	864,663	451	·00052	76	446.647	27,572	·06173
				77	233,585	24,367	·10432					77	411,184	28,172	·06851
25	874,456	861	·00098	78	209,075	23,820	·11393	25	851,429	449	·00053	78	374,229	29,090	·07773
26	865,303	847	·00098	79	187,884	23,340	·12423	26	837,919	515	·00061	79	344,539	29,549	·08576
27	860,415	846	·00098					27	831,800	449	·00054				
28	865,240	877	·00101	80	165,243	21,895	·13250	28	837,352	511	·00061	80	310,275	29,246	·09426
29	887,200	940	·00106	81	143,037	20,380	·14248	29	861,421	617	·00072	81	275,118	28,671	·10421
				82	121,504	19,852	·16339					82	237.912	28,460	·11962
30	898,399	1,003	·00112	83	103,682	18,008	·17368	30	877,666	672	·00077	83	207,071	27,138	·13106
31	900,064	983	·00109	84	86,919	17,092	·19664	31	886,206	707	·00080	84	177,925	26,174	·14711
32	888,726	1,050	·00118					32	879,715	782	·00089				
33	894,631	1,147	·00128	85	71,709	14,611	·20375	33	886,341	815	·00092	85	150,258	23,920	·15919
34	914,279	1,280	·00140	86	56,830	12,838	·22590	34	904,386	924	·00102	86	122,109	21,696	·17768
				87	43,491	10,753	·24725					87	97,176	18,649	·19191
35	933,373	1,461	·00157	88	32,269	8,299	·25718	35	925,125	1,008	·00109	88	75,309	15,771	·20942
36	943,933	1,529	·00162	89	23,646	6,623	·28009	36	940,883	1,121	·00119	89	58,119	13,091	·22524
37	951,234	1,745	·00183					37	957,144	1,300	·00136				
38	979,756	2,003	·00204	90	16,853	5,016	·29763	38	992,854	1,513	·00152	90	43,788	10,980	·25075
39	1,030,674	2,302	·00223	91	11,679	3,653	·31278	39	1,048,540	1,704	·00163	91	32,320	8,553	·26463
				92	7,841	2,836	·36169					92	23,247	6,881	·29600
40	1,052,265	2,585	00246	93	5,198	1,895	·36456	40	1,072,162	1,898	·00177	93	16,635	5,359	·32215
41	984,462	2,603	·00264	94	3,415	1,334	·39063	41	1,009,614	1,990	·00197	94	11,671	3,914	·33536
42	867,322	2,736	·00315					42	897,136	1,968	·00219				
43	795,635	2,625	·00330	95	2,188	849	·38803	43	829,331	1,942	·00234	95	8,079	2,813	·34819
44	816,556	2,982	·00365	96	1,326	578	·43590	44	849,184	2,284	·00269	96	5,383	2,095	·38919
				97	788	359	·45558					97	3,560	1,325	·37219
45	885,373	3,765	·00425	98	505	184	·36436	45	919,656	2,711	·00295	98	2,345	953	·40640
46	934,663	4,274	·00457	99	334	110	·32934	46	971,475	3,002	·00309	99	1,465	545	·37201
47	959,571	4,985	·00520					47	1,000,559	3,482	·00348				
48	962,088	5,559	·00578	100	327	155	·47401	48	1,001,065	3,739	·00374	100	1,586	823	·51892
49	965,767	6,248	·00647	and				49	1,003,124	4,017	·00400	and			
				over								over			
50	960,462	6,954	·00724					50	994,269	4,457	·00448				
51	958,563	7,667	·00800					51	994,518	4,643	·00467				
52	946,281	8,716	·00921					52	985,602	5,333	·00541				
53	935,264	9,685	·01036					53	981,483	5,705	·00581				
54	911,889	10,585	·01161					54	962,803	6,079	·00631				

Appendix III. The graduation of the mortality rates at adult ages

1. Appendix II of the report on the English Life Tables No. 11 explained the reasons for preferring a graduation by a mathematical formula to the use of King's method. It also explained that the form of mathematical curve used to represent the mortality of 1950-52 — a combination of a logistic curve with a normal curve — was chosen because of the progression of the ratios m_{x+5}/m_x shown by the pivotal values at ages 27, 32, 37 etc. This progression was similar for both sexes, a rapid rise to a maximum at age 42, then a dip followed by a second maximum in the 'seventies'. The sexes differed, however, in that for men the maximum value of m_{x+5}/m_x at age 42 — 1·79 — was larger than the later maximum of 1·61 at age 77, whilst for women the maximum at age 72 (1·77) was higher than at age 42 (1·60). As a result the size of the normal curve relative to the logistic was much larger for men than women.

2. The first step in the graduation process on this occasion was accordingly to calculate pivotal values of m_x for 1960-62 from the deaths in the three years and the corresponding exposed to risk given in Appendix II and to derive the ratios m_{x+5}/m_x. The results are set out in Table III.1, where they are compared with the corresponding ratios for 1950-52.

Table III.1

Age x	1950-52		1960-62		Ratio of m_x (1960-62) to 1950-52 rate
	Pivotal value of m_x	$\frac{m_{x+5}}{m_x}$	Pivotal value of m_x	$\frac{m_{x+5}}{m_x}$	
			Males		
27	·00145	1·19	·00099	1·21	·68
32	·00172	1·30	·00120	1·54	·70
37	·00224	1·53	·00185	1·59	·83
42	·00343	1·79	·00295	1·76	·86
47	·00613	1·74	·00520	1·76	·85
52	·01065	1·68	·00914	1·84	·86
57	·01786	1·63	·01679	1·69	·94
62	·02914	1·54	·02833	1·56	·97
67	·04500	1·53	·04406	1·54	·98
72	·06894	1·59	·06804	1·55	·99
77	·10971	1·61	·10516	1·52	·96
82	·17631	1·56	·15963	1·51	·91
87	·27507	1·48	·24091	1·45	·88
			Females		
27	·00116	1·22	·00060	1·45	·52
32	·00141	1·29	·00087	1·55	·62
37	·00182	1·42	·00135	1·59	·74
42	·00259	1·60	·00214	1·60	·83
47	·00415	1·50	·00344	1·55	·83
52	·00621	1·56	·00530	1·53	·85
57	·00967	1·61	·00812	1·67	·84
62	·01553	1·67	·01356	1·66	·87
67	·02601	1·72	·02253	1·75	·87
72	·04485	1·77	·03932	1·75	·88
77	·07960	1·70	·06896	1·71	·87
82	·13536	1·60	·11767	1·62	·87
87	·21635	1·50	·19103	1·55	·88

Women

3. For women, the general picture for 1960-62 was very similar to that in 1950-52. Again there were peaks in the ratio m_{x+5}/m_x at 42 and at 72 and the values of the ratio at those peaks were virtually the same as before. At all ages between 42 and 87 the improvement since 1950-52 had been of the order of 15 per cent, but below age 42 improvement had been more rapid with the result that at these younger ages the slope of the mortality curve had increased. Study of the data for ages above 80 showed that improvement there had been less than the 12 or 13 per cent experienced at ages 60 to 80 and this again had led to a steepening of the mortality curve. There seemed little reason to doubt that the type of formula used for English Life Tables No. 11 would again be suitable, and after a few trials a good fit was obtained. The increase in the slope at the younger ages required that the mode of the normal curve be moved to a younger age—from 62½ to 56—and the steepening at the older ages necessitated an increase from 90·8 to 95·8 in the age at which the logistic curve has a point of inflection.

4. The formula adopted for m_x is, as already stated, the sum of two expressions, the first being a logistic curve which takes the form /

$$a + b\left[1 + e^{-\alpha(x-x_1)}\right]^{-1}$$

and has a point of inflection where $x = x_1$; the second is a normal curve of the form

$$ce^{-\beta(x-x_2)^2}$$

with a mode where $x = x_2$. The constants used for females in constructing English Life Table No. 12 were:

$a = ·00035$
$b = ·7574$
$\alpha = ·1232$
$x_1 = 95·8$*
$c = ·00155$
$\beta = ·0033$
$x_2 = 56$

5. The differences between the graduated values of m_x and the pivotal values are set out in Table III. 2, which also shows the two components of the graduated values. Though at age 42 the Normal curve contributes 37 per cent of the graduated value of m_x, the proportion falls rapidly and is less than 10 per cent after age 62. The deviation from the pivotal values is always small and never exceeds 2 per cent. This suggests that the graduation has not seriously distorted the mortality curve and this is borne out by Table III. 3, comparing recorded deaths in 1960-62 with those that would have been expected had the graduated rates been experienced. The deviations are, on the whole, small in size and the accumulated sum of the deviations changes sign frequently. In relation to the numbers of actual deaths, the deviations are larger than those that would be likely to arise by chance at ages 55-59, 60-64 and 95 and over; in the latter group mis-statements of age are particularly likely. Over the range 55-64 the graduated curve seems to have cut through an undulation in the crude rates; the ratios m_{x+5}/m_x in Table III. 1, show some irregularity in this range, but there is little evidence as to whether this is a genuine irregularity in the mortality rates or whether mis-statements of age contribute to it. A more detailed comparison of actual and expected deaths is given for the age range 27 to 87 in Table III. 4; in considering this table it should be remembered that many of the usual statistical tests of a graduation are not appropriate. The data contain errors other than those due to the operation of chance, and the exposed to risk and the deaths cannot be made to correspond exactly as they would in the investigation of the mortality of assured lives or of members of a large pension fund.

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* The actual value used was $11.8\alpha^{-1}$

Table III.2

Age x	Graduated value of $10^5 m_x$			Pivotal value of $10^5 m_x$	Pivotal — Graduated 4 - 3
	Logistic curve	Normal curve	Total		
	1	2	3	4	5
			Males		
27	100		100	99	— 1
32	127	1	128	120	— 8
37	176	5	181	185	4
42	263	24	287	295	8
47	418	88	506	520	14
52	693	243	936	914	— 22
57	1,179	503	1,682	1,679	— 3
62	2,032	785	2,817	2,833	16
67	3,502	925	4,427	4,406	— 21
72	5,970	822	6,792	6,804	12
77	9,937	550	10,487	10,516	29
82	15,877	278	16,155	15,963	—192
87	23,900	106	24,006	24,091	85
			Females		
27	51	10	61	60	— 1
32	64	23	87	87	
37	89	47	136	135	— 1
42	136	81	217	214	— 3
47	220	119	339	344	5
52	378	147	525	530	5
57	667	155	822	812	— 10
62	1,197	138	1,335	1,356	21
67	2,159	104	2,263	2,253	— 10
72	3,875	67	3,942	3,932	— 10
77	6,852	36	6,888	6,896	8
82	11,758	16	11,774	11,767	— 7
87	19,212	7	19,219	19,103	—116

Table III.3

Age group	Actual deaths 1960-62 (A)	Expected deaths on basis of graduated rates (E)	Deviation A — E +	Deviation A — E —	Accumulated deviation Σ (A — E) +	Accumulated deviation Σ (A — E) —	Actual deaths 1960-62 (A)	Expected deaths on basis of graduated rates (E)	Deviation A — E +	Deviation A — E —	Accumulated deviation Σ (A — E) +	Accumulated deviation Σ (A — E) —
	Males						**Females**					
20-24							2,101	2,050	51		51	
25-29	4,371	4,362	9		9		2,541	2,583		42	9	
30-34	5,463	5,794		331		322	3,900	3,924		24		15
35-39	9,040	8,871	169			153	6,646	6,733		87		102
40-44	13,531	12,957	574		421		10,082	10,050	32			70
45-49	24,831	24,318	513		934		16,951	16,782	169		99	
50-54	43,607	44,542		935		1	26,217	25,994	223		322	
55-59	71,260	71,586		326		327	37,552	37,964		412		90
60-64	93,464	92,640	824		497		55,696	54,875	821		731	
65-69	108,440	109,090		650		153	79,163	79,528		365	366	
70-74	122,559	122,437	122			31	111,466	111,943		477		111
75-79	122,312	121,979	333		302		140,956	140,769	187		76	
80-84	97,227	98,130		903		601	139,689	139,477	212		288	
85-89	53,124	52,750	374			227	93,127	93,147		20	268	
90-94	14,734	14,372	362		135		35,687	35,661	26		294	
95 and over	2,235	2,277		42	93		8,554	8,893		339		45
Total	**786,198**	**786,105**	**93**				**770,328**	**770,373**	**45**			

Table III.4

Age x	Males			Females		
	Actual deaths 1960-62 (A)	Expected deaths using graduated m_x (E)	A — E	Actual deaths 1960-62 (A)	Expected deaths using graduated m_x (E)	A — E
27	846	860	— 14	449	507	— 58
28	877	900	— 23	511	544	— 33
29	940	967	— 27	617	594	23
30	1,003	1,024	— 21	672	658	14
31	983	1,089	—106	707	718	— 11
32	1,050	1,138	— 88	782	765	17
33	1,147	1,217	— 70	815	842	— 27
34	1,280	1,326	— 46	924	941	— 17
35	1,461	1,447	14	1,008	1,055	— 47
36	1,529	1,576	— 47	1,121	1,167	— 46
37	1,745	1,722	23	1,300	1,302	— 2
38	2,003	1,920	83	1,513	1,489	24
39	2,302	2,206	96	1,704	1,720	— 16
40	2,585	2,473	112	1,898	1,930	— 32
41	2,603	2,550	53	1,990	1,999	— 9
42	2,736	2,489	247	1,968	1,947	21
43	2,625	2,538	87	1,942	1,966	— 24
44	2,982	2,907	75	2,284	2,208	76
45	3,765	3,533	232	2,711	2,612	99
46	4,274	4,197	77	3,002	3,021	— 19
47	4,985	4,855	130	3,482	3,392	90
48	5,559	5,494	65	3,739	3,704	35
49	6,248	6,239	9	4,017	4,053	— 36
50	6,954	7,021	— 67	4,457	4,385	72
51	7,667	7,927	—260	4,643	4,784	—141
52	8,716	8,857	—141	5,333	5,174	159
53	9,685	9,876	—191	5,705	5,624	81
54	10,585	10,861	—276	6,079	6,027	52
55	11,532	11,919	—387	6,220	6,464	—244
56	13,234	13,050	184	6,926	6,955	— 29
57	14,164	14,316	—152	7,532	7,547	— 15
58	15,575	15,527	48	8,151	8,133	18
59	16,755	16,774	— 19	8,723	8,865	—142
60	17,664	17,672	— 8	9,615	9,540	75
61	18,197	18,209	— 12	9,995	10,220	—225
62	18,721	18,419	302	11,379	10,842	537
63	19,312	18,834	478	11,969	11,645	324
64	19,570	19,506	64	12,738	12,628	110
65	20,059	20,236	—177	13,450	13,618	—168
66	20,058	20,964	—906	14,214	14,658	—444
67	22,201	21,806	395	15,947	15,803	144
68	22,650	22,685	— 35	17,275	17,036	239
69	23,472	23,399	73	18,277	18,413	—136
70	23,333	23,725	—392	19,542	19,507	35
71	23,497	24,141	—644	20,174	20,881	—707
72	24,933	24,515	418	22,384	22,272	112
73	25,250	24,954	296	23,985	23,942	43
74	25,546	25,102	444	25,381	25,341	40
75	25,192	25,168	24	26,573	26,608	— 35
76	25,593	24,915	678	27,572	27,545	27
77	24,367	24,496	—129	28,172	28,322	—150

Table III.4 — continued

Age x	Males			Females		
	Actual deaths 1960-62 (A)	Expected deaths using graduated m_x (E)	A — E	Actual deaths 1960-62 (A)	Expected deaths using graduated m_x (E)	A — E
78	23,820	23,933	—113	29,090	28,767	323
79	23,340	23,467	—127	29,549	29,527	22
80	21,895	22,509	—614	29,246	29,606	—360
81	20,380	21,231	—851	28,671	29,185	—514
82	19,852	19,629	223	28,460	28,012	448
83	18,008	18,204	—196	27,138	27,012	126
84	17,092	16,557	535	26,174	25,662	512
85	14,611	14,789	—178	23,920	23,908	12
86	12,838	12,661	177	21,696	21,381	315
87	10,753	10,440	313	18,649	18,676	— 27

Men

6. For men, the pattern shown by Table III. 1, is by no means so clear cut. Compared with 1950-52, there had been considerable improvement up to age 52 and from age 82 onwards, but little improvement over the range from 57-77. As a result, the ratios m_{x+5}/m_x did not form a smooth series. Instead of rising to a peak at age 42 as in 1950-52, the ratio rises irregularly to a peak of 1·84 at age 52; this represents an increase in death rates of 13 per cent for each year of age from 52 to 57. Thereafter the ratio drops sharply to about 1·55 at each of the ages 62, 67 and 72 and declines slowly thereafter; the second maximum in the seventies has almost disappeared. In view of the abrupt changes in the ratio m_{x+5}/m_x it seemed doubtful if any reasonably smooth curve would give a good fit over the entire range. It was thought that a logistic curve would still give a reasonable result at the older ages, and that the steep increase in m_x at ages under 55 could be reproduced by using a normal curve with a mode at an age lower than the 71·6 used for English Life Table No. 11 and with a higher value of β than the ·003 then used, so as to produce a more sharply-peaked curve.

7. It proved extremely difficult to combine the two curves in such a way that they closely reproduced the pivotal values over the whole of the range, but after repeated trials constants were eventually found that, whilst they did not give as good a fit as the graduated values for females, did not seriously distort the mortality curve. These constants were:

$$\begin{aligned} a &= \cdot 00065 \\ b &= \cdot 66946 \\ \alpha &= \cdot 1162 \\ x_1 &= 92 \cdot 1 \\ c &= \cdot 00926 \\ \beta &= \cdot 00565 \\ x_2 &= 67 \cdot 4 \end{aligned}$$

8. Reference to Table III. 2, shows that the graduated values exceed the pivotal values by nearly 7 per cent at age 32 and by more than 2 per cent at age 52, whereas the pivotal values are in excess by between 2 per cent and 3 per cent at 37, 42 and 47. In other words, the graduated curve cuts through a wave in the crude rates over the range 32 to 52. At all ages over 52, the difference is less than 1 per cent except at age 82. The comparison of actual and expected deaths in Table III. 3, shows that, in relation to the total number of actual deaths the accumulated deviation is never large, except perhaps at age 49 where it reaches 934 or nearly 2 per cent of actual deaths up to that age. Deviations are, however, larger than would be expected from random fluctuations in the age-groups 30-34, where expected deaths are 6 per cent more than actual deaths, 40-44, 45-49 and 50-54; these deviations are associated with the wave-cutting effect of the formula referred to above. Further large deviations occur in the 60-70 age range, where they seem to be associated with a very irregular progression of actual deaths, (in particular the shortfall at age 66 to which reference is made in paragraph 4 of the body of this report) and at 80-84, where the deaths recorded at ages 80 and 81 are smaller than would be expected having regard to the numbers at surrounding ages. Further details are given in Table III. 4; the broad picture is of a graduation which, it is hoped, retains the salient features of the experience, whilst eliminating or reducing the irregularities which appear in the crude data.

9. The graduated values of m_x obtained by means of the formula and constants given above have to be converted to values of q_x before life tables can be constructed. This was done by means of the relationship

$$q_x = m_x \left(1 - \frac{q_{x-1}}{12 p_{x-1}}\right) \left(1 + \tfrac{5}{12} m_x\right)^{-1}$$

The expectations of life $\mathring{e}_x$, were calculated by the formula

$$\mathring{e}_x = \frac{1}{l_x} \sum_{t=0}^{\infty} l_{x+t} - \tfrac{1}{2} - \tfrac{1}{12}\mu_x$$

μ_x being taken as $\frac{1}{2}(m_{x-1} + m_x)$

An exception was at age 0, where the formula used was

$$\mathring{e}_o = p_o (1 + \mathring{e}_1) + k q_o$$

where k represents the average age at death for children dying between birth and age 1; k was taken as ·111 for boys and ·125 for girls.

Appendix IV.

English Life Tables No. 12, 1960-62

Males

Age x	l_x	d_x	p_x	q_x	$\mathring{e}_x$	Age x	l_x	d_x	p_x	q_x	$\mathring{e}_x$
0	100,000	2,449	·97551	·02449	68·09	45	92,433	369	·99601	·00399	27·05
1	97,551	153	·99843	·00157	68·80	46	92,064	412	·99552	·00448	26·15
2	97,398	96	·99901	·00099	67·90	47	91,652	463	·99495	·00505	25·27
3	97,302	67	·99931	·00069	66·97	48	91,189	520	·99430	·00570	24·40
4	97,235	60	·99938	·00062	66·02	49	90,669	584	·99356	·00644	23·53
5	97,175	55	·99943	·00057	65·06	50	90,085	656	·99272	·00728	22·68
6	97,120	51	·99948	·00052	64·09	51	89,429	736	·99177	·00823	21·84
7	97,069	47	·99952	·00048	63·13	52	88,693	825	·99070	·00930	21·02
8	97,022	43	·99956	·00044	62·16	53	87,868	923	·98949	·01051	20·21
9	96,979	40	·99959	·00041	61·18	54	86,945	1,029	·98816	·01184	19·42
10	96,939	38	·99961	·00039	60·21	55	85,916	1,144	·98669	·01331	18·65
11	96,901	37	·99962	·00038	59·23	56	84,772	1,265	·98508	·01492	17·89
12	96,864	37	·99962	·00038	58·25	57	83,507	1,393	·98332	·01668	17·16
13	96,827	40	·99959	·00041	57·28	58	82,114	1,526	·98141	·01859	16·44
14	96,787	45	·99953	·00047	56·30	59	80,588	1,664	·97935	·02065	15·74
15	96,742	57	·99941	·00059	55·33	60	78,924	1,805	·97713	·02287	15·06
16	96,685	75	·99922	·00078	54·36	61	77,119	1,947	·97475	·02525	14·40
17	96,610	96	·99901	·00099	53·40	62	75,172	2,088	·97222	·02778	13·76
18	96,514	108	·99888	·00112	52·45	63	73,084	2,228	·96951	·03049	13·14
19	96,406	113	·99883	·00117	51·51	64	70,856	2,366	·96661	·03339	12·54
20	96,293	115	·99881	·00119	50·57	65	68,490	2,499	·96352	·03648	11·95
21	96,178	113	·99882	·00118	49·63	66	65,991	2,625	·96022	·03978	11·39
22	96,065	110	·99886	·00114	48·69	67	63,366	2,745	·95668	·04332	10·84
23	95,955	104	·99892	·00108	47·74	68	60,621	2,856	·95288	·04712	10·31
24	95,851	98	·99898	·00102	46·80	69	57,765	2,959	·94878	·05122	9·79
25	95,753	95	·99901	·00099	45·84	70	54,806	3,051	·94434	·05566	9·29
26	95,658	94	·99902	·00098	44·89	71	51,755	3,130	·93953	·06047	8·81
27	95,564	96	·99900	·00100	43·93	72	48,625	3,195	·93430	·06570	8·35
28	95,468	99	·99896	·00104	42·98	73	45,430	3,243	·92861	·07139	7·90
29	95,369	104	·99891	·00109	42·02	74	42,187	3,273	·92241	·07759	7·47
30	95,265	110	·99885	·00115	41·06	75	38,914	3,282	·91566	·08434	7·05
31	95,155	115	·99879	·00121	40·11	76	35,632	3,266	·90833	·09167	6·66
32	95,040	122	·99872	·00128	39·16	77	32,366	3,225	·90037	·09963	6·28
33	94,918	129	·99864	·00136	38·21	78	29,141	3,154	·89176	·10824	5·92
34	94,789	137	·99855	·00145	37·26	79	25,987	3,054	·88248	·11752	5·57
35	94,652	147	·99845	·00155	36·31	80	22,933	2,923	·87253	·12747	5·25
36	94,505	158	·99833	·00167	35·37	81	20,010	2,763	·86192	·13808	4·94
37	94,347	171	·99819	·00181	34·43	82	17,247	2,576	·85066	·14934	4·66
38	94,176	185	·99804	·00196	33·49	83	14,671	2,365	·83878	·16122	4·39
39	93,991	201	·99786	·00214	32·55	84	12,306	2,137	·82634	·17366	4·14
40	93,790	220	·99765	·00235	31·62	85	10,169	1,897	·81341	·18659	3·90
41	93,570	242	·99741	·00259	30·70	86	8,272	1,654	·80003	·19997	3·68
42	93,328	268	·99713	·00287	29·77	87	6,618	1,414	·78631	·21369	3·48
43	93,060	297	·99681	·00319	28·86	88	5,204	1,185	·77235	·22765	3·30
44	92,763	330	·99644	·00356	27·95	89	4,019	972	·75823	·24177	3·13

Appendix IV — continued

Males

Age x	l_x	d_x	p_x	q_x	$\mathring{e}_x$	Age x	l_x	d_x	p_x	q_x	$\mathring{e}_x$
90	3,047	780	·74407	·25593	2·97	100	68	26	·62017	·37983	2·00
91	2,267	612	·72997	·27003	2·83	101	42	17	·61088	·38912	
92	1,655	470	·71604	·28396	2·70	102	25	10	·60224	·39776	
93	1,185	353	·70236	·29764	2·58	103	15	6	·59425	·40575	
94	832	259	·68904	·31096	2·47	104	9	4	·58688	·41312	
95	573	186	·67615	·32385	2·38	105	5	2	·58011	·41989	
96	387	130	·66377	·33623	2·29	106	3	1	·57391	·42609	
97	257	89	·65194	·34806	2·21	107	2	1	·56825	·43175	
98	168	60	·64071	·35929	2·14						
99	108	40	·63011	·36989	2·07						

Appendix IV.

English Life Tables No. 12, 1960-62

Females

Age x	l_x	d_x	p_x	q_x	$\mathring{e}_x$	Age x	l_x	d_x	p_x	q_x	$\mathring{e}_x$
0	100,000	1,896	·98104	·01896	74·00	45	94,685	269	·99716	·00284	32·06
1	98,104	124	·99874	·00126	74·43	46	94,416	293	·99690	·00310	31·15
2	97,980	75	·99923	·00077	73·52	47	94,123	319	·99661	·00339	30·25
3	97,905	61	·99938	·00062	72·58	48	93,804	347	·99630	·00370	29·35
4	97,844	49	·99950	·00050	71·62	49	93,457	377	·99597	·00403	28·46
5	97,795	41	·99958	·00042	70·66	50	93,080	409	·99561	·00439	27·57
6	97,754	35	·99964	·00036	69·69	51	92,671	444	·99521	·00479	26·69
7	97,719	31	·99968	·00032	68·71	52	92,227	482	·99477	·00523	25·81
8	97,688	28	·99971	·00029	67·73	53	91,745	524	·99429	·00571	24·95
9	97,660	25	·99974	·00026	66·75	54	91,221	569	·99376	·00624	24·09
10	97,635	23	·99976	·00024	65·77	55	90,652	618	·99318	·00682	23·24
11	97,612	23	·99976	·00024	64·79	56	90,034	672	·99254	·00746	22·39
12	97,589	24	·99975	·00025	63·80	57	89,362	731	·99182	·00818	21·56
13	97,565	25	·99974	·00026	62·82	58	88,631	796	·99102	·00898	20·73
14	97,540	26	·99973	·00027	61·83	59	87,835	868	·99012	·00988	19·91
15	97,514	29	·99970	·00030	60·85	60	86,967	946	·98912	·01088	19·11
16	97,485	33	·99966	·00034	59·87	61	86,021	1,032	·98800	·01200	18·31
17	97,452	36	·99963	·00037	58·89	62	84,989	1,127	·98674	·01326	17·53
18	97,416	39	·99960	·00040	57·91	63	83,862	1,231	·98532	·01468	16·76
19	97,377	41	·99958	·00042	56·93	64	82,631	1,345	·98372	·01628	16·00
20	97,336	43	·99956	·00044	55·95	65	81,286	1,470	·98192	·01808	15·26
21	97,293	44	·99955	·00045	54·98	66	79,816	1,604	·97990	·02010	14·53
22	97,249	46	·99953	·00047	54·00	67	78,212	1,750	·97763	·02237	13·81
23	97,203	48	·99951	·00049	53·03	68	76,462	1,906	·97507	·02493	13·12
24	97,155	50	·99949	·00051	52·06	69	74,556	2,073	·97219	·02781	12·44
25	97,105	52	·99946	·00054	51·08	70	72,483	2,250	·96896	·03104	11·78
26	97,053	55	·99943	·00057	50·11	71	70,233	2,434	·96535	·03465	11·14
27	96,998	58	·99940	·00060	49·14	72	67,799	2,622	·96132	·03868	10·52
28	96,940	62	·99936	·00064	48·17	73	65,177	2,814	·95683	·04317	9·93
29	96,878	67	·99931	·00069	47·20	74	62,363	3,003	·95184	·04816	9·35
30	96,811	73	·99925	·00075	46·23	75	59,360	3,188	·94630	·05370	8·80
31	96,738	78	·99919	·00081	45·26	76	56,172	3,361	·94016	·05984	8·27
32	96,660	84	·99913	·00087	44·30	77	52,811	3,518	·93338	·06662	7·77
33	96,576	92	·99905	·00095	43·34	78	49,293	3,651	·92594	·07406	7·28
34	96,484	100	·99896	·00104	42·38	79	45,642	3,752	·91780	·08220	6·83
35	96,384	110	·99886	·00114	41·42	80	41,890	3,815	·90892	·09108	6·39
36	96,274	119	·99876	·00124	40·47	81	38,075	3,836	·89926	·10074	5·98
37	96,155	131	·99864	·00136	39·52	82	34,239	3,807	·88881	·11119	5·60
38	96,024	143	·99851	·00149	38·57	83	30,432	3,726	·87756	·12244	5·24
39	95,881	157	·99836	·00164	37·63	84	26,706	3,591	·86552	·13448	4·90
40	95,724	172	·99820	·00180	36·69	85	23,115	3,405	·85271	·14729	4·58
41	95,552	188	·99803	·00197	35·75	86	19,710	3,170	·83916	·16084	4·29
42	95,364	206	·99784	·00216	34·82	87	16,540	2,896	·82491	·17509	4·01
43	95,158	226	·99763	·00237	33·90	88	13,644	2,592	·81002	·18998	3·76
44	94,932	247	·99740	·00260	32·98	89	11,052	2,270	·79459	·20541	3·53

Appendix IV — continued

Females

Age x	l_x	d_x	p_x	q_x	$\mathring{e}_x$	Age x	l_x	d_x	p_x	q_x	$\mathring{e}_x$
90	8,782	1,943	·77872	·22128	3·32	100	264	100	·62212	·37788	1·99
91	6,839	1,624	·76251	·23749	3·12	101	164	64	·60922	·39078	
92	5,215	1,324	·74608	·25392	2·94	102	100	40	·59709	·40291	
93	3,891	1,052	·72956	·27044	2·78	103	60	25	·58575	·41425	
94	2,839	815	·71308	·28692	2·63	104	35	15	·57522	·42478	
95	2,024	614	·69677	·30323	2·49	105	20	9	·56550	·43450	
96	1,410	450	·68077	·31923	2·37	106	11	5	·55658	·44342	
97	960	321	·66521	·33479	2·26	107	6	3	·54841	·45159	
98	639	224	·65021	·34979	2·16	108	3	1	·54097	·45903	
99	415	151	·63586	·36414	2·07	109	2	1	·53421	·46579	

Appendix V.

Table V.1. Rates of mortality (q_x) at selected ages in Regions

Age x	England and Wales	Northern			East and West Ridings			North Western				North Midland
		Total	Tyneside Conurbation	Remainder	Total	West Yorkshire Conurbation	Remainder	Total	South East Lancashire Conurbation	Merseyside Conurbation	Remainder	
Males												
0	·02449	·02651	·02754	·02613	·02679	·02766	·02621	·02880	·02981	·03026	·02693	·02398
2	·00099	·00107	·00080	·00117	·00117	·00122	·00113	·00102	·00106	·00104	·00097	·00099
7	·00048	·00048	·00047	·00048	·00051	·00055	·00049	·00051	·00048	·00050	·00054	·00051
12	·00038	·00041	·00029	·00045	·00035	·00033	·00037	·00038	·00043	·00033	·00036	·00038
17	·00093	·00076	·00056	·00082	·00091	·00096	·00088	·00083	·00080	·00075	·00091	·00094
22	·00114	·00121	·00109	·00125	·00112	·00132	·00099	·00110	·00105	·00099	·00122	·00119
27	·00099	·00111	·00116	·00110	·00108	·00122	·00098	·00105	·00092	·00100	·00120	·00104
32	·00119	·00124	·00113	·00128	·00128	·00120	·00133	·00142	·00149	·00145	·00135	·00114
37	·00185	·00214	·00227	·00208	·00199	·00197	·00200	·00219	·00215	·00228	·00219	·00166
42	·00294	·00363	·00390	·00353	·00315	·00330	·00306	·00344	·00346	·00361	·00334	·00273
47	·00519	·00583	·00662	·00554	·00562	·00593	·00540	·00626	·00674	·00662	·00564	·00493
52	·00910	·01026	·01060	·01015	·00994	·01084	·00933	·01087	·01098	·01124	·01058	·00832
57	·01664	·01853	·02077	·01773	·01769	·01927	·01657	·01953	·02060	·02029	·01826	·01555
62	·02793	·03006	·03292	·02905	·02948	·03121	·02821	·03244	·03377	·03415	·03062	·02564
67	·04311	·04673	·04802	·04630	·04658	·04838	·04532	·04955	·05084	·05115	·04794	·04072
72	·06580	·06870	·07304	·06724	·07134	·07719	·06731	·07478	·07773	·07712	·07165	·06433
77	·09991	·10676	·11564	·10400	·10696	·11367	·10262	·11313	·11538	·11435	·11096	·09814
82	·14783	·15510	·15539	·15496	·16356	·17433	·15707	·16391	·17000	·16165	·16030	·14721
87	·21501	·21545	·22064	·21382	·21684	·22733	·21093	·22344	·22321	·22620	·22287	·21324
Females												
0	·01896	·02117	·01963	·02172	·02018	·02046	·01998	·02257	·02274	·02431	·02132	·01825
2	·00077	·00077	·00079	·00076	·00079	·00085	·00076	·00083	·00087	·00067	·00089	·00072
7	·00032	·00033	·00030	·00035	·00040	·00044	·00038	·00036	·00036	·00031	·00039	·00031
12	·00024	·00021	·00017	·00022	·00020	·00021	·00019	·00023	·00024	·00025	·00022	·00027
17	·00036	·00034	·00033	·00035	·00037	·00042	·00034	·00037	·00043	·00026	·00040	·00034
22	·00048	·00051	·00053	·00050	·00053	·00058	·00050	·00048	·00048	·00048	·00049	·00057
27	·00060	·00067	·00063	·00068	·00059	·00064	·00056	·00069	·00067	·00063	·00073	·00053
32	·00087	·00083	·00067	·00089	·00085	·00087	·00083	·00088	·00087	·00091	·00087	·00084
37	·00135	·00146	·00166	·00139	·00140	·00147	·00136	·00155	·00149	·00179	·00148	·00126
42	·00214	·00254	·00269	·00247	·00231	·00254	·00215	·00257	·00249	·00278	·00254	·00193
47	·00343	·00363	·00364	·00362	·00358	·00361	·00355	·00400	·00404	·00393	·00402	·00349
52	·00528	·00547	·00531	·00553	·00552	·00548	·00554	·00607	·00620	·00609	·00596	·00499
57	·00808	·00877	·00919	·00864	·00868	·00888	·00851	·00917	·00933	·00959	·00886	·00796
62	·01347	·01519	·01486	·01531	·01428	·01474	·01391	·01563	·01602	·01571	·01527	·01309
67	·02228	·02528	·02501	·02536	·02383	·02469	·02315	·02566	·02700	·02395	·02529	·02259
72	·03856	·04308	·04290	·04313	·04285	·04518	·04099	·04512	·04787	·04238	·04403	·03779
77	·06666	·07370	·07173	·07438	·07329	·07591	·07119	·07715	·07985	·07293	·07677	·06733
82	·11113	·12555	·12420	·12606	·12146	·12587	·11790	·12551	·12991	·11889	·12488	·11360
87	·17437	·17559	·16688	·17857	·17700	·17833	·17598	·18273	·18317	·17980	·18371	·17667

Midland			Eastern	London and South Eastern			Southern	South Western	Wales (including Monmouthshire)			Age x
Total	West Midlands Conurbation	Remainder		Total	Greater London Conurbation	Remainder			Total	Wales I (South East)	Wales II (Remainder)	
Males												
·02492	·02492	·02492	·02061	·02218	·02244	·02137	·02208	·02157	·02803	·02855	·02666	0
·00105	·00093	·00116	·00096	·00091	·00086	·00102	·00095	·00096	·00104	·00093	·00134	2
·00048	·00050	·00045	·00046	·00046	·00044	·00050	·00046	·00050	·00056	·00057	·00052	7
·00037	·00036	·00038	·00039	·00036	·00035	·00041	·00041	·00035	·00041	·00041	·00039	12
·00099	·00094	·00104	·00094	·00091	·00086	·00106	·00097	·00115	·00096	·00088	·00117	17
·00110	·00103	·00118	·00115	·00105	·00096	·00136	·00119	·00119	·00135	·00137	·00130	22
·00095	·00095	·00094	·00082	·00093	·00091	·00100	·00093	·00101	·00119	·00121	·00113	27
·00120	·00112	·00128	·00101	·00111	·00112	·00108	·00104	·00114	·00134	·00132	·00139	32
·00182	·00190	·00175	·00146	·00173	·00177	·00162	·00155	·00171	·00218	·00218	·00219	37
·00304	·00302	·00306	·00230	·00263	·00274	·00229	·00246	·00257	·00365	·00360	·00380	42
·00506	·00529	·00483	·00407	·00491	·00499	·00462	·00460	·00476	·00565	·00586	·00513	47
·00942	·00998	·00886	·00747	·00842	·00861	·00775	·00804	·00825	·00993	·01029	·00899	52
·01745	·01842	·01650	·01379	·01547	·01571	·01469	·01482	·01493	·01841	·01902	·01687	57
·02914	·03066	·02769	·02412	·02651	·02706	·02501	·02551	·02505	·02989	·03072	·02788	62
·04467	·04666	·04288	·03688	·04066	·04230	·03707	·03884	·03809	·04838	·05018	·04431	67
·06880	·07128	·06670	·05801	·06266	·06528	·05743	·05826	·05961	·07154	·07502	·06426	72
·10377	·10698	·10115	·09110	·09462	·09791	·08830	·09010	·09312	·10565	·11048	·09616	77
·15357	·16033	·14815	·13502	·14039	·14360	·13434	·13621	·13872	·15378	·16171	·13913	82
·21826	·21846	·21803	·20942	·21192	·21245	·21093	·21687	·21169	·21880	·22130	·21464	87
Females												
·01958	·02001	·01915	·01578	·01715	·01744	·01629	·01685	·01670	·02158	·02267	·01861	0
·00083	·00079	·00087	·00063	·00069	·00069	·00069	·00082	·00099	·00078	·00082	·00068	2
·00036	·00034	·00039	·00031	·00029	·00028	·00033	·00034	·00029	·00033	·00035	·00027	7
·00023	·00020	·00026	·00023	·00024	·00022	·00030	·00021	·00027	·00028	·00030	·00021	12
·00037	·00031	·00043	·00031	·00033	·00034	·00031	·00034	·00039	·00043	·00043	·00045	17
·00050	·00047	·00054	·00041	·00046	·00045	·00051	·00040	·00044	·00059	·00058	·00064	22
·00063	·00063	·00063	·00046	·00062	·00059	·00070	·00054	·00055	·00059	·00065	·00041	27
·00095	·00108	·00082	·00078	·00086	·00088	·00081	·00078	·00083	·00106	·00101	·00120	32
·00139	·00136	·00141	·00122	·00130	·00134	·00117	·00120	·00115	·00146	·00142	·00161	37
·00211	·00224	·00197	·00182	·00197	·00196	·00200	·00187	·00202	·00224	·00233	·00198	42
·00351	·00341	·00362	·00302	·00316	·00320	·00302	·00322	·00314	·00372	·00381	·00348	47
·00552	·00522	·00582	·00474	·00490	·00491	·00489	·00469	·00517	·00567	·00579	·00541	52
·00805	·00795	·00814	·00748	·00746	·00753	·00725	·00714	·00761	·00871	·00906	·00789	57
·01396	·01330	·01463	·01198	·01230	·01248	·01184	·01194	·01240	·01435	·01480	·01338	62
·02296	·02258	·02333	·02021	·02008	·02048	·01923	·01935	·02063	·02379	·02435	·02261	67
·04080	·04120	·04042	·03474	·03470	·03542	·03319	·03321	·03548	·04106	·04328	·03662	72
·06916	·07092	·06755	·06130	·06027	·06119	·05833	·05948	·06237	·07087	·07277	·06734	77
·11837	·12051	·11636	·10355	·10126	·10332	·09713	·09960	·10434	·11695	·12058	·11070	82
·17678	·17337	·17973	·17450	·16815	·16560	·17309	·17241	·17724	·17669	·17552	·17852	87

Table V.2. Ratio of Actual Deaths (1960-62) in Regions to those expected on the basis of the national experience

Age Group	Northern			East and West Ridings			North Western				North Midland	Midland			Eastern	London and South Eastern			Southern	South Western	Wales (including Monmouthshire)			Age Group
	Total	Tyneside Conurbation	Remainder	Total	West Yorkshire Conurbation	Remainder	Total	South East Lancashire Conurbation	Merseyside Conurbation	Remainder		Total	West Midlands Conurbation	Remainder		Total	Greater London Conurbation	Remainder			Total	Wales I (South East)	Wales II (Remainder)	
Males																								
0-4	1·04	1·07	1·03	1·08	1·12	1·05	1·16	1·20	1·24	1·07	·97	1·04	1·07	1·01	·82	·95	·99	·85	·90	·89	1·11	1·11	1·08	0-4
5-9	·98	·96	·99	1·05	1·13	1·00	1·04	·98	1·02	1·10	1·04	·98	1·03	·93	·94	·94	·90	1·03	·94	1·03	1·15	1·18	1·06	5-9
10-14	1·06	·76	1·16	·94	·89	·98	·99	1·11	·87	·96	1·01	·99	·97	1·01	1·04	·97	·92	1·09	1·07	·96	1·08	1·09	1·05	10-14
15-19	·83	·62	·90	·98	1·03	·94	·90	·87	·81	·98	1·02	1·06	1·01	1·11	1·01	·98	·93	1·14	1·05	1·23	1·04	·96	1·26	15-19
20-24	1·05	·95	1·09	·99	1·16	·88	·97	·92	·88	1·07	1·05	·98	·91	1·04	1·01	·93	·85	1·19	1·05	1·05	1·18	1·19	1·15	20-24
25-29	1·11	1·15	1·10	1·08	1·21	·99	1·06	·94	1·01	1·20	1·04	·96	·96	·96	·84	·93	·91	1·01	·94	1·02	1·20	1·21	1·14	25-29
30-34	1·05	·97	1·08	1·08	1·02	1·11	1·19	1·24	1·20	1·14	·96	1·01	·95	1·06	·84	·93	·94	·90	·87	·95	1·13	1·12	1·17	30-34
35-39	1·16	1·23	1·13	1·08	1·07	1·08	1·19	1·17	1·23	1·19	·90	·99	1·03	·96	·79	·94	·96	·87	·84	·92	1·19	1·18	1·19	35-39
40-44	1·23	1·32	1·19	1·08	1·13	1·04	1·18	1·19	1·23	1·14	·93	1·03	1·03	1·03	·78	·90	·94	·79	·84	·88	1·24	1·22	1·27	40-44
45-49	1·12	1·27	1·07	1·08	1·15	1·04	1·21	1·29	1·28	1·09	·95	·98	1·02	·93	·79	·94	·96	·89	·89	·92	1·09	1·13	·99	45-49
50-54	1·13	1·17	1·11	1·09	1·19	1·02	1·19	1·21	1·24	1·16	·91	1·03	1·09	·97	·82	·92	·95	·85	·88	·91	1·09	1·13	·99	50-54
55-59	1·11	1·25	1·07	1·07	1·16	1·00	1·18	1·24	1·22	1·10	·93	1·05	1·11	·99	·83	·93	·94	·88	·89	·90	1·11	1·14	1·02	55-59
60-64	1·08	1·18	1·04	1·06	1·12	1·01	1·16	1·21	1·22	1·10	·92	1·04	1·10	·99	·86	·95	·97	·89	·91	·90	1·08	1·11	1·00	60-64
65-69	1·08	1·12	1·07	1·08	1·13	1·05	1·15	1·18	1·19	1·11	·94	1·04	1·08	·99	·86	·94	·98	·86	·90	·88	1·12	1·16	1·03	65-69
70-74	1·05	1·11	1·03	1·09	1·18	1·02	1·14	1·19	1·18	1·09	·98	1·05	1·08	1·01	·88	·95	·99	·87	·88	·90	1·09	1·14	·98	70-74
75-79	1·07	1·16	1·04	1·07	1·15	1·03	1·14	1·16	1·15	1·11	·98	1·04	1·07	1·01	·91	·95	·98	·88	·90	·93	1·06	1·11	·96	75-79
80-84	1·05	1·06	1·05	1·11	1·19	1·06	1·12	1·16	1·10	1·09	·99	1·04	1·09	1·00	·91	·95	·97	·90	·92	·94	1·04	1·10	·94	80-84
85 & over	1·06	1·09	1·05	1·04	1·11	1·00	1·09	1·11	1·07	1·08	1·00	1·04	1·05	1·04	·95	·96	·98	·94	·96	·96	1·03	1·05	1·00	85 & over
0-19	1·02	1·01	1·02	1·06	1·10	1·03	1·12	1·15	1·17	1·06	·98	1·03	1·06	1·01	·85	·95	·97	·90	·92	·94	1·10	1·10	1·10	0-19
20-49	1·14	1·22	1·11	1·07	1·12	1·04	1·17	1·20	1·20	1·13	·95	·99	1·00	·98	·81	·93	·94	·90	·89	·93	1·16	1·17	1·12	20-49
50-69	1·10	1·17	1·07	1·07	1·14	1·02	1·17	1·21	1·21	1·11	·93	1·04	1·09	·99	·85	·94	·96	·87	·90	·89	1·10	1·14	1·01	50-69
70 & over	1·06	1·11	1·04	1·08	1·16	1·03	1·13	1·16	1·14	1·10	·99	1·04	1·08	1·02	·91	·95	·98	·89	·91	·93	1·06	1·11	·97	70 & over
All ages	**1·08**	**1·14**	**1·05**	**1·08**	**1·15**	**1·03**	**1·15**	**1·18**	**1·17**	**1·10**	**·96**	**1·04**	**1·08**	**1·00**	**·88**	**·94**	**·97**	**·89**	**·90**	**·92**	**1·09**	**1·12**	**1·00**	**All ages**
Females																								
0-4	1·07	1·02	1·08	1·05	1·09	1·02	1·17	1·19	1·25	1·10	·95	1·05	1·11	·99	·82	·95	·99	·83	·90	·89	1·09	1·14	·94	0-4
5-9	1·01	·89	1·05	1·22	1·34	1·14	1·08	1·08	·92	1·17	·93	1·10	1·01	1·17	·94	·89	·84	1·01	1·03	·88	·99	1·05	·83	5-9
10-14	·88	·72	·93	·86	·93	·82	1·00	1·04	1·05	·93	1·11	·98	·84	1·10	·95	1·02	·94	1·23	·90	1·14	1·16	1·25	·92	10-14
15-19	·97	·94	·97	1·04	1·17	·95	1·04	1·18	·73	1·10	·96	1·04	·89	1·19	·88	·95	·96	·91	·94	1·07	1·21	1·19	1·24	15-19
20-24	1·05	1·08	1·04	1·10	1·20	1·03	1·00	1·00	·99	1·02	1·15	1·04	·97	1·11	·85	·95	·93	1·04	·83	·92	1·21	1·18	1·28	20-24
25-29	1·11	1·05	1·13	·99	1·07	·94	1·14	1·11	1·05	1·21	·90	1·06	1·06	1·05	·78	1·02	·98	1·15	·89	·93	1·00	1·10	·74	25-29
30-34	·98	·81	1·03	·98	1·01	·96	1·03	1·02	1·07	1·01	·97	1·09	1·23	·95	·90	1·00	1·01	·94	·90	·95	1·21	1·16	1·36	30-34
35-39	1·08	1·22	1·03	1·04	1·10	1·01	1·15	1·11	1·32	1·10	·94	1·03	1·02	1·04	·90	·96	·99	·88	·89	·86	1·09	1·05	1·18	35-39
40-44	1·17	1·25	1·15	1·08	1·18	1·01	1·20	1·16	1·29	1·19	·91	·99	1·04	·93	·85	·92	·92	·93	·88	·94	1·05	1·09	·94	40-44
45-49	1·06	1·06	1·06	1·04	1·06	1·04	1·17	1·18	1·15	1·17	1·01	1·02	·99	1·05	·88	·92	·93	·88	·93	·92	1·08	1·11	1·02	45-49
50-54	1·04	1·02	1·05	1·05	1·05	1·05	1·15	1·18	1·16	1·13	·95	1·04	·99	1·10	·90	·93	·93	·92	·89	·98	1·08	1·10	1·02	50-54
55-59	1·09	1·13	1·07	1·07	1·10	1·05	1·14	1·16	1·19	1·10	·98	1·00	·98	1·01	·92	·92	·93	·90	·88	·94	1·08	1·12	·98	55-59
60-64	1·13	1·10	1·14	1·06	1·10	1·03	1·16	1·19	1·16	1·13	·97	1·03	·99	1·08	·89	·91	·92	·88	·89	·92	1·07	1·10	1·00	60-64
65-69	1·13	1·12	1·14	1·07	1·11	1·04	1·15	1·21	1·08	1·14	1·01	1·03	1·01	1·05	·91	·90	·92	·86	·87	·93	1·07	1·09	1·01	65-69
70-74	1·12	1·11	1·12	1·11	1·17	1·06	1·17	1·24	1·10	1·14	·98	1·06	1·07	1·05	·90	·90	·92	·86	·86	·92	1·06	1·12	·95	70-74
75-79	1·11	1·08	1·12	1·10	1·14	1·07	1·16	1·20	1·10	1·15	1·01	1·04	1·07	1·02	·92	·90	·92	·87	·89	·93	1·06	1·09	1·01	75-79
80-84	1·13	1·12	1·14	1·10	1·14	1·06	1·13	1·18	1·07	1·13	1·02	1·07	1·09	1·05	·93	·91	·93	·87	·89	·94	1·05	1·09	1·00	80-84
85 & over	1·08	1·04	1·09	1·08	1·11	1·06	1·13	1·15	1·08	1·13	1·03	1·05	1·07	1·04	·96	·93	·93	·92	·94	·98	1·04	1·05	1·03	85 & over
0-19	1·05	·99	1·07	1·05	1·10	1·02	1·15	1·18	1·20	1·10	·95	1·05	1·08	1·02	·83	·95	·98	·86	·91	·92	1·09	1·15	·95	0-19
20-49	1·09	1·11	1·08	1·05	1·09	1·01	1·15	1·14	1·19	1·14	·97	1·02	1·03	1·02	·87	·94	·95	·92	·90	·92	1·09	1·10	1·05	20-49
50-69	1·11	1·11	1·11	1·07	1·10	1·04	1·15	1·19	1·13	1·13	·99	1·03	1·00	1·06	·90	·91	·92	·88	·88	·93	1·07	1·10	1·00	50-69
70 & over	1·11	1·09	1·12	1·10	1·14	1·06	1·15	1·20	1·09	1·14	1·01	1·05	1·07	1·04	·93	·91	·92	·89	·90	·95	1·06	1·09	1·00	70 & over
All ages	**1·11**	**1·09**	**1·11**	**1·08**	**1·13**	**1·05**	**1·15**	**1·19**	**1·11**	**1·14**	**1·00**	**1·04**	**1·05**	**1·04**	**·92**	**·91**	**·93**	**·89**	**·90**	**·94**	**1·06**	**1·10**	**1·00**	**All ages**

Table V.3. Abridged Life Tables for England, 1960-62

Age x	Males		Females	
	l_x	$\mathring{e}_x$	l_x	$\mathring{e}_x$
0	10,000	68·2	10,000	74·1
5	9,718	65·1	9,780	70·8
10	9,694	60·3	9,764	65·9
15	9,675	55·4	9,752	60·9
20	9,628	50·7	9,734	56·0
25	9,574	45·9	9,712	51·2
30	9,527	41·2	9,683	46·3
35	9,466	36·4	9,641	41·5
40	9,383	31·7	9,575	36·8
45	9,250	27·1	9,471	32·1
50	9,018	22·7	9,311	27·6
55	8,605	18·7	9,070	23·3
60	7,910	15·1	8,704	19·2
65	6,867	12·0	8,140	15·3
70	5,504	9·3	7,267	11·8
75	3,916	7·1	5,961	8·9
80	2,312	5·3	4,217	6·4
85	1,026	4·0	2,332	4·7

Table V.4. Abridged Life Tables for Wales, 1960-62

Age x	Males		Females	
	l_x	$\mathring{e}_x$	l_x	$\mathring{e}_x$
0	10,000	66·8	10,000	73·2
5	9,680	64·0	9,753	70·0
10	9,653	59·2	9,737	65·1
15	9,633	54·3	9,722	60·2
20	9,584	49·6	9,701	55·3
25	9,519	44·9	9,673	50·5
30	9,462	40·2	9,644	45·6
35	9,394	35·4	9,593	40·9
40	9,294	30·8	9,523	36·1
45	9,129	26·3	9,414	31·5
50	8,878	21·9	9,241	27·1
55	8,433	18·0	8,983	22·8
60	7,677	14·5	8,591	18·7
65	6,594	11·4	7,997	14·9
70	5,129	8·9	7,080	11·4
75	3,530	6·8	5,727	8·5
80	2,014	5·1	3,955	6·2
85	860	3·9	2,112	4·5

Table V.5. Abridged Life Tables for Greater London, 1960-62

Age x	Males		Females	
	l_x	$\mathring{e}_x$	l_x	$\mathring{e}_x$
0	10,000	68·7	10,000	75·0
5	9,743	65·5	9,800	71·5
10	9,722	60·6	9,786	66·6
15	9,705	55·7	9,774	61·6
20	9,660	51·0	9,757	56·7
25	9,614	46·2	9,736	51·9
30	9,570	41·4	9,707	47·0
35	9,513	36·6	9,664	42·2
40	9,431	32·0	9,598	37·5
45	9,304	27·4	9,503	32·8
50	9,079	23·0	9,353	28·3
55	8,683	18·9	9,126	24·0
60	8,014	15·2	8,780	19·8
65	6,984	12·1	8,250	15·9
70	5,611	9·4	7,429	12·3
75	3,995	7·2	6,191	9·3
80	2,381	5·4	4,505	6.8
85	1,081	4·0	2,599	4·9

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