

CONTINUOUS MORTALITY INVESTIGATION

MORTALITY OF ANNUITANTS:
EXPERIENCE FOR 1955-58

IN *J.I.A.* 84, 73, and *T.F.A.* 25, 316, a comparison was given between the mortality experienced in 1951-54 with that expected according to the generation table for durations 5 and over, published with the *a(55)* table. A similar comparison for 1955-58 is given in Table 1. It will be seen that, generally speaking, mortality at durations 5 and over was a little heavier than expected on the basis of the projected rates. At durations 1-4, as would be expected, mortality was lighter at most ages than the projected rates for durations 5 and over.

It is interesting to compare the percentages of actual to expected deaths for all ages combined for the two four-year periods:

Period	Males (%)	Females (%)
Durations 1-4		
1951-54	100.6	86.0
1955-58	95.9	85.9
Durations 5 and over		
1951-54	101.2	106.2
1955-58	104.1	107.5

These results suggest that male mortality at durations 1-4 has improved between the two periods more than was assumed by the generation tables, while female mortality has improved to approximately the assumed extent. At durations 5 and over, the improvement in mortality assumed in the generation tables was not in fact realized.

In order to make a direct comparison with the earlier period, and at the same time to show the results on the basis of a standard table to facilitate comparison, if required, with pensioners' mortality for the same period, the annuitants' mortality for each of three four-year periods has been compared with that expected according to the annuitants' mortality experience in 1947, as published on page xviii of the preface to *The a(55) Tables for Annuitants*. These comparisons are shown in Table 2. In order to bring the annuitants' and the pensioners' investigations into line it has been necessary to re-arrange the grouping of the annuitants' experience and to include the year 1955 in two adjacent groups, i.e. 1952-55 and 1955-58.

For male annuitants the results at duration 0 show an increase (statistically non-significant) between 1948-51 and 1952-55. In the last period, however, there was a sharp decrease which may be due to a change in the class of annuitant after the 1956 Finance Act. It is noteworthy that the data at duration 0 have substantially increased since 1956.

At durations 1-4 the male mortality was significantly higher in 1952-55 than in 1948-51, but fell again in 1955-58 (although not to the level of the first period). There seems to be no ostensible reason for these variations.

At durations 5 and over, the male mortality showed little change over the entire period and, as already remarked, the improvement envisaged in the construction of the *a*(55) tables has not materialized. This is in accord with the experience of the general male population at ages over 55, i.e. the ages at which the annuitant data are almost wholly concentrated. In fact it can be said that the mortality has conformed fairly closely to the basic table for the experience of male annuitants in 1947. What effect the entry of the new class of annuitants consequent upon the 1956 Finance Act may have cannot at present be foretold.

For female lives there is again a reduction (though less marked than for the males) at duration 0 for the final period, and again a direct effect of the 1956 Finance Act may be suspected. There has also been a steadily maintained fall at most ages in the mortality at durations 1-4. At durations 5 and over the experience, like that of the male lives, has shown no significant variation over the entire period and has in fact lain slightly above the 1947 experience table. In the general population, female mortality has shown improvement between 1947 and 1958 at all ages below 85 and the lack of any improvement among female annuitants at durations 5 and over is surprising. As with the males, however, the effect of possible changes in the class of annuitant following the 1956 Finance Act is as yet uncertain.

The following table summarizes the percentages of actual to expected deaths on the basis of the 1947 table of annuitant mortality. The third

*Percentages of actual to expected deaths according
to the 1947 table of annuitant mortality*

(All ages combined)

Duration	Sex	1948-51	1952-55	1956-58
0	Male	65	73	53
	Female	57	62	53
1-4	Male	86	101	85
	Female	84	83	79
5 and over	Male	100	98	97
	Female	103	100	103

period has been reduced to the triennium 1956-58 in order to throw the contrast between the experience before and after the 1956 Finance Act into sharper relief. When studying the figures it should be borne in mind that the 1947 table is an ultimate table relating to durations 5 and over and that these ultimate rates have here been used to calculate the expected deaths in all three groups of durations.

The low percentages at duration 0 for 1956-58 should be regarded as a warning that a change may have taken place in the class of life entering the experience and it will be interesting to see whether the statistics for future years confirm this impression.

Table 1. *Mortality of annuitants 1955-58. Comparison of actual deaths under immediate annuities with deaths according to the 'duration 5 and over' generation table published with the a(55) tables*

Ages (nearest)	Actual deaths	Expected deaths	100 A/E	Actual deaths	Expected deaths	100 A/E
	Males, durations 1-4			Males, durations 5 and over		
41-50	—	—	—	—	1	0
51-55	6	2	300	2	3	67
56-60	8	5	160	15	9	167
61-65	15	19	79	66	36	183
66-70	97	87	111	145	124	117
71-75	113	120	94	469	393	119
76-80	134	145	92	755	746	101
81-85	133	128	104	895	912	98
86-90	36	59	61	690	701	98
91-95	12	13	92	261	244	107
96 and over				53	51	104
All ages over 40	554	578	96	3,351	3,220	104
	Females, durations 1-4			Females, durations 5 and over		
41-50	2	2	100	4	3	133
51-55	4	5	80	12	11	109
56-60	18	18	100	39	37	105
61-65	54	59	92	133	136	98
66-70	107	129	83	491	422	116
71-75	187	210	89	1,058	1,098	96
76-80	226	289	78	2,358	2,191	108
81-85	221	255	87	3,479	3,096	112
86-90	130	148	88	2,860	2,737	104
91-95	52	51	102	1,431	1,311	109
96 and over				343	313	110
All ages over 40	1,001	1,166	86	12,208	11,355	108

Table 2. Annuitants 1948-58: actual deaths and percentages of actual to expected deaths according to the 1947 table of annuitant mortality

Duration	Age-group	Males						Females					
		1948-51			1952-55			1955-58			1948-51		
		Deaths	100 A/E	Deaths	100 A/E	Deaths	100 A/E	Deaths	100 A/E	Deaths	100 A/E	Deaths	100 A/E
0	41-70	32	72	35	92	32	70	55	55	34	51	33	45
	71-80	43	57	46	65	41	46	78	54	73	62	81	57
	81 and over	28	70	27	67	38	62	52	63	56	70	75	65
	All over 40	103	65	108	73	111	57	185	57	163	62	189	57
1-4	41-60	18	125	11	125	14	185	62	103	32	87	24	86
	61-65	28	87	30	131	15	74	80	73	64	82	54	85
	66-70	96	91	98	97	97	104	180	79	121	74	107	77
	71-75	128	77	148	107	113	88	234	73	216	82	187	83
	76-80	145	81	148	92	134	87	314	94	256	83	226	74
	81-85	107	85	140	101	133	99	215	88	233	87	221	82
	86-90	58	108	53	95	36	58	114	90	138	85	130	84
	91 and over	13	102	14	123	12	88	22	86	42	101	52	99
	All over 40	593	86	642	101	554	90	1,221	84	1,102	83	1,001	81
	5 and over	41	195	21	118	17	117	84	108	71	104	55	97
5 and over	41-60	59	90	64	140	66	169	183	92	139	81	133	90
	61-65	193	95	159	94	145	108	602	103	495	95	491	108
	66-70	535	100	467	101	469	112	1,365	101	1,236	97	1,058	90
	71-75	883	103	784	92	755	96	2,362	101	2,360	100	2,358	102
	76-80	906	101	944	99	895	93	2,958	103	3,195	101	3,479	107
	81-85	496	89	650	99	600	95	2,427	110	2,539	101	2,860	100
	86-90	211	105	202	101	261	104	1,040	105	1,232	108	1,431	106
	91-95	40	110	38	69	53	103	230	91	324	105	343	107
	96 and over	100	100	3,329	98	3,351	99	11,251	103	11,591	100	12,208	102
	All over 40	3,364	100	3,329	98	3,351	99	11,251	103	11,591	100	12,208	102

MORTALITY OF PENSIONERS UNDER LIFE OFFICE
PENSION SCHEMES: EXPERIENCE FOR 1955-58

THE last report on the experience of the pensioners' section of the Continuous Mortality Investigation was based on the years 1952-55, and was published in *J.I.A.* 84, 77, and *T.F.A.* 25, 322. In order to make the pensioners' experience more directly comparable with the experience under single-life immediate annuities, it has been decided to synchronize this report with the one concurrently being published in respect of the annuitants, by basing it on the years 1955-58.

Broadly speaking, for the males and also for the females who retired at or after normal retiring age, the experience of 1955 was similar to the combined experience of the three years 1956-58. In the case of the females who retired before the normal age, the mortality experienced in 1955 was higher at all ages than in 1956-58 but was similar to the combined experience of 1952-54. It follows that the inclusion of the year 1955 in this report as well as the previous one will not affect the direction of the trends, although they will be less marked than if two completely independent quadrennia were compared.

As this report is being synchronized with the report on the mortality of annuitants, the bases of comparison are also being changed to make the two reports similar. The annuitants' experience was first compared with the expected deaths according to the generation tables published with the *a(55)* table, and a similar comparison for pensioners who retired at or after the normal age is shown in Table 1 for the two periods 1951-54 and 1955-58. For males, it will be seen that the divergence between pensioner mortality and the projected annuitants' generation tables is greatest at the youngest ages and tends to decrease with age, the relationship being much the same for the two periods. For females, if there is any similar feature in the experience it is difficult to discern, although it may be significant that the percentage ratios of actual to expected deaths were higher for the later than the earlier period at the three youngest age-groups and lower at the other four; if this tendency continues then the picture for females may shortly be similar to that for males.

In Table 2, the ratios are shown for the three periods 1948-51, 1952-55 and 1955-58, between the actual deaths amongst pensioners who retired at or after the normal age and the expected deaths according to the English Life Tables No. 11 and to the 1947 table of annuitant mortality experienced at durations 5 and over published on p. xviii of *The a(55) Tables for Annuitants*. The ratios are given in age-groups and also, as in previous reports, for individual ages 66-80 for males only, the data for females being too scanty to justify an age-by-age

Table 1. *Pensioners who retired at or after the normal age. Comparison of actual deaths with deaths expected according to the generation tables published with the a(55) table*

Ages nearest	1951-54			1955-58		
	Actual deaths	Expected deaths	100 A/E	Actual deaths	Expected deaths	100 A/E
Males						
60 and under	11	7	157	21	14	150
61-65	294	177	166	443	231	192
66-70	2,976	2,247	132	4,477	3,220	139
71-75	1,788	1,574	114	4,094	3,337	123
76-80	778	690	113	1,704	1,534	111
81-85	154	138	112	500	479	104
86-90	29	29	100	72	66	109
91 and over	4	3	133	9	8	112
All ages	6,034	4,865	124	11,320	8,889	127
Females						
60 and under	18	14	129	29	19	153
61-65	98	86	114	218	185	118
66-70	67	72	93	168	172	98
71-75	60	46	130	99	99	100
76-80	23	19	121	50	50	100
81-85	10	9	111	19	17	112
86 and over	4	3	133	5	8	62
All ages	280	249	112	588	550	107

tabulation. For males, generally it was only in the youngest age-group (65 and under) that pensioner mortality exceeded population mortality, although there was a tendency throughout the eleven years for mortality in the other age-groups to approach the population mortality, the feature that the ratios of actual to expected deaths decrease with advancing age again being shown. For females too, it is only in the youngest age-group (60 and under) that pensioner mortality generally exceeded population mortality, but the tendency for the ratios to decrease with age was not so clear until 1955-58—possibly owing to paucity of data in the earlier periods. There was no tendency for mortality of female pensioners at the higher ages to approach population mortality.

The comparisons with the 1947 table of annuitant mortality show that male pensioner mortality has been well above this table, while by 1955-58 female pensioner mortality had fallen below this table at all the higher age-groups. If the percentages are compared with Table 2 of the note on the mortality of annuitants (page 256) it will be seen that, whereas male pensioners have throughout experienced heavier mortality than

Table 2. Pensioners who retired at or after the normal age. Experience 1948-51, 1952-55 and 1955-58

Ages nearest	1948-51			1952-55			1955-58			100 A/E (1947 table of annuitant mortality)		
	Expected deaths			Expected deaths			Expected deaths			100 A/E (E.L.T. 11)		
	1947 table of annuitant mortality			1947 table of annuitant mortality			1947 table of annuitant mortality			1948-1955-58		
	Exposed to risk	Actual deaths	E.L.T. 11	Exposed to risk	Actual deaths	E.L.T. 11	Exposed to risk	Actual deaths	E.L.T. 11	1948-51	1952-55	1955-58
Males												
66	10,369	420	390	14,324	588	552	18,460	727	712	105	107	102
67	9,990	360	410	15,713	658	600	20,202	849	848	86	100	100
68	8,535	350	390	15,707	687	718	20,466	904	935	90	96	97
69	6,791	323	338	14,872	682	740	19,881	978	989	96	92	99
70	5,446	260	295	13,424	713	727	18,917	1,019	1,025	90	98	99
71	4,622	245	273	11,475	615	678	17,533	970	1,035	90	91	94
72	3,876	247	240	9,076	483	584	15,404	912	901	90	83	92
73	3,180	200	221	6,980	416	490	13,026	880	915	90	85	96
74	2,543	170	195	5,371	363	411	10,484	749	803	87	88	93
75	1,938	143	162	4,235	287	354	8,141	583	681	88	81	86
76	1,428	110	131	3,366	267	308	6,089	473	557	91	87	85
77	972	111	97	2,627	234	262	4,597	415	460	114	89	90
78	620	56	68	1,959	182	214	3,473	324	379	82	85	85
79	398	32	47	1,421	125	170	2,601	262	321	68	74	82
80	265	34	35	1,005	113	131	2,015	230	263	97	86	87
65 and under	6,802	230	219	8,552	335	275	11,391	464	363	105	122	128
66-70	41,131	1,722	1,841	74,040	3,328	3,397	97,026	4,477	4,509	94	98	99
71-75	16,159	1,005	1,102	37,137	2,164	2,517	64,588	4,094	4,425	91	86	93
76-80	3,683	352	378	10,378	921	1,085	18,865	1,704	1,980	85	86	113
81 and over	576	75	100	1,725	253	289	4,262	581	709	75	88	82
All ages	68,351	3,384	3,640	131,832	7,001	7,563	197,032	11,320	11,086	93	93	94
Females												
60 and under	1,139	8	12	1,803	25	19	2,313	20	24	67	132	121
61-65	3,255	41	52	8,346	123	134	14,063	218	239	79	92	91
66-70	1,834	32	48	4,504	83	118	8,970	168	235	67	70	71
71-75	731	44	33	3,163	66	79	5,948	109	142	133	84	70
76 and over	239	17	24	611	42	55	1,207	74	109	71	76	68
All ages	7,198	142	169	17,012	339	405	30,316	588	749	84	84	79
										105	105	105

male annuitants at durations 5 and over, in the corresponding female sections there is now less difference between pensioners and annuitants.

Generally, although there has been little over-all change in the levels of male mortality from period to period, it has tended to rise at the younger ages and to fall at the older; and a similar feature seems to be developing for female mortality combined with an over-all reduction between 1952-55 and 1955-58.

Offices will recognize that the need for allowing for future mortality improvement is as important for pensioners as for annuitants. New entrants to pension schemes at the present time will not become pensioners for some decades to come, during which time there may be marked improvements in the mortality of older lives, and careful consideration should be given to the choice of a suitable mortality table.

Originally the experience of pensioners related predominantly to retired clerical employees, but retired manual workers may have come increasingly into the experience in recent years, and will continue to do so in future. Some light on the effect on the mortality shown by mixing the experience might be thrown by the information obtained from the data now being collected for studying the mortality experience by amounts. Although many of the contributing offices did not begin to submit data for amounts until the year 1959, twenty-four offices submitted information for the year 1958, and the experience of these offices by lives and amounts is shown in Table 3. In spite of the comparative smallness of the data, it is clear that at all ages male mortality is lower when weighted with the size of the pension; in other words the mortality of those in receipt of larger pensions is lighter. This does not appear to be so for females, possibly because there is greater class homogeneity in the female experience; but by reason of paucity of data this result should not be regarded as conclusive, the number of deaths at all ages being only 153.

Table 4 shows the experience of pensioners who retired before the normal age, actual deaths again being compared with the E.L.T. 11 and the 1947 table of annuitant mortality. The percentages decrease with age, this tendency being more marked than in the case of the normal retirements. In Table 5, the percentages of actual to expected deaths according to E.L.T. 11 are compared with the corresponding percentages for the normal retirements; it will be seen that for both sexes the over-all mortality for those who retired early is of the order of 80% higher than that experienced by those who retired at or after the normal age, the disparity being above this average in the lowest age-group (up to 65 for males and up to 60 for females) and tending in the case of males (but not necessarily for females) to diminish throughout life.

Table 3. *Pensioners who retired at or after the normal age, twenty-four offices only, 1958. Comparison by both lives and amounts between mortality experienced and that expected according to the 1947 table of annuitant mortality*

Ages nearest	Lives			Amounts		
	Actual deaths	Expected deaths	100 A/E	Actual deaths	Expected deaths	100 A/E
Males						
65 and under	120	67	179	13,618	9,044	151
66-70	1,082	844	128	106,649	85,323	125
71-75	1,068	886	121	78,972	78,420	101
76-80	462	416	111	34,055	35,419	96
81 and over	152	151	101	9,905	12,039	82
All ages	2,884	2,364	122	243,199	220,245	110
Females						
60 and under	5	5	100	334	303	110
61-65	51	54	94	2,634	2,549	103
66-70	50	54	93	1,979	2,355	84
71-75	29	30	97	943	1,313	72
76 and over	18	19	95	941	853	110
All ages	153	120 162	94	6,831	7,373	93

Table 4. *Pensioners who retired before the normal age. Experience 1948-51, 1952-55 and 1955-58*

Ages nearest	1948-51			1952-55			1955-58			100 A/E (E.L.T. 11)			100 A/E (1947 table of annuitant mortality)		
	Expected deaths			Expected deaths			Expected deaths			(E.L.T. 11)			1948-1952-1955-58		
	1947 table of annuitant mortality			1947 table of annuitant mortality			1947 table of annuitant mortality			1948-1952-1955-58			1948-1952-1955-58		
	Exposed to risk	Actual deaths	E.L.T. 11	Exposed to risk	Actual deaths	E.L.T. 11	Exposed to risk	Actual deaths	E.L.T. 11	Exposed to risk	Actual deaths	E.L.T. 11	Exposed to risk	Actual deaths	E.L.T. 11
Males															
65 and under	5,652	387	151	109	8,843	581	239	173	11,513	811	312	226	256	243	260
66-70	2,780	148	123	95	5,731	346	257	197	8,038	528	362	278	120	135	146
71 and over	1,046	82	78	63	2,294	181	176	143	4,181	347	325	264	105	103	107
All ages	9,478	617	352	267	16,868	1,108	672	513	23,732	1,686	999	768	175	165	169
Females															
60 and under	737	14	7	6	1,438	41	13	12	2,044	54	19	17	200	315	284
61-65	704	18	11	10	1,333	27	22	18	2,174	41	35	30	164	123	117
66 and over	285	8	9	7	891	30	28	22	1,586	58	53	41	89	107	109
All ages	1,726	40	27	23	3,662	98	63	52	5,804	153	107	88	148	156	143
													233	342	318
													186	150	137
													114	136	141
													174	188	174

Table 5. *Comparison between experience of pensioners who retired before the normal age and that of pensioners who retired at or after the normal age*

(Expected deaths according to the English Life Tables No. 11.)

Ages nearest	Before normal age 100 A/E			At or after normal age 100 A/E			100 A/E (early retirements) 100 A/E (normal or late retirements)		
	1948-	1952-	1955-	1948-	1952-	1955-	1948-	1952-	1955-
	51	55	58	51	55	58	51	55	58
Males									
65 and under	256	243	260	105	122	128	2.44	1.99	2.03
66-70	120	135	146	94	98	99	1.28	1.38	1.47
71 and over	105	103	107	91	86	90	1.15	1.20	1.19
All ages	175	165	169	93	93	94	1.88	1.77	1.80
Females									
60 and under	200	315	284	67	132	121	2.99	2.39	2.35
61-65	164	123	117	79	92	91	2.08	1.37	1.29
66 and over	89	107	109	89	76	70	1.00	1.41	1.56
All ages	148	156	143	84	84	79	1.76	1.86	1.81