

**TRANSACTIONS OF SOCIETY OF ACTUARIES
1949 VOL. 1 NO. 1**

**REPORT OF THE COMMITTEE ON MORTALITY UNDER
ORDINARY INSURANCES AND ANNUITIES**

**MORTALITY UNDER STANDARD "ORDINARY"
INSURANCE ISSUES**

In continuance of the series of studies which have been undertaken annually since 1934 the present report covers the mortality experience observed between 1947 and 1948 policy anniversaries. As in the previous years sixteen life insurance companies, including the thirteen largest in the United States and Canada, contributed their data for the additional year of experience now presented.

The study covers the following subjects:

1. Mortality during the first fifteen years of insurance under standard, medically examined, "Ordinary" insurances.
2. Mortality during the sixteenth and later policy years under standard, "Ordinary" insurances, by attained age only.

**EXPERIENCE IN THE FIRST FIFTEEN YEARS OF INSURANCE ISSUES
OF 1933 TO 1947**

The total exposures amounted to \$38,805,486,000 while death losses were \$137,309,000. The actual claims were related to the expected by the 1925-1939 Basic Table published in *TASA XLII*, 182. Table 1 summarizes the results first by ages at entry for all years of issue combined and second by year of issue for all ages combined. Table 2 shows the data for each year of issue subdivided by age at entry. In Table 3 the mortality ratios of the current experience are compared with those of the last six years after excluding war deaths prior to the 1946 anniversaries. This comparison has been made by age at entry and by policy duration. The over-all ratio of actual to expected mortality of 63% compares favorably with 66% in the previous year and 77% in 1941-1942, the first year shown in the table. A reduction in mortality has occurred in all but four issue age groups in 1947-1948 compared with 1946-1947. Such increases as occurred were small and scattered.

While the Committee's instructions call for reporting only medically examined business in the experience of the first fifteen years of duration, it appears that two contributors have found it impracticable to make such a limitation at this time, although it is hoped that this can be done in the

TABLE 1
EXPERIENCE BETWEEN ANNIVERSARIES IN 1947 AND 1948
EXPECTED DEATHS BY BASIC TABLE 1925-1939

UNIT \$1,000

ISSUES 1933 TO 1947—DURATIONS 1 TO 15

Ages at Entry	Exposed to Risk	Actual Deaths	Expected Deaths	Ratio
10-14.....	\$ 1,279,535	\$ 1,143	\$ 2,046	56%
15-19.....	2,232,921	2,245	4,039	56
20-24.....	4,518,285	4,476	8,616	52
25-29.....	6,204,065	8,540	14,930	57
30-34.....	7,045,642	13,473	22,575	60
35-39.....	6,600,186	21,040	32,008	66
40-44.....	5,129,956	25,274	38,696	65
45-49.....	3,197,705	25,260	37,403	68
50-54.....	1,691,674	17,515	29,517	59
55-59.....	677,473	11,763	17,832	66
60-64.....	194,576	5,213	7,835	67
65 and over.....	33,468	1,367	1,861	73
Total.....	\$38,805,486	\$137,309	\$217,358	63%

ALL AGES COMBINED

Year of Issue	Exposed to Risk	Actual Deaths	Expected Deaths	Ratio
1933.....	\$ 1,425,670	\$ 12,461	\$ 15,293	81%
1934.....	1,865,552	13,511	18,367	74
1935.....	1,880,450	11,950	17,021	70
1936.....	2,103,815	12,093	17,300	70
1937.....	2,271,428	11,300	16,917	67
1938.....	2,182,159	9,301	14,892	62
1939.....	1,901,486	7,647	11,841	65
1940.....	2,163,714	7,787	12,356	63
1941.....	2,705,555	8,835	14,507	61
1942.....	1,992,402	6,204	10,950	57
1943.....	2,393,268	7,526	12,598	60
1944.....	2,767,417	7,929	13,382	59
1945.....	3,151,697	7,754	13,499	57
1946.....	4,979,213	7,333	16,442	45
1947.....	5,021,660	5,678	11,993	47
Total.....	\$38,805,486	\$137,309	\$217,358	63%

TABLE 2
EXPERIENCE BETWEEN ANNIVERSARIES IN 1947 AND 1948
EXPECTED DEATHS BY BASIC TABLE 1925-1939

UNIT \$1,000

Issue Year	Duration	Ages at Entry	Exposed to Risk	Actual Deaths	Expected Deaths	Ratio
1933	15	10-14	\$ 88,771	\$ 113	\$ 191	59%
		15-19	109,625	167	201	83
		20-24	171,747	266	392	68
		25-29	231,486	614	1,137	54
		30-34	232,414	1,040	1,367	76
		35-39	219,779	2,142	2,255	95
		40-44	171,279	2,397	2,806	85
		45-49	109,351	2,182	2,633	83
		50-54	55,412	1,710	2,014	85
		55-59	26,958	1,112	1,430	78
		60-64	7,793	634	727	87
		65 and over	1,055	84	140	60
		Total	\$1,425,670	\$12,461	\$15,293	81%
		1934	14	10-14	\$ 88,404	\$ 103
15-19	119,282			110	221	50
20-24	234,887			324	514	63
25-29	318,272			737	1,311	56
30-34	327,500			1,434	1,805	79
35-39	295,587			2,081	2,657	78
40-44	230,680			2,648	3,446	77
45-49	137,336			2,475	3,157	78
50-54	72,742			1,544	2,563	60
55-59	30,021			1,330	1,575	84
60-64	9,561			586	773	76
65 and over	1,280			139	151	92
Total	\$1,865,552			\$13,511	\$18,367	74%
1935	13			10-14	\$ 77,935	\$ 95
		15-19	118,591	148	223	66
		20-24	243,192	306	523	59
		25-29	326,107	747	1,141	65
		30-34	334,009	1,136	1,727	66
		35-39	300,931	1,989	2,429	82
		40-44	228,383	2,435	3,111	78
		45-49	139,600	1,907	3,017	63
		50-54	70,070	1,503	2,300	65
		55-59	30,103	1,162	1,508	77
		60-64	9,946	441	710	62
		65 and over	1,583	81	163	50
		Total	\$1,880,450	\$11,950	\$17,021	70%

TABLE 2—Continued

Issue Year	Duration	Ages at Entry	Exposed to Risk	Actual Deaths	Expected Deaths	Ratio
1936	12	10-14	\$ 83,897	\$ 87	\$ 180	48%
		15-19	133,564	137	252	54
		20-24	277,811	404	589	69
		25-29	363,639	787	1,116	71
		30-34	368,889	1,254	1,778	71
		35-39	333,021	1,986	2,474	80
		40-44	268,549	2,182	3,322	66
		45-49	155,296	2,379	3,120	76
		50-54	76,394	1,590	2,244	71
		55-59	31,072	745	1,433	52
		60-64	10,046	479	644	74
		65 and over	1,637	63	148	43
			Total	\$2,103,815	\$12,093	\$17,300
1937	11	10-14	\$ 90,691	\$ 91	\$ 183	50%
		15-19	146,642	141	277	51
		20-24	318,406	339	662	51
		25-29	396,159	718	1,117	64
		30-34	404,046	1,257	1,806	70
		35-39	344,290	1,785	2,372	75
		40-44	271,179	1,921	3,056	63
		45-49	167,117	2,252	3,045	74
		50-54	85,416	1,296	2,224	58
		55-59	35,473	991	1,445	69
		60-64	10,336	325	599	54
		65 and over	1,673	184	131	140
			Total	\$2,271,428	\$11,300	\$16,917
1938	10	10-14	\$ 91,768	\$ 108	\$ 171	63%
		15-19	132,316	105	250	42
		20-24	289,093	328	598	55
		25-29	377,390	680	996	68
		30-34	402,933	950	1,652	58
		35-39	342,467	1,171	2,182	54
		40-44	256,004	1,958	2,593	76
		45-49	162,293	1,586	2,650	60
		50-54	80,766	1,172	1,867	63
		55-59	33,820	760	1,201	63
		60-64	11,325	432	593	73
		65 and over	1,984	51	139	37
			Total	\$2,182,159	\$ 9,301	\$14,892

TABLE 2—Continued

Issue Year	Duration	Ages at Entry	Exposed to Risk	Actual Deaths	Expected Deaths	Ratio
1939.....	9	10-14	\$ 80,484	\$ 67	\$ 139	48%
		15-19	126,679	123	239	51
		20-24	270,585	240	549	44
		25-29	332,855	415	832	50
		30-34	334,143	732	1,270	58
		35-39	285,467	1,176	1,684	70
		40-44	212,544	1,283	1,945	66
		45-49	139,555	1,412	2,039	69
		50-54	76,013	986	1,588	62
		55-59	31,938	823	1,000	82
		60-64	9,424	276	443	62
		65 and over	1,799	114	113	101
			Total	\$1,901,486	\$ 7,647	\$11,841
1940.....	8	10-14	\$ 82,277	\$ 73	\$ 131	56%
		15-19	146,155	139	278	50
		20-24	318,222	293	636	46
		25-29	385,309	455	932	49
		30-34	379,371	895	1,351	66
		35-39	323,693	1,149	1,780	65
		40-44	239,607	1,130	1,998	57
		45-49	157,515	1,647	2,084	79
		50-54	84,080	1,068	1,619	66
		55-59	35,263	553	997	55
		60-64	10,137	276	428	64
		65 and over	2,085	109	122	89
			Total	\$2,163,714	\$ 7,787	\$12,356
1941.....	7	10-14	\$ 89,843	\$ 117	\$ 132	89%
		15-19	196,146	188	377	50
		20-24	396,891	429	786	55
		25-29	468,794	507	1,111	46
		30-34	481,213	855	1,617	53
		35-39	414,404	1,302	2,126	61
		40-44	293,996	1,561	2,267	69
		45-49	200,717	1,664	2,431	68
		50-54	105,071	1,055	1,899	56
		55-59	41,904	704	1,087	65
		60-64	13,960	375	529	71
		65 and over	2,616	78	145	54
			Total	\$2,705,555	\$8,835	\$14,507

TABLE 2—Continued

Issue Year	Duration	Ages at Entry	Exposed to Risk	Actual Deaths	Expected Deaths	Ratio
1942.....	6	10-14	\$ 66,735	\$ 53	\$ 92	58%
		15-19	145,392	151	281	54
		20-24	236,331	216	468	46
		25-29	326,470	421	748	56
		30-34	349,631	624	1,098	57
		35-39	313,918	974	1,510	65
		40-44	234,636	1,127	1,701	66
		45-49	167,322	913	1,867	49
		50-54	96,422	926	1,647	56
		55-59	40,592	476	980	49
		60-64	12,251	250	422	59
		65 and over	2,702	73	136	54
			Total	\$1,992,402	\$ 6,204	\$10,950
1943.....	5	10-14	\$ 76,919	\$ 65	\$ 97	67%
		15-19	145,058	145	273	53
		20-24	205,094	152	392	39
		25-29	332,555	308	702	44
		30-34	410,997	708	1,143	62
		35-39	424,400	931	1,782	52
		40-44	353,322	1,655	2,244	74
		45-49	241,352	1,281	2,310	55
		50-54	131,788	890	1,965	45
		55-59	53,902	983	1,131	87
		60-64	15,227	270	447	60
		65 and over	2,654	138	112	123
			Total	\$2,393,268	\$ 7,526	\$12,598
1944.....	4	10-14	\$ 89,298	\$ 48	\$ 104	46%
		15-19	153,524	207	279	74
		20-24	194,306	227	358	63
		25-29	316,500	426	620	69
		30-34	476,219	513	1,186	43
		35-39	531,510	1,121	1,983	57
		40-44	466,758	1,161	2,633	44
		45-49	295,364	1,742	2,449	71
		50-54	162,907	1,315	2,119	62
		55-59	62,197	906	1,141	79
		60-64	15,998	192	410	47
		65 and over	2,836	71	100	71
			Total	\$2,767,417	\$ 7,929	\$13,382

TABLE 2—Continued

Issue Year	Duration	Ages at Entry	Exposed to Risk	Actual Deaths	Expected Deaths	Ratio
1945	3	10-14	\$ 90,955	\$ 42	\$ 98	43%
		15-19	155,348	135	275	49
		20-24	223,966	174	399	44
		25-29	364,686	543	675	80
		30-34	576,904	661	1,315	50
		35-39	636,164	1,168	2,144	54
		40-44	519,076	1,441	2,621	55
		45-49	322,557	1,561	2,374	66
		50-54	175,129	1,091	2,017	54
		55-59	65,832	453	1,069	42
		60-64	18,077	422	417	101
		65 and over	3,003	63	95	66
			Total	\$3,151,697	\$ 7,754	\$13,499
1946	2	10-14	\$ 94,791	\$ 43	\$ 97	44%
		15-19	185,326	195	317	62
		20-24	593,057	371	1,020	36
		25-29	863,527	699	1,468	48
		30-34	979,693	797	2,008	40
		35-39	904,379	1,101	2,695	41
		40-44	671,421	1,438	2,894	50
		45-49	388,499	1,335	2,448	55
		50-54	199,833	792	1,962	40
		55-59	75,360	365	1,038	35
		60-64	19,973	156	399	39
		65 and over	3,354	41	96	43
			Total	\$4,979,213	\$ 7,333	\$16,442
1947	1	10-14	\$ 86,767	\$ 38	\$ 68	56%
		15-19	219,273	154	296	52
		20-24	544,697	407	730	56
		25-29	800,316	483	1,024	47
		30-34	987,680	617	1,452	42
		35-39	930,176	964	1,935	50
		40-44	712,522	937	2,059	46
		45-49	413,831	924	1,779	52
		50-54	219,631	577	1,489	39
		55-59	83,038	400	797	50
		60-64	20,522	99	294	34
		65 and over	3,207	78	70	111
			Total	\$5,021,660	\$ 5,678	\$11,993

TABLE 3

MORTALITY RATIOS DURING SEVEN YEAR PERIOD, 1941 TO 1948 ANNIVERSARIES
(WAR DEATHS PRIOR TO 1946 ANNIVERSARIES EXCLUDED)

Ratios, for Experience Years Indicated, of Actual Deaths by Amount
to Expected Deaths Computed by Basic Table 1925-1939

DURATIONS 1 TO 15 COMBINED

Ages at Entry	1941-1942	1942-1943	1943-1944	1944-1945	1945-1946	1946-1947	1947-1948
10-14	70%	50%	52%	27%	87%	65%	56%
15-19	71	57	61	50	94	61	56
20-24	64	63	61	61	66	58	52
25-29	66	62	61	62	57	56	57
30-34	71	71	75	67	67	61	60
35-39	78	74	75	70	68	65	66
40-44	78	72	77	72	70	66	65
45-49	79	76	74	69	73	74	68
50-54	82	79	71	70	64	68	59
55-59	81	77	77	81	66	65	66
60-64	84	70	91	70	60	66	67
65 and over	75	69	96	75	71	75	73
Total	77%	73%	74%	69%	68%	66%	63%

ALL AGES COMBINED

Policy Year	1941-1942	1942-1943	1943-1944	1944-1945	1945-1946	1946-1947	1947-1948
1	64%	57%	61%	51%	50%	47%	47%
2	59	51	58	51	49	48	45
3	71	64	53	52	61	58	57
4	59	57	55	57	74	63	59
5	64	55	65	57	58	68	60
6	69	62	56	59	58	56	57
7	70	61	64	63	66	55	61
8	72	67	72	60	64	63	63
9	80	73	70	72	68	65	65
10	77	78	70	72	66	68	62
11	76	76	80	76	70	74	67
12	87	81	84	73	72	68	70
13	86	81	83	73	77	72	70
14	90	84	89	81	83	78	74
15	88	89	90	91	80	88	81
Total	77%	73%	74%	69%	68%	66%	63%

future. The total contribution of one of these companies to the exposures for the first policy year amounted to less than $1\frac{1}{2}\%$ of the exposures of all companies for that policy year, so that any deviation in its nonmedical mortality from the mortality under medically examined insurance should have a minor effect on the results. The other company's contribution was

TABLE 4
EXPERIENCE BETWEEN ANNIVERSARIES IN 1947 AND 1948
ISSUES OF 1932 AND EARLIER—DURATIONS 16 AND OVER COMBINED
UNIT \$1,000

Attained Ages	(1) Exposed to Risk	(2) Actual Deaths	(3) Rate of Mortality per M*	(4) Expected Deaths†	(5) Ratio (2) ÷ (4)
25-29.....	\$ 132,922	\$ 155	1.17	\$ 423	37%
30-34.....	379,845	548	1.44	1,524	36
35-39.....	942,906	1,938	2.06	4,978	39
40-44.....	1,792,077	6,226	3.47	12,823	49
45-49.....	2,466,180	13,908	5.64	24,754	56
50-54.....	2,991,195	28,782	9.62	43,215	67
55-59.....	2,973,358	48,232	16.22	62,626	77
60-64.....	2,420,739	59,913	24.75	75,231	80
65-69.....	1,534,462	60,277	39.28	70,937	85
70-74.....	889,585	49,688	55.86	61,035	81
75-79.....	408,537	35,354	86.54	41,513	85
80-84.....	138,863	15,348	110.52	20,717	74
85-89.....	30,345	5,534	182.38	6,578	84
90-94.....	4,151	1,062	255.85	1,283	83
95.....	218	108	497.02	86	126
Total.....	\$17,105,383	\$327,073	\$427,723	77%

* The rate of mortality for each quinary age group was obtained from deaths taken to the dollar, although in column (2) the amounts are given to the nearest \$1,000.

† By Commissioners 1941 Standard Ordinary Table for individual attained ages.

considerably higher, its nonmedical material for the first policy year possibly accounting for about 15% of the first year exposures of all companies for issue ages 10 to 19, possibly 7% for issue ages 20 to 29 and 2% for issue ages 30 to 39. Proportions such as these are applicable only to the first few policy years; prior to 1942 the nonmedical business of this company was an insignificant part of its total issues. This company reports that in a recent investigation its standard nonmedical business gave a slightly more favorable mortality rate than its medically examined business.

EXPERIENCE IN THE 16TH AND LATER YEARS OF INSURANCE ISSUES
OF 1932 AND EARLIER

All but one of the companies contributing to the study of the recent issues have supplied data on exposures and death losses by attained ages for standard issues in force more than fifteen years.

The total exposure was \$17,105,383,000 of insurance and the death claims amounted to \$327,073,000. Table 4 summarizes the results in

TABLE 5
MORTALITY RATIOS DURING SEVEN YEAR PERIOD, 1941 TO 1948 ANNIVERSARIES
(WAR DEATHS PRIOR TO 1946 ANNIVERSARIES EXCLUDED)
DURATIONS 16 AND OVER
Ratios, for Experience Years Indicated, of Actual Deaths by Amount to
Expected Deaths Computed by Commissioners
1941 Standard Ordinary Table

Attained Ages	1941-1942	1942-1943	1943-1944	1944-1945	1945-1946	1946-1947	1947-1948
25-29.....	79%	62%	57%	76%	66%	34%	37%
30-34.....	48	53	47	47	52	43	36
35-39.....	47	41	47	47	46	37	39
40-44.....	50	51	53	48	46	44	49
45-49.....	61	63	66	57	63	58	56
50-54.....	74	72	70	70	67	66	67
55-59.....	78	76	76	74	74	76	77
60-64.....	87	87	82	81	79	81	80
65-69.....	86	88	83	80	79	77	85
70-74.....	83	87	84	86	80	79	81
75-79.....	83	85	86	81	80	85	85
80-84.....	85	98	87	87	78	83	74
85-89.....	84	80	88	76	79	78	84
90-95.....	89	74	76	58	73	84	85
Total.....	79%	80%	78%	76%	75%	75%	77%

quinary attained age groups and in addition to the exposures and deaths shows for each age group the rate of mortality, the expected deaths by the Commissioners 1941 Standard Ordinary Mortality Table (*TASA XLII*, 329) and the ratio of actual to expected deaths. The over-all ratio of actual to expected deaths was 77%, 2 percentage points higher than that of the preceding year.

In Table 5 the mortality in the current report is compared with that of the preceding six years, war deaths prior to the 1946 anniversaries being excluded. Contrary to the experience at the earlier durations, only four attained age groups show declines in mortality compared with the previous year.