

TRANSACTIONS OF SOCIETY OF ACTUARIES 1969 REPORTS

I. 1959-67 GROUP CONVERSION MORTALITY AND WITHDRAWAL EXPERIENCE

THIS report presents the results of the investigation of the mortality and withdrawal experience under permanent forms of life insurance policies issued on the attained age basis without medical examination under the Group Life conversion privilege. It covers the experience of the eleven contributing companies from policy anniversaries in 1959 to anniversaries in 1967 and is based on amounts of insurance. These eleven companies have contributed \$8,942 million of exposure to this study, of which \$8,471 million was contributed for the select portion and \$471 million for the ultimate portion. The last study of this type was published in *TSA, 1960 Reports*, pages 105-14, covering the period from anniversaries in 1953 to anniversaries in 1959 and was also based on amounts of insurance.

Nine of the eleven companies that contributed to the present study also contributed to the 1953-59 study; one of the ten contributors to the earlier study discontinued, and two new companies have joined to make up the total of eleven contributors to the 1959-67 experience. The discontinuing company's share of the total 1953-59 experience is unknown but estimated to be less than 3 per cent; the two new companies submitted about 2.5 per cent of the total 1959-67 experience.

Excluded from this study are conversions from the Federal Employees' and the Servicemen's Group Life Insurance plans, one-year preliminary term conversions, conversions from Group Paid-up or Group Permanent Insurance, conversions to monthly or weekly premium forms of insurance other than those classified as Ordinary insurance, and conversions which have been dated back or classified as "not taken." Substandard experience arising from ratings of a nonmedical nature, for example, occupational ratings, was omitted. Conversions resulting from master policy terminations, comprising a small proportion of all conversions, are included in the study. Individual contributing companies were not always able to eliminate or to include data of the types just mentioned, but the volume of such exceptions was small.

The tables used for most of the mortality comparisons are the Commissioners 1958 Standard Ordinary Table and the 1955-60 Basic Tables (*1962 Reports*, pp. 44-58). In the 1953-59 study, the Commissioners 1958 Standard Ordinary Table and the 1946-49 Basic Tables were used, which should be borne in mind when the two studies are compared.

TOTAL MORTALITY EXPERIENCE

Table 1 summarizes the select mortality experience of the contributing companies, showing mortality ratios according to the 1958 CSO Table by duration for all issue ages combined, and provides a comparison of the mortality experience during the 1959-67 period for policy years 1-20 with the corresponding experience of the 1953-59 study. The experience of the first twenty policy years combined is 176 per cent of 1958 CSO mortality, slightly higher than it was in the last study. However, it should be noted in this and other tables that ratios based on combined issue ages or the twenty policy durations are considerably af-

TABLE 1
1959-67 GROUP CONVERSION STUDY
SELECT MORTALITY RATIOS FOR FIRST TWENTY POLICY YEARS
BY POLICY YEAR, ALL AGES COMBINED
RATIOS OF ACTUAL DEATHS TO TABULAR BY THE 1958 CSO TABLE
BASED ON AMOUNTS OF INSURANCE--CONTRIBUTIONS OF ELEVEN COMPANIES

POLICY YEAR	EXPOSED TO RISK (000) 1959-67	ACTUAL DEATHS (000) 1959-67	TABULAR DEATHS (000) 1959-67	RATIO OF ACTUAL TO TABULAR	
				1959-67	1953-59
1	\$ 970,784	\$ 42,424	\$ 12,108	350%	322%
2	793,279	25,031	10,740	233	216
3	703,746	21,776	10,162	214	204
4	631,379	18,558	9,630	193	180
5	579,891	17,353	9,360	185	177
6	528,818	15,265	8,961	170	169
7	482,508	13,637	8,447	161	161
8	440,413	12,923	7,976	162	159
9	397,236	11,533	7,348	157	140
10	355,545	9,636	6,641	145	140
11	323,149	9,095	6,151	148	135
12	297,930	8,341	5,756	145	132
13	278,450	7,161	5,401	133	129
14	274,298	6,902	5,285	131	127
15	272,867	6,624	5,360	124	128
16	253,222	6,197	5,090	122	121
17	248,619	5,689	5,128	111	108
18	237,716	5,469	5,041	108	121
19	211,604	4,900	4,622	106	113
20	189,597	4,476	4,316	104	108
Total	\$8,471,051	\$252,992	\$143,523	176%	174%

fect by differences in age and policy-year distributions between the current and previous studies.

The select mortality experience of all eleven companies in ten-year issue age groups is presented in Table 2, using a twenty-year select period. Table 2 is the same in form as Table 3 in the preceding report. Mortality ratios are shown according to the 1955-60 Basic Tables and the 1958 CSO Table. It should be noted that some distortion is caused by the necessity for using 1955-60 ultimate rates for tabular deaths at durations 16-20. For the age group 65 and over the mortality ratios may be considerably affected by differences in age distributions between group conversion issues and the policy issues underlying the 1955-60 Basic Tables.

Caution should be used in utilizing these data in that they represent the average of the experience of the contributing companies and so reflect a blend of the different issue and commission practices followed. However, an analysis showed that during the period of this study the select experiences of all but one of the companies lay within a range of 15 per cent on either side of the average. The experience of one of the new contributors was about 28 per cent above the average, but this appears to be due to a relatively higher-than-average proportion of exposure at the earlier policy durations where mortality ratios are highest.

Table 3 displays experience of each of the first five durations by year of issue. The small differences between the all-years-combined ratios in Table 3 and the all-ages-combined ratios found in Table 2 are accounted for by the fact that the experience of one company is omitted from the former because that company's experience was not available by year of issue.

Table 4 presents results of the ultimate mortality study to which seven companies contributed. Mortality ratios are shown according to the 1955-60 Basic Tables, the 1958 CSO Table, and tabular deaths derived from the 1953-59 Group Conversion Experience. The individual company experience ranged from about 67 per cent of average to about 142 per cent of average. The ultimate experiences of four companies which accounted for 82 per cent of the deaths were within a 20 per cent range on either side of the average. The experience of one large company was well below the average ultimate experience, possibly reflecting past issue and commission practices different from most other companies. The experience of the remaining two contributors was well above the average, but each contributed less than 1 per cent of the deaths.

TABLE 2—1959-67 GROUP CONVERSION STUDY
 SELECT MORTALITY RATIOS IN TEN-YEAR AGE GROUPS
 BASED ON AMOUNTS OF INSURANCE—CONTRIBUTIONS OF ELEVEN COMPANIES

POLICY YEAR	ISSUE AGES						
	Under 25	25-34	35-44	45-54	55-64	65 and Over	All Ages
Ratios of Actual Deaths to Tabular by the 1955-60 Basic Tables							
1	1,915%	2,211%	1,405%	1,299%	1,465%	1,176%	1,335%
2	1,213	1,808	832	674	696	555	674
3	1,012	1,037	666	580	496	425	519
4	452	842	560	507	385	344	425
5	750	748	561	434	384	307	393
6	772	566	459	359	339	276	339
7	400	647	428	278	296	254	299
8	488	545	384	319	293	221	294
9	379	352	327	279	268	249	275
10	449	413	295	258	230	191	242
11	349	371	272	250	223	188	235
12	438	328	227	234	216	176	220
13	318	235	214	201	187	159	194
14	305	211	215	189	160	167	186
15	280	190	174	179	163	152	172
16	216	181	186	137	123	116	145
17	248	160	147	129	114	122	132
18	130	160	135	130	119	89	129
19	235	154	140	122	101	98	125
20	173	138	134	124	100	88	123
All years	421%	361%	300%	292%	326%	325%	313%
Ratios of Actual Deaths to Tabular by 1958 CSO Table							
1	686%	593%	479%	404%	386%	262%	350%
2	447	575	349	280	247	163	233
3	415	400	322	288	220	144	214
4	187	339	291	270	189	129	193
5	305	308	298	229	189	129	185
6	312	243	260	205	170	126	170
7	161	297	258	175	157	123	161
8	196	269	238	200	156	111	162
9	157	187	209	174	144	135	157
10	191	233	194	162	130	112	145
11	154	222	187	159	133	120	148
12	202	205	160	155	138	118	145
13	153	151	155	140	123	107	133
14	152	141	160	138	108	110	131
15	143	130	132	134	111	100	124
16	117	128	152	118	105	104	122
17	137	116	122	111	97	109	111
18	85	120	113	112	102	81	108
19	137	118	117	105	87	91	106
20	104	107	113	106	87	80	104
All years	203%	216%	204%	189%	178%	145%	176%

TABLE 2—Continued

POLICY YEAR	ISSUE AGES						All Ages
	Under 25	25-34	35-44	45-54	55-64	65 and Over	
	Number of Actual Deaths						
1.....	63	209	632	1,589	3,261	3,990	9,744
2.....	32	185	434	1,160	2,224	2,853	6,888
3.....	25	133	387	1,046	1,969	2,654	6,214
4.....	16	112	384	1,084	1,714	2,526	5,836
5.....	22	120	390	1,006	1,729	2,490	5,757
6.....	28	107	405	980	1,618	2,483	5,621
7.....	71	126	382	931	1,479	2,274	5,263
8.....	22	143	416	996	1,429	2,027	5,033
9.....	24	121	422	990	1,369	1,917	4,843
10.....	29	145	412	925	1,161	1,475	4,147
11.....	26	148	429	916	1,090	1,356	3,965
12.....	32	159	413	931	1,114	1,071	3,720
13.....	30	151	454	877	985	833	3,330
14.....	35	153	486	944	850	652	3,120
15.....	37	164	549	993	902	481	3,126
16.....	34	186	600	904	769	377	2,870
17.....	47	200	572	970	730	284	2,803
18.....	41	227	597	1,017	684	204	2,770
19.....	56	247	603	907	486	155	2,454
20.....	43	252	585	848	450	97	2,275

TOTAL WITHDRAWAL RATES

The withdrawal part of this study is limited to withdrawal in the first nineteen policy years. All types of terminations (other than death) were counted as withdrawals, that is, lapses, surrenders, term extensions, reduced paid-ups, and endowment maturities. The withdrawals of policy year t were taken to be the total withdrawals at mean duration t , except that for the first year those at mean duration 0 were added. Exposure to death for policy year t is the denominator, except that for the first policy year withdrawals at mean duration 0 were added. The effect of this method of determining withdrawal rates is that withdrawals occurring during any calendar year before or after a policy anniversary are averaged together. The resulting rates can readily be used to give proper effect to all withdrawals, including policies with fractional modes of payment.

The select withdrawal rates derived from the experience of the nine companies that contributed withdrawal experience are displayed in Table 5. The twentieth-year withdrawal rates are not included because they are affected considerably by maturing endowments.

TABLE 3
 1959-67 GROUP CONVERSION STUDY
 SELECT MORTALITY RATIOS BY CALENDAR YEAR OF ISSUE FOR POLICY YEARS 1-5
 BASED ON AMOUNTS OF INSURANCE—CONTRIBUTIONS OF TEN COMPANIES

YEAR OF ISSUE	POLICY YEAR				
	1	2	3	4	5
Ratio of Actual Deaths to Tabular by the 1955-60 Basic Tables					
1955					312%
1956				371%	356
1957			442%	315	356
1958		656%	494	391	414
1959	1,328%	621	490	450	413
1960	1,253	687	507	424	385
1961	1,311	620	583	429	384
1962	1,453	714	478	397	483
1963	1,333	669	528	556	
1964	1,300	650	569		
1965	1,268	741			
1966	1,530				
All years...	1,350%	672%	517%	427%	395%
Ratio of Actual Deaths to Tabular by the 1958 CSO Table					
1955					147%
1956				167%	167
1957			183%	143	168
1958		225%	203	177	195
1959	336%	212	200	202	194
1960	329	238	210	192	182
1961	344	214	241	195	182
1962	382	248	199	181	229
1963	351	232	219	253	
1964	343	225	236		
1965	334	257			
1966	407				
All years...	354%	229%	214%	194%	187%

TABLE 4
 1959-67 GROUP CONVERSION STUDY
 ULTIMATE MORTALITY RATIOS IN TEN-YEAR AGE GROUPS
 EXPERIENCE TRUNCATED AT TWENTY YEARS
 BASED ON AMOUNTS OF INSURANCE—CONTRIBUTIONS OF SEVEN COMPANIES

ATTAINED AGE	RATIO OF ACTUAL TO TABULAR DEATHS			NUMBER OF ACTUAL DEATHS	EXPOSED TO RISK (000) 1959-67
	By 1955-60 Basic Tables	By 1958 CSO	By 1953-59 Group Con- version Ex- perience		
Under 45	139%	89%	118%	64	\$ 24,439
45-54	132	104	115	660	128,005
55-64	131	111	100	1,931	175,858
65-74	120	103	98	2,690	110,671
75-84	115	100	105	1,771	29,772
85 and over	93	86	83	372	2,714
All ages	122%	104%	101%	7,488	\$471,459

TABLE 5
 1959-67 GROUP CONVERSION STUDY
 SELECT WITHDRAWAL RATES
 BASED ON AMOUNTS OF INSURANCE—
 CONTRIBUTIONS OF NINE COMPANIES

POLICY YEAR	ISSUE AGES		
	Under 45	45-59	60 and Over
1	22.3%	16.6%	6.9%
2	4.3	3.1	1.9
3	3.3	2.7	2.2
4	2.6	2.2	1.6
5	2.6	2.1	1.8
6	2.3	2.1	1.9
7	2.2	2.1	1.7
8	2.2	2.0	1.7
9	1.9	1.8	2.0
10	2.1	2.1	2.4
11-15	1.7	2.2	2.4
16-19	1.9	2.5	2.9

TABLE 6
1959-67 GROUP CONVERSION STUDY
SELECT MORTALITY RATIOS—BY SEX
BASED ON AMOUNTS OF INSURANCE

POLICY YEAR	SEX*	ISSUE AGES						
		Under 25	25-34	35-44	45-54	55-64	65 and Over	All Ages
Ratio of Actual to Tabular by the 1958 CSO Table								
1	Male	729%	547%	468%	404%	405%	273%	358%
	Female	688	742	632	420	328	175	319
	Total	716%	569%	480%	405%	397%	265%	354%
2-5	Male	402%	404%	322%	278%	227%	150%	218%
	Female	214	371	313	252	149	93	164
	Total	336%	400%	321%	276%	219%	145%	212%
6-10	Male	270%	276%	250%	200%	164%	129%	172%
	Female	124	183	166	110	102	92	110
	Total	209%	262%	242%	191%	157%	125%	166%
11-15	Male	278%	207%	172%	167%	138%	123%	153%
	Female	84	102	131	92	96	94	100
	Total	185%	188%	168%	159%	133%	120%	147%
16-20	Male	166%	145%	149%	129%	113%	124%	131%
	Female	85	105	90	86	93	115	92
	Total	138%	139%	144%	126%	111%	123%	128%
Number of Actual Deaths								
1	Male	38	146	449	1,159	2,513	3,362	7,667
	Female	24	46	132	297	515	423	1,437
	Total	62	192	581	1,456	3,028	3,785	9,104
2-5	Male	57	400	1,288	3,515	6,379	9,276	20,915
	Female	31	120	270	702	1,080	1,010	3,213
	Total	88	520	1,558	4,217	7,459	10,286	24,128
6-10	Male	120	507	1,701	3,891	5,807	8,772	20,798
	Female	47	131	333	673	885	996	3,065
	Total	167	638	2,034	4,564	6,692	9,768	23,863
11-15	Male	80	486	1,510	3,299	3,554	3,577	12,506
	Female	40	124	313	533	618	449	2,077
	Total	120	610	1,823	3,832	4,172	4,026	14,583
16-20	Male	87	592	1,742	2,810	1,991	824	8,046
	Female	31	123	220	339	284	99	1,096
	Total	118	715	1,962	3,149	2,275	923	9,142

* Separate male and female data combined for total.

MORTALITY AND WITHDRAWAL RATES BY SEX

Companies were asked to submit data by sex where such coding was available. Of the total select exposure of \$8,471 million, about \$6,019 million was on males, \$1,045 million was on females, and \$1,407 million was without sex coding. Of the total ultimate exposure of about \$471

TABLE 7
 1959-67 GROUP CONVERSION STUDY
 ULTIMATE MORTALITY RATIOS—BY SEX
 EXPERIENCE TRUNCATED AT TWENTY YEARS
 BASED ON AMOUNTS OF INSURANCE

Attained Age	Male	Female	Male and Female Combined
Ratio of Actual Deaths to Tabular by the 1958 CSO Table			
Under 45.	155%	51%	121%
45-54.	124	64	112
55-64.	135	58	128
65-74.	116	49	112
75-84.	111	83	110
85 and over.	114	92	113
All ages.	120%	61%	116%
Number of Actual Deaths			
Under 45.	33	6	39
45-54.	393	84	477
55-64.	1,435	129	1,564
65-74.	2,088	109	2,197
75-84.	1,440	93	1,533
85 and over.	344	16	360
All ages.	5,733	437	6,170

million, about \$276 million was on males, about \$38 million was on females, and \$157 million was without sex coding. Since several companies have only recently introduced sex coding, the experience by sex is more heavily weighted with recent issues than the experience in total.

Select mortality experience by sex is shown in Table 6. For the first policy year, the male mortality ratio, all ages combined, is about 112 per cent of the female mortality ratio. For later policy years in the select period, this ratio is about 135 to 155 per cent.

Although the volume of data for females is small, the ultimate experience in Table 7 indicates a considerable variation in ultimate mortality by sex.

Withdrawal rates in the select period show very minor variation by sex, as displayed in Table 8.

TABLE 8
1959-67 GROUP CONVERSION STUDY
SELECT WITHDRAWAL RATES—BY SEX
BASED ON AMOUNTS OF INSURANCE

POLICY YEAR	SEX	ISSUE AGE		
		Under 45	45-59	60 and Over
1	Male	22.1%	16.9%	6.8%
	Female	23.9	14.1	7.2
2-5	Male	3.3	2.7	2.0
	Female	4.0	2.6	1.8
6-10	Male	2.1	2.1	1.9
	Female	2.4	1.8	1.6
11-15	Male	1.5	2.1	2.3
	Female	1.6	1.8	2.4
16-19	Male	1.3	2.2	3.0
	Female	1.1	1.8	2.5

The following companies contributed to the experience for this investigation:

Aetna Life Insurance Company
Connecticut General Life Insurance Company
Continental Assurance Company
Equitable Life Assurance Society
John Hancock Mutual Life Insurance Company
Lincoln National Life Insurance Company
Metropolitan Life Insurance Company
New York Life Insurance Company
Prudential Insurance Company of America
Sun Life Assurance Company of Canada
The Travelers Insurance Company