

**TRANSACTIONS OF SOCIETY OF ACTUARIES
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**THE COMMISSIONERS 1960 STANDARD GROUP
MORTALITY TABLE AND 1961 STANDARD
GROUP LIFE INSURANCE PREMIUM RATES**

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I. INTRODUCTION

THE statutory determination of minimum premium rates for group life insurance dates from 1926. In that year the Superintendent of Insurance of the State of New York was authorized to establish minimum rates applicable to the first policy year of contracts issued thereafter by companies licensed in the state. This development came about as the result of concern by the Superintendent over the intense competition for new business which he feared would be harmful to the companies and demoralizing to the then infant group insurance.

The law set forth as the basis of the rates the American Men Ultimate Mortality Table, interest at $3\frac{1}{2}\%$ per annum, and a loading to be fixed by the Superintendent. Initial rates higher than the minimum might be charged individual groups where deemed appropriate. The rates for a case might be adjusted after the first policy year without regard to the minimum in accordance with the already accepted practice of basing the renewal of a group upon its evolving experience.

Similar laws were passed by Michigan and Pennsylvania in 1929, Ohio in 1935 and Maine in 1957. In 1950, the then existing laws were amended to permit a downward revision in the minimum premium rates by substituting the Commissioners 1941 Standard Ordinary Mortality Table and 3% interest for the AM⁽⁶⁾ Table and $3\frac{1}{2}\%$ interest.

The continued improvement in mortality, the construction of Table X₁₇ for ordinary insurance, and the use by companies not doing business in New York of premium rates well below the statutory minimums in jurisdictions where they were not estopped from doing so, focused attention on the possibility of a further reduction. In discussing "The New Standard Ordinary Mortality Table" by Charles M. Sternhell, it was brought out that the pattern of group mortality is quite different from that of ordinary insurance and that Table X₁₇, or a variant thereof, would not be appropriate as a mortality standard for premium rates for group life insurance (see *TSA IX*, 41). The time had come, it was urged, for the development of a separate group mortality table from the extensive data in the inter-company group insurance experience studies of the Society.

The National Association of Insurance Commissioners took up the question in the fall of 1957 and established a Subcommittee to Study the Use and Application of Minimum Group Life Insurance Rates under Existing State Laws consisting of the Commissioners of the five states with minimum premium statutes. The Subcommittee initiated a two-part program. Its short range objective was to review the minimum premium rates then in effect and to consider whether and how they might be reduced within the limitations of the existing laws. This consideration led to the adoption, effective July 1, 1958, of a lower scale of minimum premiums based upon the 1941 CSO Table with the expense loading reduced for cases with an insurance volume in excess of \$250,000.

The long-range objective was the development of a group mortality table and a corresponding scale of premium rates. In December 1958, the Subcommittee appointed an Industry Advisory Committee to work with its Committee of Technicians in carrying out this larger task. The membership of these two committees was as follows:

INDUSTRY ADVISORY COMMITTEE	COMMISSIONERS' TECHNICIANS' COMMITTEE
MORTON D. MILLER, <i>Chairman</i>	WILLIAM V. FOX, JR., <i>Chairman</i>
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The mortality table proposed by the two Committees was adopted in November 1960 and designated the Commissioners 1960 Standard Group Mortality Table.

The New York and Pennsylvania statutes were changed in 1959 and Michigan's in 1960, in contemplation of the development of the new table. The Commissioners' authority in these states was broadened to permit them to determine the mortality standard as well as the loading formula. The Ohio and Maine laws were amended in 1961 simply by substituting the 1960 CSG Table for the 1941 CSO Table. A public hearing concerning the adoption of premium rates based upon the new table was held in February 1961 and the Commissioners 1961 Standard Group Life Insurance Premium Rates became effective August 1, except

for the delay until September in Maine and Michigan to meet procedural requirements. It gives me great satisfaction to point to the fact that the first official group mortality table should have come into use in the golden anniversary year of group insurance, which originated in 1911 with the issuance of the first group life contracts by the Equitable Life Assurance Society.

The purpose of this paper is to describe the studies made by the two Committees, the construction of the new table, and the 1961 premium rates. First, I wish to record my sincere appreciation for the able assistance and full cooperation of the members of the Industry Advisory Committee in our large undertaking, and for the helpful guidance throughout of the Technicians Committee. My thanks also go to Raymond Krieger at the Equitable for his substantial help.

II. CONSTRUCTION OF THE TABLE

The natural starting point was the experience in the intercompany studies carried on by the Society's Group Mortality Committee. However, despite the huge volume of this material, serious consideration was given to the possible alternative of developing the table from population data. It was thought that the higher level of population mortality rates might be used without substantial adjustment, thus avoiding the judgmental and somewhat arbitrary process of building margins into the experience mortality rates in order to make the final table appropriate for the purposes of premium determination.

Upon analysis, the population data presented their own set of difficulties, including the choice of the year or the period of the population rates to be employed and the proper mix of male and female mortality rates. Consequently, it was decided to proceed from the intercompany studies.

The last available report of the Group Mortality Committee in the 1955 *Reports* volume covered the calendar period 1950 through 1954, which approximately corresponds with the period of observation underlying the Commissioners 1958 Standard Ordinary Mortality Table. It was decided to use this material but, in order to be completely current, to add the unpublished experience for the four additional calendar years through 1958, which had already been submitted to the compiling company.

The intercompany studies are based on the experience of employer-employee groups with 25 employees or more. Data with respect to multiple-employer, union, professional association or other types of association groups are specifically excluded. The experience is divided according to industry between nonrated or standard groups, those accepted at issue

without extra premiums, and rated or substandard groups. It was felt that only the nonrated experience comprising about 93% of the total exposure should be used. The data for the nine calendar years, 1950 through 1958, are set forth in Appendix A.

As shown in Appendix A, the experience is compiled separately for each of the three disability provisions commonly found in group life insurance policies which are briefly as follows:

- (i) The Waiver of Premium Disability clause, in general, provides for waiver of premium upon receipt of proof of total disability of at least 9 months duration, occurring before age 60. Proof of continued total disability is required annually thereafter.
- (ii) The Extended Death Benefit clause provides for payment of the full face amount, in general, upon death occurring within one year after termination of employment and prior to age 65 (or 60) if the employee was disabled at the time of termination of employment and continued disabled until death.
- (iii) The Total and Permanent Disability clause provides, upon an employee's disability prior to age 60, for payment of the face amount of insurance, in some instances in one sum, in others in installments over a short period, usually 60 months.

It was felt desirable to combine the experience under the three disability clauses, if possible, so that advantage could be taken of the total volume of the available data. In the intercompany studies an extended death benefit claim is reported as a death claim and an approved waiver of premium disability claim is taken to be equivalent in value to 75% of a death claim. For the Total and Permanent Disability clause it was thought reasonable to consider 50% of the disability claims as immediate death claims and the remainder as approximating the added cost of the benefit arising through the anticipation of later death claims.

Review of the separate data for the three disability clauses with the numbers of waiver of premium and total and permanent disability claims modified in this way showed the patterns of the adjusted mortality rates to be similar. It was thus concluded that a combination of the data would be satisfactory and that a group mortality table derived therefrom would be appropriate for extended death benefit and waiver of premium plans. Special rating consideration would be necessary for the additional value of total and permanent disability benefit plans.

Thus, the first step in the construction was the development of the table of composite 1950-1958 adjusted mortality rates for nonrated industries, shown herein as Table 1, along with the corresponding accidental death rates. The data in the intercompany studies are submitted in quinquennial age groups on the basis of age nearest birthday as of

July 1 on the average for the exposure, and age nearest birthday at the time of claim for the claims. Thus the central age rates obtained by dividing the exposures into the claims are forces of decrement, or μ_x 's. The total group experience in Table 1 of over 59 million life years and almost 400,000 claims is as extensive as that underlying the 1958 CSO Table.

While the intercompany studies produce a tremendous amount of data, they are participated in by a relatively small number of underwriters. In order to give other companies an opportunity to contribute their experience, invitations were sent to 136 additional companies, which, together with those contributing to the intercompany studies, underwrite more than 99% of the group life insurance in the United States. Replies were received from a substantial number of those to whom inquiries were sent, but no useful data were obtained as almost all were

TABLE 1
COMPOSITE 1950-1958 ADJUSTED MORTALITY RATES
FOR NONRATED INDUSTRIES
BY LIVES

CENTRAL AGE	EXPOSED TO RISK	DEATH AND DISABILITY CLAIMS*	FORCE OF DECREMENT	
			Total	Accidental Death
18.....	1,904,308	1,874	.00098	.00063
23.....	5,672,349	5,828	.00103	.00056
28.....	7,622,722	8,166	.00107	.00044
33.....	7,962,396	10,301	.00129	.00039
38.....	7,830,458	15,191	.00194	.00037
43.....	7,312,695	24,254	.00332	.00039
48.....	6,343,719	35,352	.00557	.00041
53.....	5,123,395	46,749	.00912	.00045
58.....	3,999,052	59,058	.01477	.00051
18-58.....	53,771,094	206,773	.00385	.00044
63.....	2,837,925	58,532	.02062	.00064
68.....	1,519,210	47,827	.03148	.00078
73.....	681,359	33,299	.04887	.00108
78.....	267,773	20,902	.07806	.00159
83.....	86,342	10,665	.12352	.00269
88.....	19,729	3,798	.19251	.00436
93.....	2,835	802	.28289	.00847
98.....	239	88	.36820	.02092
63-98.....	5,415,412	175,913	.03248	.00083
Total..	59,186,506	382,686	.00647	.00047

* The number of death and disability claims is equal to the number of death claims plus 75% of the Waiver of Premium Disability claims plus 50% of the Total and Permanent Disability claims.

to the effect that the company did not have material in a form suitable for the purpose.

The next step was to consider the extent and form of the mortality margins in the final table. Since the table was to provide for the mortality element of minimum group life insurance premium rates, it would be necessary to take appropriate account of the pattern of operation of

TABLE 2
DISPERSION* OF MORTALITY FOR NONRATED INDUSTRIES

INDUSTRY CODE	RATIO OF INDUSTRY MORTALITY TO AVERAGE MORTALITY	NUMBER OF INDUSTRIES	LIFE-YEARS EXPOSED	CUMULATIVE PERCENTAGES BY:	
				Number of Industries	Life-Years Exposed
41, 68, 82, 85, 88, 114, 116, 117, 130, 133, 182, 185, 186, 240, 242, 260, 270, 292, 296, 300, 325, 335, 350, 373, 380	Less than average	38	36,977,595	38%	55%
30, 62, 63, 65, 66, 80, 83, 84, 111, 132, 161, 192, 202, 271, 336, 341, 342, 372, 375	100% and less than 108% of average	25	14,317,237	63	76
67, 100, 112, 184, 193, 194, 291, 326, 327, 362	108% and less than 115% of average	19	10,276,327	82	91
60, 81, 191, 195, 290, 299, 310, 330	115% and less than 123% of average	10	3,335,028	92	96
	123% and over	8	2,862,234	100	100

* Source: TSA 1955 Reports of Mortality and Morbidity Experience, Table 4, pp. 43-48, based on experience during calendar years 1946-1954.

the business, as well as the characteristics of the data. Among the factors contributing to the need for significant margins in excess of the experience level are the following:

- a) Relatively few industries, the most hazardous, are underwritten with an extra premium. It seemed desirable to provide sufficient margin to permit the continuance of this practice. Table 2, which is based upon the experience by industry set forth in Table 4 of the 1955 *Reports*, brings out the considerable dispersion of experience among the standard or nonrated industries from the average for all nonrated industries.
- b) The composite experience is based on lives, whereas financial results reflect amount variations. While there was no ready way of ascertain-

ing the difference in the levels of mortality by lives and amounts, it was reasonable to think that the experience by amounts was not as favorable as would appear from the experience compiled by lives, especially with the provision in recent years of more substantial amounts of insurance and the more liberal underwriting practices prevalent generally.

- c) Group life insurance is written on an experience rating basis, whether by stock or mutual companies, for all except the smallest cases. In determining dividend participation or retroactive rate credits, it is general practice to recognize the experience of the particular group as well as that of the company's business as a whole. The credibility given to the group's experience is increased with the size of the group to the point where participation for the largest groups is determined almost wholly from their own experience. The availability to the larger groups of the alternative of self-insurance tends to make this a necessary practice.

Obviously, the variation in experience from group to group, even for relatively large groups, is substantially greater than for a company's business as a whole. This is a consideration that does not arise in the construction of a mortality table for ordinary insurance, where the experience of a company is averaged for all its business in the same mortality class.

The extent of individual case experience fluctuations is brought out in Paul Jackson's paper "Experience Rating," *TSA V*, page 239, and confirmed in Arthur Weaver's discussion on page 257. Mr. Jackson shows that for groups with between 1,600 and 3,200 lives and an average expected loss ratio of 50% in relation to premiums one-sixth will have actual loss ratios in excess of 67% of premiums and in two out of one hundred cases the actual loss ratios will exceed 84% of premiums. Where between 400 and 800 lives are insured, the latter percentages become 82% and 114% respectively; greater fluctuations are likely among smaller groups.

- d) The importance of accidental deaths as a principal cause of claim, particularly at the younger ages, suggested that part of the mortality margins should be in the form of a constant addition to the experience mortality rates.

It was concluded that the basic mortality margins should be in the form of a percentage plus a constant. Working with Table 1, the combination of 20% of the experience rates at each age and a constant addition of one death per thousand appeared to give satisfactory results at most

working ages. The margins produced seemed too high at ages 18 and 23, however. Furthermore, it was thought desirable to complete the table to age zero. Therefore, the mortality rates were graded into 117.5% of the 1958 CSO Table at age 18, and the same percentage of the 1958 CSO Table was used down to age zero.

It was decided to grade into 105% of the 1958 CSO Table for ages 73 and above and thus maintain a consistent margin over the latter at all ages, except that the table would come back to 100% of the 1958 CSO Table at age 99 and have the same limiting age of 100. That this grading also produced margins somewhat higher than the basic margins at ages 63 to 83 was considered to be a desirable result, since it was thought the experience at these ages was not fully indicative of the level likely to emerge.

The experience is predominantly among lives still actively working, a factor which tends to weed out the more seriously impaired lives year by year. A similar effect shows up in the pensioner experience under group annuities where the mortality among early retirements, usually for disability reasons, is materially greater than that among those who work until normal retirement or retire later.

Current trends are for more continuation of group life insurance into retirement which may be expected to cause future experience levels to rise. This conclusion is supported by a review of the Total and Permanent Disability clause experience; by reason of being the oldest form of benefit, these plans have the most mature age distributions. The mortality rates under this clause are greater from age 68 through age 83 than for either the Waiver of Premium or Extended Death Benefit clause, and consequently at a higher level than those in the composite table. Further support to this conclusion was given by the relatively high pensioner mortality rates shown in an unpublished analysis of the experience under retirement continuance funds for group life insurance.

The set of adjusted quinquennial μ_x 's arrived at as described above is shown in Appendix B. The last step was to obtain the final table in the form of q_x 's at individual ages. This was done as follows:

- (i) For ages zero to 18, the mortality rates in the final table are equal to 117.5% of the 1958 CSO Table q_x 's. The age zero rate is for age one day, corresponding to that in the 1958 CSO Table.
- (ii) For ages 19 to 61, the rates were obtained by applying Jenkins' Fifth Difference Modified Osculatory Interpolation Formula to quinquennial q_x values derived from Appendix B.
- (iii) For ages 62 to 70, the rates are based on a grading of the ratios of the q_x 's obtained by the application of Jenkins' Formula to the corre-

sponding q_x 's from the 1958 CSO Table. In this way, slight modifications in the formula values at these ages were made in the interest of smoothness.

- (iv) For ages 71 to 98, the rates are 105% of the 1958 CSO Table q_x 's.
- (v) At age 99, the rate is 1.000.

The full table of graduated mortality rates which will be known as the Commissioners 1960 Standard Group Mortality Table is shown in Table 3 along with the corresponding l_x 's, d_x 's and o_x 's.

As mentioned earlier, the table is intended for plans with the Waiver of Premium Disability and the Extended Death Benefit clauses, with additional claim provision to be made for the greater value of the Total and Permanent Disability Benefit. Furthermore, it should be emphasized that the table is based upon experience with employer-employee groups and may not reflect adequately the level of experience to be anticipated in trusteeship or association cases.

The 1960 CSG Table is compared with the 1958 and 1941 CSO Tables in Table 4. The group table was constructed to be above the 1958 CSO Table throughout. The additional margins are greater at the working ages than after retirement, and average about 10% over-all when weighted by the total exposed to risk from Appendix A. The 1960 CSG Table rates are seen to be substantially below those of the 1941 CSO Table, more so at the working ages than thereafter. The reduction averages about 20% when weighted by the total exposed to risk.

III. THE 1960 BASIC GROUP MORTALITY TABLE

It seemed desirable that there be a basic table. Not only would this follow the construction of the Commissioners Standard Ordinary Tables but there are a number of possible uses for a basic group table—for example, in retirement projections and other experience studies.

The Basic Table was derived by (i) subtracting 1 death per 1,000 from the graduated mortality rates and dividing by 1.20 to remove the formula margins at the adult ages, (ii) adopting a terminal age of 101 as in the case of the 1941 and 1958 Basic Tables, (iii) merging the Basic Table mortality rates into 85% of the 1949-1951 total population rates for ages below 18, and (iv) adopting the age zero rate from the 1958 Basic Table.

The resulting 1960 Basic Group Mortality Table shown in Table 5 is above the experience level in the range of ages from 60 to 83 where the additional margins were included in the 1960 CSG Table. It makes no provision for the added cost of the Total and Permanent Disability clause. The Basic Table was not submitted to the Commissioners.

TABLE 3
 COMMISSIONERS 1960 STANDARD GROUP MORTALITY TABLE

Age x	q_x	l_x	d_x	e_x
0.....	.00832	10,000,000	83,200	66.86
1.....	.00207	9,916,800	20,528	66.41
2.....	.00179	9,896,272	17,714	65.55
3.....	.00172	9,878,558	16,991	64.67
4.....	.00165	9,861,567	16,272	63.78
5.....	.00159	9,845,295	15,654	62.88
6.....	.00153	9,829,641	15,039	61.98
7.....	.00148	9,814,602	14,526	61.08
8.....	.00145	9,800,076	14,210	60.17
9.....	.00142	9,785,866	13,896	59.25
10.....	.00142	9,771,970	13,876	58.34
11.....	.00145	9,758,094	14,149	57.42
12.....	.00148	9,743,945	14,421	56.50
13.....	.00155	9,729,524	15,081	55.58
14.....	.00163	9,714,443	15,835	54.67
15.....	.00172	9,698,608	16,682	53.76
16.....	.00181	9,681,926	17,524	52.85
17.....	.00190	9,664,402	18,362	51.95
18.....	.00199	9,646,040	19,196	51.04
19.....	.00203	9,626,844	19,542	50.14
20.....	.00209	9,607,302	20,079	49.25
21.....	.00214	9,587,223	20,517	48.35
22.....	.00218	9,566,706	20,855	47.45
23.....	.00221	9,545,851	21,096	46.55
24.....	.00224	9,524,755	21,335	45.65
25.....	.00226	9,503,420	21,478	44.76
26.....	.00228	9,481,942	21,619	43.86
27.....	.00230	9,460,323	21,759	42.96
28.....	.00233	9,438,564	21,992	42.05
29.....	.00236	9,416,572	22,223	41.15
30.....	.00240	9,394,349	22,546	40.25
31.....	.00245	9,371,803	22,961	39.34
32.....	.00251	9,348,842	23,466	38.44
33.....	.00260	9,325,376	24,246	37.53
34.....	.00271	9,301,130	25,206	36.63
35.....	.00285	9,275,924	26,436	35.73
36.....	.00302	9,249,488	27,933	34.83
37.....	.00321	9,221,555	29,601	33.93
38.....	.00345	9,191,954	31,712	33.04
39.....	.00372	9,160,242	34,076	32.15
40.....	.00402	9,126,166	36,687	31.27
41.....	.00437	9,089,479	39,721	30.39
42.....	.00475	9,049,758	42,986	29.53
43.....	.00518	9,006,772	46,655	28.66
44.....	.00564	8,960,117	50,535	27.81
45.....	.00615	8,909,582	54,794	26.97
46.....	.00670	8,854,788	59,327	26.13
47.....	.00731	8,795,461	64,295	25.30
48.....	.00798	8,731,166	69,675	24.49
49.....	.00872	8,661,491	75,528	23.68

TABLE 3—Continued

COMMISSIONERS 1960 STANDARD GROUP MORTALITY TABLE

Age x	q_x	l_x	d_x	e_x
50.....	.00952	8,585,963	81,738	22.88
51.....	.01040	8,504,225	88,444	22.10
52.....	.01137	8,415,781	95,687	21.32
53.....	.01244	8,320,094	103,502	20.56
54.....	.01361	8,216,592	111,828	19.82
55.....	.01488	8,104,764	120,599	19.08
56.....	.01624	7,984,165	129,663	18.36
57.....	.01770	7,854,502	139,025	17.66
58.....	.01924	7,715,477	148,446	16.97
59.....	.02087	7,567,031	157,924	16.29
60.....	.02262	7,409,107	167,594	15.63
61.....	.02451	7,241,513	177,489	14.98
62.....	.02660	7,064,024	187,903	14.34
63.....	.02886	6,876,121	198,445	13.72
64.....	.03131	6,677,676	209,078	13.11
65.....	.03400	6,468,598	219,932	12.52
66.....	.03700	6,248,666	231,201	11.94
67.....	.04032	6,017,465	242,624	11.38
68.....	.04401	5,774,841	254,151	10.84
69.....	.04803	5,520,690	265,159	10.32
70.....	.05233	5,255,531	275,022	9.81
71.....	.05686	4,980,509	283,192	9.33
72.....	.06158	4,697,317	289,261	8.86
73.....	.06642	4,408,056	292,783	8.41
74.....	.07153	4,115,273	294,365	7.97
75.....	.07704	3,820,908	294,363	7.54
76.....	.08314	3,526,545	293,197	7.13
77.....	.08998	3,233,348	290,937	6.73
78.....	.09771	2,942,411	287,503	6.35
79.....	.10625	2,654,908	282,084	5.98
80.....	.11548	2,372,824	274,014	5.63
81.....	.12532	2,098,810	263,023	5.30
82.....	.13563	1,835,787	248,988	4.99
83.....	.14635	1,586,799	232,228	4.70
84.....	.15751	1,354,571	213,358	4.42
85.....	.16920	1,141,213	193,093	4.15
86.....	.18146	948,120	172,046	3.89
87.....	.19439	776,074	150,861	3.65
88.....	.20816	625,213	130,144	3.41
89.....	.22308	495,069	110,440	3.17
90.....	.23955	384,629	92,138	2.94
91.....	.25806	292,491	75,480	2.70
92.....	.27923	217,011	60,596	2.47
93.....	.30376	156,415	47,513	2.23
94.....	.33249	108,902	36,209	1.99
95.....	.36880	72,693	26,809	1.73
96.....	.42059	45,884	19,298	1.45
97.....	.51284	26,586	13,634	1.13
98.....	.70156	12,952	9,087	.80
99.....	1.00000	3,865	3,865	.50

IV. THE 1961 SCALE OF PREMIUM RATES

There had been three levels of minimum statutory premiums.

- (i) The 1926 scale based upon the AM⁽⁶⁾ Table with interest at $3\frac{1}{2}\%$ and a loading of \$1.70 per \$1,000 plus $6\frac{1}{2}\%$ of the gross premium prevailed until 1950.

TABLE 4

COMPARISON OF COMMISSIONERS 1960 STANDARD GROUP MORTALITY
TABLE WITH THE 1958 AND 1941 CSO TABLES

Age <i>x</i>	1960 CSG Table	1958 CSO Table	1941 CSO Table	(1) + (2)	(1) + (3)
	q_x (1)	q_x (2)	q_x (3)	(4)	(5)
0.....	.00832	.00708	.02258	1.175	.368
3.....	.00172	.00146	.00338	1.178	.509
8.....	.00145	.00123	.00231	1.179	.628
13.....	.00155	.00132	.00198	1.174	.783
18.....	.00199	.00169	.00230	1.178	.865
23.....	.00221	.00189	.00268	1.169	.825
28.....	.00233	.00203	.00325	1.148	.717
33.....	.00260	.00232	.00412	1.121	.631
38.....	.00345	.00301	.00546	1.146	.632
43.....	.00518	.00453	.00751	1.143	.690
48.....	.00798	.00695	.01064	1.148	.750
53.....	.01244	.01089	.01543	1.142	.806
58.....	.01924	.01700	.02271	1.132	.847
63.....	.02886	.02657	.03376	1.086	.855
68.....	.04401	.04168	.05046	1.056	.872
73.....	.06642	.06326	.07550	1.050	.880
78.....	.09771	.09306	.11259	1.050	.868
83.....	.14635	.13938	.16657	1.050	.879
88.....	.20816	.19825	.24300	1.050	.857
93.....	.30376	.28930	.34666	1.050	.876
98.....	.70156	.66815	.72467	1.050	.968

- (ii) The 1950 scale employed the 1941 CSO Table and 3% interest, with a loading of 10% of the net premium plus what was in effect a policy constant equal to \$1.80 per annum per \$1,000 on the first \$75,000 of insurance.
- (iii) The 1958 scale was similar to the 1950 scale except that it graded off the policy constant and the percentage loading commencing with an insurance volume of \$250,000 so that for cases of over \$500,000 in volume the premium rates became the 1941 CSO Table net premiums with interest at 3% and no loading.

TABLE 5
1960 BASIC GROUP MORTALITY TABLE

Age x	q_x	l_x	d_x	e_x
0	.00633	10,000,000	63,300	71.30
1	.00196	9,936,700	19,476	70.75
2	.00118	9,917,224	11,702	69.89
3	.00089	9,905,522	8,816	68.97
4	.00073	9,896,706	7,225	68.03
5	.00065	9,889,481	6,428	67.08
6	.00058	9,883,053	5,732	66.13
7	.00052	9,877,321	5,136	65.17
8	.00048	9,872,185	4,739	64.20
9	.00046	9,867,446	4,539	63.23
10	.00045	9,862,907	4,438	62.26
11	.00046	9,858,469	4,535	61.29
12	.00049	9,853,934	4,828	60.31
13	.00055	9,849,106	5,417	59.34
14	.00064	9,843,689	6,300	58.38
15	.00074	9,837,389	7,280	57.41
16	.00085	9,830,109	8,356	56.46
17	.00094	9,821,753	9,232	55.50
18	.00098	9,812,521	9,616	54.55
19	.00099	9,802,905	9,705	53.61
20	.00100	9,793,200	9,793	52.66
21	.00101	9,783,407	9,881	51.71
22	.00102	9,773,526	9,969	50.76
23	.00103	9,763,557	10,056	49.82
24	.00104	9,753,501	10,144	48.87
25	.00105	9,743,357	10,231	47.92
26	.00107	9,733,126	10,414	46.97
27	.00108	9,722,712	10,501	46.02
28	.00111	9,712,211	10,781	45.07
29	.00113	9,701,430	10,963	44.12
30	.00117	9,690,467	11,338	43.16
31	.00121	9,679,129	11,712	42.21
32	.00126	9,667,417	12,181	41.27
33	.00133	9,655,236	12,841	40.32
34	.00143	9,642,395	13,789	39.37
35	.00154	9,628,606	14,828	38.43
36	.00168	9,613,778	16,151	37.48
37	.00184	9,597,627	17,660	36.55
38	.00204	9,579,967	19,543	35.61
39	.00227	9,560,424	21,702	34.68
40	.00252	9,538,722	24,038	33.76
41	.00281	9,514,684	26,736	32.85
42	.00313	9,487,948	29,697	31.94
43	.00348	9,458,251	32,915	31.04
44	.00387	9,425,336	36,476	30.14
45	.00429	9,388,860	40,278	29.26
46	.00475	9,348,582	44,406	28.38
47	.00526	9,304,176	48,940	27.51
48	.00582	9,255,236	53,865	26.66
49	.00643	9,201,371	59,165	25.81

TABLE 5—Continued
1960 BASIC GROUP MORTALITY TABLE

Age x	q_x	l_x	d_x	${}_x p_x$
50.....	.00710	9,142,206	64,910	24.97
51.....	.00783	9,077,296	71,075	24.15
52.....	.00864	9,006,221	77,814	23.34
53.....	.00953	8,928,407	85,088	22.54
54.....	.01051	8,843,319	92,943	21.75
55.....	.01157	8,750,376	101,242	20.97
56.....	.01270	8,649,134	109,844	20.21
57.....	.01392	8,539,290	118,867	19.47
58.....	.01520	8,420,423	127,990	18.73
59.....	.01656	8,292,433	137,323	18.02
60.....	.01802	8,155,110	146,955	17.31
61.....	.01959	8,008,155	156,880	16.62
62.....	.02133	7,851,275	167,468	15.94
63.....	.02322	7,683,807	178,418	15.28
64.....	.02526	7,505,389	189,586	14.63
65.....	.02750	7,315,803	201,185	13.99
66.....	.03000	7,114,618	213,439	13.38
67.....	.03277	6,901,179	226,152	12.77
68.....	.03584	6,675,027	239,233	12.19
69.....	.03919	6,435,794	252,219	11.62
70.....	.04278	6,183,575	264,533	11.08
71.....	.04655	5,919,042	275,531	10.55
72.....	.05048	5,643,511	284,884	10.04
73.....	.05452	5,358,627	292,152	9.55
74.....	.05878	5,066,475	297,807	9.07
75.....	.06337	4,768,668	302,190	8.61
76.....	.06845	4,466,478	305,730	8.15
77.....	.07415	4,160,748	308,519	7.72
78.....	.08059	3,852,229	310,451	7.30
79.....	.08771	3,541,778	310,649	6.89
80.....	.09540	3,231,129	308,250	6.51
81.....	.10360	2,922,879	302,810	6.14
82.....	.11219	2,620,069	293,946	5.79
83.....	.12113	2,326,123	281,763	5.46
84.....	.13043	2,044,360	266,646	5.14
85.....	.14017	1,777,714	249,182	4.84
86.....	.15038	1,528,532	229,861	4.55
87.....	.16116	1,298,671	209,294	4.26
88.....	.17263	1,089,377	188,059	3.99
89.....	.18507	901,318	166,807	3.71
90.....	.19879	734,511	146,013	3.44
91.....	.21422	588,498	126,068	3.17
92.....	.23186	462,430	107,219	2.90
93.....	.25230	355,211	89,620	2.62
94.....	.27624	265,591	73,367	2.34
95.....	.30650	192,224	58,917	2.05
96.....	.34966	133,307	46,612	1.73
97.....	.42653	86,695	36,978	1.39
98.....	.56054	49,717	27,868	1.05
99.....	.75169	21,849	16,424	.75
100.....	1.00000	5,425	5,425	.50

It was clear that in establishing premiums based on the 1960 CSG Table, which was designed to take care of the mortality element alone, it would not be possible to rely on mortality margins for expenses and contingencies as had been the case in the past. Instead, specific and adequate loading provision would have to be made in the gross premiums for groups of all sizes. At the one extreme, account would have to be taken of the necessarily greater expense requirements of baby groups, *i.e.*, those with fewer than 25 lives, that were now being written. At the other end of the scale, there should be a minimum specific loading for the largest groups of between 5% and 10% of premiums.

It was suggested to the Commissioners that under current marketing conditions the following would constitute a realistic loading formula meeting these requirements:

- (i) A basic loading percentage equal to 25% of the gross premium.
- (ii) A policy constant of \$2.40 per annum per thousand to be added on the first \$40,000 of insurance in consideration of the extra expense of writing baby groups.
- (iii) Further recognition of the variation in expenses by size of case in the form of a table of advance expense adjustment factors ranging from 1% to 20% to be applied to reduce the total premium otherwise determined, as is generally the practice in establishing initial premiums for group health insurance.

The Commissioners 1961 Standard Group Life Insurance Premium Rates as promulgated by New York are set forth in Appendix C including the details of their computation and the loading formula. The minimum additional premium specified for total and permanent disability plans of \$.96 per annum per \$1,000 of insurance follows the pattern of rating such benefits in earlier premium scales.

The application of the 1961 scale of premiums to a sample of new group life insurance policies issued showed that on the average first year gross premiums were reduced by about 9% in comparison with the 1958 scale and 16% when related to the previous 1950 scale. Reductions from the 1958 scale are less for smaller groups than for the larger ones and greater for groups with lower age distributions than for higher age groups, reflecting the greater improvement in mortality at the younger ages incorporated into the new table.

APPENDIX A
CALENDAR YEARS 1950-1958
NONRATED INDUSTRIES

CENTRAL AGE	WAIVER OF PREMIUM				EXTENDED DEATH BENEFIT			TOTAL AND PERMANENT DISABILITY			
	Years Exposed	Total Claims*	Accidental Deaths	Disability Claims*	Years Exposed	Total Claims	Accidental Deaths	Years Exposed	Total Claims	Accidental Deaths	Disability Claims
18.....	707,716	758	494	28	401,645	397	262	794,947	751	445	64
23.....	2,104,444	2,416	1,323	160	1,225,556	1,209	680	2,342,349	2,358	1,155	311
28.....	2,931,588	3,254	1,317	318	1,692,030	1,786	789	2,999,104	3,375	1,282	497
33.....	3,161,130	4,363	1,336	399	1,774,278	2,143	676	3,026,988	4,139	1,107	688
38.....	3,110,908	6,290	1,205	521	1,784,888	3,375	676	2,934,662	5,991	1,047	930
43.....	2,898,544	9,956	1,175	749	1,689,622	5,434	680	2,724,529	9,566	993	1,404
48.....	2,487,354	14,419	1,085	1,033	1,492,881	7,923	613	2,363,484	14,056	891	2,093
53.....	1,986,634	18,453	907	1,483	1,238,143	10,649	554	1,898,618	19,348	837	3,402
58.....	1,543,296	22,908	837	2,558	983,675	13,702	519	1,472,081	25,822	682	6,747
18-58....	20,931,614	82,817	9,679	7,249	12,282,718	46,618	5,449	20,556,762	85,406	8,439	16,136
63.....	1,099,261	22,109	715	.....	689,220	14,590	449	1,049,444	21,833	656	.....
68.....	566,690	16,693	436	.....	366,362	11,751	297	586,158	19,383	446	.....
73.....	236,796	10,761	254	.....	158,996	7,782	193	285,567	14,756	288	.....
78.....	84,426	5,986	131	.....	60,851	4,748	116	122,496	10,168	179	.....
83.....	24,057	2,712	61	.....	18,248	2,319	59	44,037	5,634	112	.....
88.....	5,015	869	16	.....	3,580	768	25	11,134	2,161	45	.....
93.....	643	153	6	.....	449	140	5	1,743	509	13	.....
98.....	59	23	3	.....	21	13	0	159	52	2	.....
63-98....	2,016,947	59,306	1,622	.....	1,297,727	42,111	1,144	2,100,738	74,496	1,741	.....
Total..	22,948,561	142,123	11,301	7,249	13,580,445	88,729	6,593	22,657,500	159,902	10,180	16,136

* 75% of Disability Claims on Waiver of Premium.

APPENDIX B

ADJUSTED QUINQUENNIAL FORCE OF
MORTALITY* WITH MARGINS
INCLUDED

Age <i>x</i>	<i>μ_x</i>
3.....	.00174
8.....	.00146
13.....	.00152
18.....	.00195
23.....	.00221
28.....	.00231
33.....	.00255
38.....	.00333
43.....	.00498
48.....	.00768
53.....	.01194
58.....	.01872
63.....	.02804
68.....	.04295
73.....	.06600
78.....	.09815
83.....	.15131
88.....	.22324
93.....	.34056
98.....	.85069

* Based on 1950-1958 Composite Group Experience.

APPENDIX C

STATE OF NEW YORK
INSURANCE DEPARTMENT

324 STATE STREET
ALBANY 10

July 14, 1961

TO: ALL AUTHORIZED LIFE INSURANCE COMPANIES
WRITING GROUP LIFE INSURANCE

Re: *Minimum Premiums for Group Life Insurance*

Pursuant to Section 204, subdivision 2, of the New York Insurance Law as amended, no life insurance company authorized to do business in this state

shall hereafter issue, within or without this state, any policy of group life insurance on which the premium shall be less than the minimum gross premium described below:

- (1) The minimum gross annual renewable Term premium shall be equal to the net premium according to the Commissioners' 1960 Standard Group Mortality Table with interest at 3%, loaded in accordance with item (2) plus a constant in item (3) and reduced on account of premium size according to item (4). The loading formula agrees with that adopted by the NAIC at its meetings in New York City, November 28, 1960.
- (2) annual premium = $1000q_x$ (Commissioners' 1960 Standard Group Mortality Table) times $v^{1/2}$ (at 3% = .985329) divided by .75
- (3) The constant to be added is applicable only to the first \$40,000 of insurance and shall be equal to \$2.40 per \$1000 of insurance where premiums are on an annual basis, \$1.20 on a semi-annual basis, \$.60 on a quarterly basis, and \$.20 where premiums are on a monthly basis. The constant shall not apply to the volume of insurance in excess of \$40,000.
- (4) The scale of advance expense adjustment factors applicable to the sum of (2) and (3) shall be as follows:

Total of (2) and (3)		Total of (2) and (3)		Advance Expense Adjustment
(Annual Basis)		(Monthly Basis)		
Under	\$	Under	\$	0%
\$ 2,400-	2,999	\$ 200-	249	1
3,000-	3,599	250-	299	2
3,600-	4,199	300-	349	3
4,200-	4,799	350-	399	4
4,800-	5,399	400-	449	5
5,400-	5,999	450-	499	6
6,000-	7,199	500-	599	7
7,200-	8,399	600-	699	8
8,400-	9,599	700-	799	9
9,600-	11,999	800-	999	10
12,000-	17,999	1,000-	1,499	11
18,000-	35,999	1,500-	2,999	12
36,000-	59,999	3,000-	4,999	13
60,000-	119,999	5,000-	9,999	14
120,000-	179,999	10,000-	14,999	15
180,000-	239,999	15,000-	19,999	16
240,000-	359,999	20,000-	29,999	17
360,000-	479,999	30,000-	39,999	18
480,000-	719,999	40,000-	59,999	19
720,000 and over		60,000 and over		20

- (5) Fractional premiums shall be determined on the basis of the following percentages of the annual premium:

Semi-annual.....	50.375%
Quarterly.....	25.250%
Monthly.....	8.458%

For convenience and ready reference tables of annual, semi-annual, quarterly, and monthly premiums as calculated on the above basis are attached.

- (6) The new minimum group life premiums shall permit inclusion of disability benefits commonly described as:
- (a) Extended Death Benefit
 - (b) Waiver of Premiums

For the disability benefit which provides for the payment of the face amount of insurance in instalments in the event of total and permanent disability, an addition of at least \$.96 per \$1000 of face amount shall be made to the tabular annual premium before advance expense adjustment (\$.48 per thousand, \$.24 per thousand, and \$.08 per thousand to the tabular semi-annual, quarterly, and monthly premiums, respectively), and the amount thereof shall be stated as a part of the printed text.

- (7) Each company shall continue as heretofore to file with the Department tables of extra premiums for hazardous occupational classifications as adopted by the company.
- (8) The new minimum group life premiums for the first policy year shall become effective on new group life policies issued on and after August 1, 1961.
- (9) In the case of new group life policies applied for on and after the date of this notice but prior to August 1, 1961, the minimum group life premiums as calculated herein may be used.
- (10) Companies shall file either revised group life policy forms or amendatory riders or appropriate alternate pages to conform with promulgated rates. In the event that riders or alternate pages are adopted, and after the same have been approved, each company should submit a list by policy number of all approved group life contract forms amended by such rider or alternate page, together with copies of the amending form for attachment to each contract as amended.

Very truly yours,

THOMAS THACHER
Superintendent of Insurance

Attach.

MINIMUM GROUP LIFE RENEWABLE TERM GROSS PREMIUMS

(According to the Commissioners' 1960 Standard
Group Mortality Table at 3% Interest)

Age Nearest Birthday	Annual	Semi-Annual	Quarterly	Monthly	Age Nearest Birthday
15	\$ 2.26	\$ 1.14	\$.57	\$.19	15
16	2.38	1.20	.60	.20	16
17	2.50	1.26	.63	.21	17
18	2.61	1.31	.66	.22	18
19	2.67	1.35	.67	.23	19
20	2.75	1.39	.69	.23	20
21	2.81	1.42	.71	.24	21
22	2.86	1.44	.72	.24	22
23	2.90	1.46	.73	.25	23
24	2.94	1.48	.74	.25	24
25	2.97	1.50	.75	.25	25
26	3.00	1.51	.76	.25	26
27	3.02	1.52	.76	.26	27
28	3.06	1.54	.77	.26	28
29	3.10	1.56	.78	.26	29
30	3.15	1.59	.80	.27	30
31	3.22	1.62	.81	.27	31
32	3.30	1.66	.83	.28	32
33	3.42	1.72	.86	.29	33
34	3.56	1.79	.90	.30	34
35	3.74	1.88	.94	.32	35
36	3.97	2.00	1.00	.34	36
37	4.22	2.13	1.07	.36	37
38	4.53	2.28	1.14	.38	38
39	4.89	2.46	1.23	.41	39
40	5.28	2.66	1.33	.45	40
41	5.74	2.89	1.45	.49	41
42	6.24	3.14	1.58	.53	42
43	6.81	3.43	1.72	.58	43
44	7.41	3.73	1.87	.63	44
45	8.08	4.07	2.04	.68	45
46	8.80	4.43	2.22	.74	46
47	9.60	4.84	2.42	.81	47
48	10.48	5.28	2.65	.89	48
49	11.46	5.77	2.89	.97	49
50	12.51	6.30	3.16	1.06	50
51	13.66	6.88	3.45	1.16	51
52	14.94	7.53	3.77	1.26	52
53	16.34	8.23	4.13	1.38	53
54	17.88	9.01	4.51	1.51	54
55	19.55	9.85	4.94	1.65	55
56	21.34	10.75	5.39	1.80	56
57	23.25	11.71	5.87	1.97	57
58	25.28	12.73	6.38	2.14	58
59	27.42	13.81	6.92	2.32	59
60	29.72	14.97	7.50	2.51	60

NOTE: To the foregoing rates a constant should be added on the first \$40,000 of insurance equal to \$2.40 per M annually, \$1.20 per M semi-annually, \$.60 per M quarterly and \$.20 per M monthly. The foregoing rates are exclusive of any reduction on account of premium size.

Age Nearest Birthday	Annual	Semi-Annual	Quarterly	Monthly	Age Nearest Birthday
61	\$ 32.20	\$ 16.22	\$ 8.13	\$ 2.72	61
62	34.95	17.61	8.82	2.96	62
63	37.92	19.10	9.57	3.21	63
64	41.13	20.72	10.39	3.48	64
65	44.67	22.50	11.28	3.78	65
66	48.61	24.49	12.27	4.11	66
67	52.97	26.68	13.37	4.48	67
68	57.82	29.13	14.60	4.89	68
69	63.10	31.79	15.93	5.34	69
70	68.75	34.63	17.36	5.81	70
71	74.70	37.63	18.86	6.32	71
72	80.90	40.75	20.43	6.84	72
73	87.26	43.96	22.03	7.38	73
74	93.97	47.34	23.73	7.95	74
75	101.21	50.98	25.56	8.56	75
76	109.23	55.02	27.58	9.24	76
77	118.21	59.55	29.85	10.00	77
78	128.37	64.67	32.41	10.86	78
79	139.59	70.32	35.25	11.81	79
80	151.71	76.42	38.31	12.83	80
81	164.64	82.94	41.57	13.93	81
82	178.19	89.76	44.99	15.07	82
83	192.27	96.86	48.55	16.26	83
84	206.93	104.24	52.25	17.50	84
85	222.29	111.98	56.13	18.80	85
86	238.40	120.09	60.20	20.16	86
87	255.38	128.65	64.48	21.60	87
88	273.47	137.76	69.05	23.13	88
89	293.08	147.64	74.00	24.79	89
90	314.71	158.54	79.46	26.62	90
91	339.03	170.79	85.61	28.68	91
92	366.84	184.80	92.63	31.03	92
93	399.07	201.03	100.77	33.75	93
94	436.82	220.05	110.30	36.95	94
95	484.52	244.08	122.34	40.98	95

NOTE: To the foregoing rates a constant should be added on the first \$40,000 of insurance equal to \$2.40 per M annually, \$1.20 per M semi-annually, \$.60 per M quarterly and \$.20 per M monthly. The foregoing rates are exclusive of any reduction on account of premium size.