

**TRANSACTIONS OF SOCIETY OF ACTUARIES
1976 REPORTS**

**REPORT OF THE COMMITTEE ON SELF-
ADMINISTERED RETIREMENT PLANS**

**MORTALITY AMONG PENSIONERS
AND SOME NONRETIRED EXPERIENCE**

PREVIOUS reports of this Committee are in the *1958 Reports* (p. 115); *1962 Reports* (p. 120); *1966 Reports* (p. 182); and *1971 Reports* (p. 257). Data from the *1971 Reports* were used in constructing the UP-1984 Mortality Table, the first such table based primarily on non-insured pensioner mortality experience for ages 65 and over.¹ For the *1971 Reports*, actual-to-expected mortality ratios were derived on the basis of the *GA-1951 Table* and also on the basis of the 1971 GAM Table. For the purpose of analyzing the experience gathered for this report, actual-to-expected mortality ratios were derived on the basis of the UP-1984 Table (set forward one year for males and set back four years for females, unless otherwise indicated) and also on the basis of the 1971 GAM Tables for males and females.

Prior reports were limited to the mortality experience of nondisability retirements by number of lives. This report has been expanded to include some disability pensioner mortality experience, and, for several of the nondisability mortality experiences, the results have been shown on the basis of pension amounts and by number of lives. Each experience has been summarized and reported separately, as in prior reports, and, where available and of sufficient size to be meaningful, the experience for male and female pensioners has been shown separately. Finally, the data base for the report has been expanded to include the experiences for three large nonretired groups.

A considerable effort has been made to obtain more data for this report than were included in prior reports. In addition to the United States civil service plan data for government employees, the largest from the standpoint of the number of deaths in the experience shown in the *1971 Reports*, data have been made available concerning the experience under the United States railroad retirement system since 1940 and under social security for the years 1970-74. These three governmental systems cover most of the work force and are technically of a noninsured or self-administered type. Since civil service data have been included in prior reports, it

¹ William W. Fellers and Paul H. Jackson, "Noninsured Pensioner Mortality; the UP-1984 Table," *Proceedings of the Conference of Actuaries in Public Practice*, XXV, 456.

seemed appropriate and desirable to obtain the extensive railroad retirement data and also the recent social security data for this report, so that data from these three major governmental systems could be considered.

Data for a number of smaller groups, mainly governmental units, that were shown in the *1971 Reports* have not been included in this report, either because the experiences were not made available, or because the data could not be revised readily to a consistent basis, or because the experiences did not appear to add significantly to the total picture. The experiences that have been included have all been regrouped on the basis of consistent quinquennial periods of time, the most recent quinquennial period being 1970-74.

Experiences included in this report, and a brief description of the group, are shown in Table A in descending order by number of deaths during the 1970-74 period.

TABLE A
GROUP EXPERIENCES INCLUDED IN REPORT

Number of Deaths, 1970-74	Description of Group	Summarized in Table
5,998,664	United States social security, ages 65 and over (includes disability pensioners), by number	1
126,075	United States civil service retired government employees, by number	2
126,026	United States railroad retirement, retired, unisex, by number	3
23,165	Electrical union, merged nonretired and retired, unisex, by number	4
20,146	Public utility companies, retired, by number and amount	5
8,495	Manufacturing company, nonretired hourly males, by number	6
7,823	Manufacturing company, retired hourly males, by number	7
6,531	Manufacturing company, retired males, salaried and hourly, by number and amount	8
4,501	Railroad, retired, unisex, by number and amount	9
4,101	Chemical manufacturing company, retired, nondisability and disability, salaried and hourly, by number	10
2,049	Light manufacturing company, nonretired and retired, unisex, by number and amount	11
975	Manufacturing company, retired hourly males, by number	12

The pensioner mortality experience (predominantly nondisability) has been summarized in Table B on the basis of actual-to-expected mortality ratios. All of the groups of Table A have been included except the sixth, which is an exclusively nonretired experience.

From Table B, note first that the rate of mortality improvement has been less for females than for males since 1970 for group 1 and since 1965 for a number of other groups. This suggests a reversal of a trend noted in prior reports of a higher rate of mortality improvement for females than for males.

As expected, salaried experiences are more favorable than hourly experiences for groups 8 and 10. On the basis of ten points representing one year of age by the UP-1984 Table, the experiences of the hourly category

TABLE B
PENSIONER MORTALITY

GROUP SUMMARIZED FROM TABLE	ACTUAL-TO-EXPECTED MORTALITY RATIOS ON UP-1984 BASIS FOR FIVE-YEAR PERIOD BEGINNING IN:							AVERAGE ANNUAL IMPROVEMENT	
	1940	1945	1950	1955	1960	1965	1970	Percent Im- provement	Since Year
1. Males							122%	1.4%	1970
Females							116	0.6	1970
2. Males	128%	124%	120%	118%	114%	109%	101	0.9	1940
Females	131	125	112	102	99	92	90	1.4	1940
3. 93% males	137	130	126	126	121	117	112	0.8	1940
4. Ages 65 and Over					131	127	124	0.7	1960
5. Males:									
By number		144	134	132	132	128	115	1.2	1945
By amount		141	129	142	127	118	105	1.4	1945
Females:									
By number		163	133	128	118	108	106	2.3	1945
By amount		162	135	130	118	106	102	2.4	1945
7. Males							111	1.3	1955
8. Salaried males:									
By number						93	93		
By amount							88		
Hourly males:									
By number						113	105	1.6	1965
By amount							103		
9. 90% males:									
By number			130	130	109	110	106	1.2	1950
By amount							97		
10. Salaried males	167*	109*	111*	96*	106	96	91	1.5	1960
Hourly males	81*	116*	122	118	114	109	112	0.5	1950
11. Unisex:									
By number							111†		
By amount							105†		
12. Hourly males			121*	126	114	116	96	1.5	1955

* Less than 250 deaths; not included for purpose of determining average annual rate in last column.

† On basis of UP-1984 Table without adjustment, as compared with UP-1984 Table set forward one year for other predominantly male groups.

for group 8 appear to represent more than a one-year differential (i.e., it would take more than a one-year set-forward in mortality to put the hourly category on a basis consistent with the salaried category).

The experiences by amount of monthly pension, shown for groups 5, 8, 9, and 11, are more favorable than the corresponding experiences by number. This difference is more marked for salaried than for hourly and is also more significant for males than for females. Groups 5 and 9 each have about a ten-point spread for males, thus suggesting that for these groups a one-year setback in the UP-1984 Table would make provision for the relatively better mortality experienced by those receiving higher benefits. On the other hand, there is only a five-point spread for salaried males in group 8 and a six-point spread for unisex group 11. These represent less than a one-year age adjustment, as do the other differences shown, which are even less (for females in group 5 and hourly males in group 8).

I. UNITED STATES SOCIAL SECURITY (MEDICARE EXPERIENCE,
WHICH INCLUDES DISABILITY PENSIONERS)

We are fortunate in having available the United States social security medicare mortality experience by year for 1970-74. However, the social security mortality experience was not available in convenient form prior to 1968, and so we have not included the quinquennial period 1965-69.

Table 1 displays, by sex and quinquennial age group, the number of deaths and actual-to-expected mortality ratios for the United States social security system for each year from 1970 through 1974 and for all five years combined. This experience includes all those covered under medicare at attained ages 65 and over. In one respect, it is fortunate that disabilities and nondisabilities are all included in the experience, because in this way the antiselection associated with disability is removed from the experience. When nondisability experience alone is considered, the experience becomes *more select to the extent that disabilities are treated separately*. It will be noted that, the older the age group, generally the lower the ratio of actual to expected mortality. This trend may reflect simply that the disability portion of the experience runs out at the older ages.

Since the experience is so large, the actual-to-expected ratios for the older age groups have considerable credibility. For ages 95 and over, the ratio of actual to expected mortality for males was less than 100 percent by both mortality standards in 1974 and by one of the two standards for the full five-year period. For females at these ages, it was less than 100 percent by the 1971 GAM standard for all five years.

It is also interesting to note that, from 1973 to 1974, the overall actual-to-expected ratios showed marked improvement for males and less im-

TABLE 1
UNITED STATES SOCIAL SECURITY MEDICARE DATA
(Disability and Nondisability)

AGE GROUP	1970			1971			1972			1973			1974			1970-74		
	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths
	UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM
Males																		
65-69	137%	154%	124,640	136%	153%	124,893	136%	153%	128,397	134%	151%	115,394	130%	147%	114,087	135%	152%	607,411
70-74	131	133	133,635	131	133	134,812	133	135	136,016	131	133	135,064	125	127	133,518	130	132	673,045
75-79	122	128	134,939	123	128	136,593	124	129	139,956	122	127	137,979	117	122	130,966	122	127	680,433
80-84	116	117	106,683	117	118	109,280	118	118	111,285	117	117	120,417	112	112	116,813	116	116	564,478
85-89	111	115	61,605	112	117	64,826	112	116	66,323	112	116	77,992	107	112	76,725	111	115	347,471
90-94	100	115	21,640	101	117	23,141	101	116	23,907	101	116	32,742	97	112	33,012	100	115	134,442
95-99	81	104	4,661	82	105	4,974	80	102	5,177	80	103	7,533	77	98	7,535	80	102	29,880
Total	123%	129%	587,803	123%	129%	598,519	124%	130%	611,061	121%	127%	627,121	116%	123%	612,656	122%	128%	3,037,160
Females																		
65-69	106%	170%	74,091	105%	169%	74,432	105%	169%	76,513	102%	164%	66,155	99%	159%	65,759	104%	166%	356,950
70-74	109	148	100,871	107	145	100,079	108	146	100,568	104	140	93,638	99	134	92,844	106	143	488,000
75-79	119	130	126,950	118	129	129,113	118	128	131,743	115	126	124,989	110	120	119,269	116	127	632,064
80-84	126	127	125,212	126	128	130,062	124	126	132,751	122	124	138,444	118	119	137,097	123	124	663,566
85-89	129	126	89,028	131	128	94,729	130	127	98,801	129	127	112,897	124	121	113,409	128	126	508,864
90-94	126	118	39,162	127	120	42,462	126	118	44,101	126	118	58,783	121	113	59,961	125	117	244,469
95-99	108	97	9,919	110	100	11,183	108	98	12,033	106	95	17,128	103	93	17,328	106	96	67,591
Total	118%	134%	565,233	118%	134%	582,060	118%	133%	596,510	116%	129%	612,034	115%	123%	605,667	116%	130%	2,961,504
Grand total (males and females)			1,153,036			1,180,579			1,207,571			1,239,155			1,218,323			5,998,664

* Set forward one year for males and set back four years for females.

provement for females. However, for the four-year period prior to 1974, the mortality improvement was not as significant for males as it was for females.

Finally, it will be observed that there were more deaths among men than women during the 1970-74 period. This may be attributed to the relatively lower mortality rates among women more than offsetting the fact that there are more women that have survived to these older ages and are thus exposed to the probability of death. One may expect that in the future there will be more deaths among women at these older ages simply because more will have survived to the older ages.

II. RETIRED GOVERNMENT EMPLOYEES (CIVIL SERVICE "NONDISABILITY ANNUITANTS")

The experience of the United States civil service system for government employees for the five-year period from 1970 to 1974 included 126,075 deaths among pensioners classified as "nondisability annuitants." Since there was a tax incentive in 1973 and 1974 for a pensioner to receive disability benefits, one of the reasons for the mortality improvement shown for this five-year period as compared with the prior five-year periods may be the more superselect nature of the remaining "nondisability annuitants."

Table 2 summarizes the mortality experience since 1940 for males and females. This covers a thirty-five-year period, which seems adequate for the purpose of considering mortality improvement from one five-year period to the next.

Mortality during the 1970-74 period was generally 7-8 percent more favorable for males and 2-6 percent more favorable for females than during the 1965-69 period. This indicates an annual rate of mortality improvement of about $1\frac{1}{2}$ percent for males and $\frac{4}{5}$ percent for females. However, this improvement may have been distorted by the 1970-74 period having a more superselect group because of the additional incentive to qualify for disability pensions.

Another point to note is that at the older ages (i.e., ages 80 and over) the mortality ratios are generally less favorable for females than for males. However, the reverse is more often true at the younger ages (i.e., ages under 80).

III. RAILROAD RETIREMENT (NONDISABILITY RETIREMENT)

Railroad retirement experience was made available for the same thirty-five-year period for which the civil service experience is shown. This experience is also for those pensioners classified as "nondisability." How-

TABLE 2
 RETIRED GOVERNMENT EMPLOYEES
 (Civil Service "Nondisability Annuitants")

AGE GROUP	7/40-6/45			7/45-6/50			7/50-6/55			7/55-6/60			7/60-6/65			7/65-6/70			7/70-6/75		
	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths
	UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM	
Males																					
Under 55.....	†	†	2	†	†	3	84%	98%	21	127%	148%	47	106%	124%	77	97%	113%	150	103%	120%	698
55-59.....	146%	173%	92	132%	156%	340	134	158	424	118	140	565	123	146	786	105	124	1,171	104	123	3,143
60-64.....	139	164	942	154	182	1,940	144	170	3,031	130	153	4,169	126	148	4,408	118	139	5,341	106	125	8,514
65-69.....	123	138	2,887	130	146	3,962	134	151	6,333	128	144	10,206	121	136	14,015	111	125	12,954	103	116	14,747
70-74.....	128	130	4,020	119	121	5,489	114	116	7,649	116	118	11,354	113	115	17,530	109	110	22,269	103	106	19,819
75-79.....	128	133	3,253	118	123	4,588	112	116	6,556	113	117	9,247	111	115	13,149	107	112	19,492	102	105	25,392
80-84.....	133	134	2,130	123	124	2,926	112	113	4,229	112	113	6,383	111	112	8,782	107	108	12,244	99	100	18,456
85-89.....	127	133	762	117	122	1,269	114	119	1,908	114	119	3,130	110	115	4,558	107	111	6,125	95	99	8,836
90 and over.....	114	132	212	119	137	372	115	133	658	106	123	1,018	108	125	1,767	103	119	2,601	90	104	3,843
65 and over.....	127	133	13,264	121	127	18,606	117	123	27,333	117	123	41,338	114	119	59,801	108	113	75,685	101	105	91,093
All.....	128%	135%	14,300	124%	131%	20,889	120%	127%	30,809	118%	125%	46,119	114%	121%	65,072	109%	114%	82,347	101%	107%	103,448
Females																					
Under 55.....	†	†	0	†	†	0	†	†	3	†	†	4	†	†	9	93%	172%	19	97%	178%	90
55-59.....	†	†	8	79%	151%	16	74%	141%	36	102%	195%	55	92%	175%	66	83	159	115	94	178	357
60-64.....	129%	221%	43	110	189	125	101	173	263	107	184	436	90	155	1,643	84	144	847	79	134	1,328
65-69.....	117	188	150	132	212	364	108	174	639	100	161	1,021	88	142	1,777	81	130	2,363	77	122	2,912
70-74.....	106	143	266	110	148	480	100	135	770	94	128	1,362	86	117	2,308	78	106	3,497	78	105	4,479
75-79.....	135	148	288	124	135	448	113	123	710	98	107	1,220	106	115	2,085	93	101	3,333	89	98	5,246
80-84.....	164	166	206	147	148	342	128	129	526	108	109	901	118	119	1,469	111	112	2,519	102	103	4,489
85-89.....	165	162	82	141	139	136	148	145	296	119	116	476	124	122	792	123	121	1,377	116	113	2,597
90 and over.....	166	156	28	132	125	46	134	126	92	121	113	192	141	133	378	138	130	674	110	103	1,129
65 and over.....	130	156	1,020	126	152	1,816	114	138	3,033	101	122	5,181	100	122	8,809	93	112	13,663	90	106	20,852
All.....	131%	159%	1,071	125%	154%	1,957	112%	140%	3,335	102%	126%	5,676	99%	124%	9,527	92%	114%	14,644	90%	108%	22,627
Grand total.....			15,371			22,846			34,144			51,795			74,599			96,991			126,075

* Set forward one year for males and set back four years for females.
 † Less than ten deaths.

ever, the experience has been treated on a unisex basis, since only about 7 percent of the group is female. In spite of the female content, the experience shows generally higher actual-to-expected mortality ratios than are shown for males in the civil service experience. Possibly a reason for this is that the railroad retirement experience emerges from a predominantly "heavy industry" group whereas the civil service male experience emerges from a predominantly clerical group. Table 3 summarizes the railroad retirement experience.

It is of interest to note that there are 126,026 deaths in the 1970-74 railroad experience, only 49 fewer than in the 1970-74 civil service experience. This is because the railroad retirement pensioner group emerged from a group of active members that was at one time larger than the civil service group. Of course, since that time the active civil service group has grown and the active railroad group has declined. Finally, it should be noted that from 1965-69 to 1970-74 the mortality experience improved by 1 percent per year, whereas for the preceding five-year period the improvement was about $\frac{4}{5}$ percent per year. This suggests a continuation in the rate of mortality improvement, which has been about 1 percent per year since 1955-60. Before then, there did not seem to be much mortality improvement for a period of about ten years.

An underlying factor to note in considering this experience and other experiences is the shift in the availability and size of early retirement benefits, and in the emphasis on these benefits. For this reason, homogeneous data have not been available over the period of time being considered, and a significant part of the mortality improvement may be attributable to this shift.

IV. MERGED NONRETIRED AND RETIRED EXPERIENCES FOR ELECTRICAL GROUP

Another experience of a "heavy industry" type is that of a large electrical union group for which no separation in data has been made by sex, since the group is predominantly male. The experience is given on a merged basis for nonretired and retired. Those at attained ages 65 and over are basically the retired group, although there are a few retirements at younger ages and, lacking any mandatory retirement age, there are a considerable number of actives in the 65-69 and 70-75 age groups. Unfortunately, the retired and nonretired experiences are not available for this group on a regular basis. Thus the degree to which pensioner anti-selectivity occurs at the time of retirement, due to those not retiring having better mortality than those retiring, cannot be examined for this group.

TABLE 3
RAILROAD RETIREMENT NONDISABILITY RETIREMENTS
(Including about 7 Percent Females)

AGE GROUP	POLICY YEARS BEGINNING IN:												POLICY YEARS ENDING IN:								
	1940-44			1945-49			1950-54			1955-59			1960-64			1965-69			1970-74		
	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths
	UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM	
60-64	125%	147%	452	99%	117%	405	84%	100%	280	86%	102%	342	97%	115%	951	115%	136%	1,238	103%	121%	1,267
65-69	144	162	8,644	138	156	11,768	136	153	14,117	126	142	14,602	115	129	15,542	115	129	16,072	111	125	16,255
70-74	133	135	6,973	130	132	15,136	129	131	20,956	127	129	25,605	124	126	27,059	119	121	27,273	114	116	25,795
75-79	129	134	1,939	126	131	8,534	122	127	17,276	127	132	24,604	123	128	30,544	118	123	31,343	113	118	30,189
80-84	122	123	448	119	119	1,881	121	122	9,293	126	126	16,929	122	123	22,818	116	117	26,513	111	111	27,527
85-89	121	126	122	122	127	351	114	119	2,595	125	130	8,630	121	126	11,306	114	119	14,062	110	115	17,515
90 and over			97	112	47	113	131	395	115	133	2,167	114	132	4,522	111	128	5,486	109	126	7,478	
Total	137%	146%	18,578	130%	137%	38,122	126%	132%	64,912	126%	131%	92,879	121%	126%	113,742	117%	122%	121,987	112%	117%	126,026

* Set forward one year.

TABLE 4

ELECTRICAL UNION PENSION AND DEATH
BENEFIT FUNDS FOR MEMBERSHIP
(Normal Retirement Age Is 65)

AGE GROUP	1960-64			1965-69			1970-74		
	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths
	UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM	
Under 25	102%	219%	82	147%	315%	131	115%	247%	126
25-29	108	168	136	146	226	213	112	174	208
30-34	145	191	283	148	195	259	143	189	290
35-39	126	174	454	119	165	368	119	165	323
40-44	118	166	637	117	164	658	107	151	501
45-49	123	152	989	113	140	980	111	138	963
50-54	129	151	1,626	116	135	1,445	111	129	1,428
55-59	133	157	2,420	128	151	2,344	119	141	2,096
60-64	134	158	2,686	128	151	3,301	118	139	2,944
65-69	127	143	2,535	124	140	3,411	120	135	4,049
70-74	132	134	2,147	130	132	3,164	126	128	4,023
75-79	134	140	1,370	127	133	2,321	122	127	3,163
80-84	128	129	597	127	128	1,227	124	125	2,011
85 and over	150	156	301	137	143	556	133	139	1,040
Ages 65 and over	131	139	6,950	127	135	10,679	124	130	14,286
Total	130%	149%	16,263	126%	142%	20,378	121%	134%	23,165

* Set forward one year.

This experience is given in Table 4 for the last three five-year periods beginning in 1960. For the five-year period 1970-74 there were 23,165 deaths, of which 14,286 were at attained ages 65 and older. First, it will be noted that this "heavy industry" experience is generally less favorable than railroad retirement experience. Second, for the period since 1960, the rate of mortality improvement appears to have been about $\frac{1}{3}$ percent per year for those aged 65 and over (i.e., generally the pensioner group), although, when measured by the 1971 GAM Table, the rate of mortality improvement from 1965-69 to 1970-74 has been closer to 1 percent per year. In any event, the annual rate of mortality improvement has been in line with that indicated for railroad retirement. The conservatism in the 1971 GAM Table at ages under 45 is readily apparent.

V. PUBLIC UTILITY COMPANIES

Table 5 shows the mortality experience of predominantly nondisability pensioners of a large complex of public utilities. There were 20,146 deaths

TABLE 5

SERVICE PENSIONERS OF A GROUP OF PUBLIC UTILITY COMPANIES COVERED UNDER A UNIFORM PLAN
(Retirement Is Compulsory at Age 65, and Service Pensioners Include
Employees Retired for Disability if Eligible for a Service Pension)
EXPERIENCE BY NUMBER

AGE GROUP	1945-49			1950-54			1955-59			1960-64			1965-69			1970-74		
	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths
	UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM	
Males																		
45-49	†	†	5	†	†	7	†	†	1	†	†	2	†	†	6	†	†	4
50-54	693%	805%	35	594%	689%	35	594%	690%	54	513%	594%	46	700%	812%	25	569%	660%	77
55-59	377	446	153	366	433	142	384	454	185	344	407	269	369	437	276	305	360	192
60-64	198	233	427	196	231	471	173	203	476	173	203	800	181	213	1,469	180	212	1,357
65-69	126	139	768	129	143	1,131	127	141	1,367	126	139	1,630	116	129	2,122	114	127	2,853
70-74	132	137	573	117	120	868	129	132	1,365	126	130	1,622	122	125	1,912	105	108	2,348
75-79	128	132	339	124	128	576	117	121	946	123	127	1,393	124	129	1,694	109	113	1,864
80-84	135	136	156	115	116	268	117	117	486	117	118	864	114	115	1,138	106	107	1,290
85-89	86	90	37	150	156	108	135	141	205	130	135	344	102	107	491	100	105	686
90-94	126	146	14	109	125	27	127	147	29	127	146	74	103	119	119	75	87	186
95 and over	†	†	2				151	193	12	†	†	4	60	77	10	66	84	26
Total	144%	155%	2,509	134%	144%	3,633	132%	140%	5,126	132%	140%	7,048	128%	136%	9,262	115%	122%	10,883
Females																		
45-49	†	†	7	319%	556%	14	414%	717%	18	586%	1,019%	16	†	†	3	1,134%	1,964%	11
50-54	282%	524%	60	259	481	83	260	483	129	240	447	145	349%	655%	110	283%	528%	59
55-59	205	384	141	163	306	189	159	298	268	131	243	400	135	252	555	155	289	382
60-64	170	287	186	124	211	238	127	214	418	112	190	608	108	183	1,017	120	202	1,382
65-69	118	188	169	106	169	319	104	165	575	95	151	898	89	141	1,246	92	146	1,971
70-74	156	208	141	133	176	262	117	154	486	115	152	881	97	128	1,282	100	131	1,961
75-79	171	187	72	127	139	133	133	145	311	126	137	631	120	130	1,124	104	113	1,711
80-84	144	146	31	150	152	63	152	154	167	143	145	348	123	124	652	108	109	1,114
85-89	239	234	10	207	203	32	167	163	53	155	151	132	138	135	268	116	114	514
90-94	†	†	2	†	†	2	239	226	15	220	207	26	119	112	54	131	124	135
95 and over										†	†	1	†	†	1	166	151	23
Total	163%	243%	819	133%	194%	1,335	128%	182%	2,440	118%	164%	4,086	108%	146%	6,312	106%	137%	9,263

* Set forward one year for males and set back four years for females.

† Less than ten deaths.

TABLE 5—Continued
EXPERIENCE BY AMOUNT

AGE GROUP	1945-49			1950-54			1955-59			1960-64			1965-69			1970-74		
	A/E		Monthly Benefit	A/E		Monthly Benefit	A/E		Monthly Benefit	A/E		Monthly Benefit	A/E		Monthly Benefit	A/E		Monthly Benefit
	UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM	
Males																		
45-49	†	†	\$ 478	†	†	\$ 770	†	†	\$ 111	†	†	\$ 307	†	†	\$ 1,305	†	†	\$ 952
50-54	724%	841%	3,289	614%	715%	3,973	687%	797%	8,067	502%	581%	8,361	675%	782%	5,625	511%	594%	19,038
55-59	371	438	14,968	355	420	16,073	366	433	27,168	333	393	56,707	349	414	70,038	280	331	59,135
60-64	175	206	41,093	188	221	57,947	166	187	77,127	153	180	174,842	155	182	380,004	162	191	505,395
65-69	128	140	75,445	119	132	121,435	117	130	176,319	113	127	296,854	102	113	520,448	102	113	1,075,132
70-74	127	131	49,777	116	119	90,441	126	129	163,196	121	122	251,079	111	114	402,602	96	98	833,315
75-79	119	124	30,427	116	121	59,299	110	113	98,657	117	121	188,689	116	120	259,725	99	103	597,682
80-84	139	140	13,442	109	110	32,348	115	116	55,205	122	123	115,639	113	113	179,687	95	96	353,730
85-89	87	91	2,635	145	150	12,977	136	142	28,391	127	133	43,773	91	95	63,564	91	96	171,038
90-94	116	134	1,052	105	122	2,815	127	146	3,196	123	141	10,878	99	114	16,229	72	83	45,812
95 and over	†	†	273	.....	.....	147	189	.....	1,308	†	†	507	61	79	1,395	61	78	6,652
Total	141%	151%	\$232,879	129%	138%	\$398,078	142%	137%	\$639,355	127%	136%	\$1,147,636	118%	127%	\$1,941,022	105%	112%	\$3,667,881
Females																		
45-49	†	†	\$ 285	312%	538%	\$ 1,050	461%	801%	\$ 1,761	612%	1,053%	\$ 1,843	†	†	\$ 369	1,406%	2,461%	\$ 2,067
50-54	278%	518%	3,033	260	482	6,396	266	494	11,484	241	450	16,438	355%	629%	13,855	302	563	10,157
55-59	209	392	7,540	165	309	14,880	163	306	24,509	132	248	46,802	133	248	73,139	161	300	63,956
60-64	168	284	9,449	125	212	18,576	128	216	35,575	112	189	61,719	108	183	126,802	119	200	244,851
65-69	116	185	7,598	109	174	25,042	104	165	45,417	94	149	87,386	84	133	151,651	90	142	364,245
70-74	154	201	6,337	136	181	22,024	117	155	40,436	115	152	85,577	95	125	152,116	96	126	344,521
75-79	162	176	3,445	129	140	12,018	133	145	27,335	125	136	62,286	118	129	128,312	100	109	295,306
80-84	140	142	1,564	142	143	5,827	154	156	15,897	144	145	35,926	122	123	73,258	105	106	188,195
85-89	219	216	414	214	209	3,231	172	169	5,556	156	153	14,224	136	133	29,858	112	109	81,083
90-94	†	†	100	†	†	200	235	220	1,447	225	212	3,000	119	112	6,251	129	121	21,076
95 and over	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	115	†	†	103	143	130	3,506
Total	162%	242%	\$ 39,765	135%	195%	\$109,244	130%	184%	\$209,417	118%	165%	\$ 415,316	106%	144%	\$ 755,714	102%	133%	\$1,618,963

* Set forward one year for males and set back four years for females.

† Less than ten deaths.

from this group of pensioners during the five-year period 1970-74. Experience has been made available for quinquennial periods beginning in 1945.

The first page of Table 5 shows the experience for each sex by number of deaths, and this is comparable with what we have been considering up to this point. But the second page of Table 5 adds another dimension by showing the experience on the basis of amounts of monthly pension.

When measured by number of deaths, the overall experience for males appears to be between that of the electrical union group and railroad retirement. The experience by amount of monthly benefit appears to be about 10 percent better than by number of deaths, which is close to a one-year adjustment in age by the UP-1984 Table. Perhaps the higher the benefit, the more likely it is that the pensioner can have his medical requirements met on a timely basis and so defer the time of his death. Those receiving higher benefits may also have fewer worries of meeting the increasing cost of living.

A second observation on this experience is that the rate of improvement in mortality was quite significant for males from 1965-69 to 1970-74, and somewhat less significant for females. In fact, the average annual rate of improvement by the UP-1984 Table was about $2\frac{1}{2}$ percent for males compared with less than $\frac{1}{2}$ percent for females. By the 1971 GAM Table, the comparison is 2.8 percent for males and 1.8 percent for females.

Finally, the extremely high rate of mortality for the younger age groups probably reflects the disability portion of the experience during the early years, since the experience includes cases of disability where the employee was eligible for a service pension at retirement. This is therefore similar in certain respects to the Table 1 social security medicare experience.

VI. NONRETIRED HOURLY MALES OF A MANUFACTURING COMPANY

The mortality experience for a large nonretired group of hourly males is summarized in Table 6 for two periods, 1966-69 and 1970-74. The female experience was not of sufficient size to warrant inclusion in this report.

The earlier period includes only four years, and this is the main reason why the number of deaths during the 1970-74 period was some 27 percent higher than during the earlier period.

Generally, the actual-to-expected mortality ratios decline continuously from the younger age groups to the older age groups, and there is a sharp drop at ages 55 and over, when early retirement becomes available and those subject to higher mortality tend to retire.

It is interesting to note a parallel between the mortality experience of active and retired groups. The actual-to-expected mortality ratios for the younger age groups of the active and retired groups are both generally high. For active employees, this may reflect the higher degree of risk-taking at the younger ages and the overconservatism in the 1971 GAM Table under age 45. For the retired group, it may reflect the fact that people retire earlier because of ill health. For this reason, the remaining

TABLE 6
NONRETIRED HOURLY MALE EMPLOYEES OF A MANUFACTURING COMPANY
(Pension Plan Permits Nondisability Retirement Beginning at Age 55
or, if Earlier, after 30 Years of Service)

AGE GROUP	1966-69			1970-74		
	A/E		No. Deaths	A/E		No. Deaths
	UP-1984*	1971 GAM		UP-1984*	1971 GAM	
20-24.....	171%	357%	534	164%	341%	560
25-29.....	138	211	354	147	224	556
30-34.....	122	162	305	136	180	482
35-39.....	115	160	429	114	158	521
40-44.....	112	155	669	106	147	771
45-49.....	101	124	882	103	126	1,217
50-54.....	107	124	1,326	96	112	1,583
55-59.....	97	115	1,407	97	115	1,874
60-64.....	89	105	788	87	103	931
Total.....	107%	135%	6,694	105%	132%	8,495

* Set forward one year.

active employees at the older ages, who are eligible for retirement but do not retire, appear to enjoy better-than-average health.

VII. NONDISABILITY SERVICE RETIREMENTS OF THE HOURLY MALE EMPLOYEES OF A MANUFACTURING COMPANY

The pensioner mortality experience in Table 7 has emerged from a group similar in many respects to the nonretired group of Table 6, and so may be considered a related experience. Again the female content of the basic experience was not significant enough for consideration.

When service retirements under age 60 were first available in the 1965-69 period, the actual-to-expected mortality was fairly high, but this has settled down, if the 58 deaths under age 60 during the 1970-74 period may be considered significant. This may have occurred because

of a greater acceptance of earlier retirement due to higher benefits being available. On the other hand, at ages 75 and over the opposite trend is noted, with the actual-to-expected ratios being higher for the 1970-74 period than for the 1965-69 period. Hence there appears to be a change in the general direction of this mortality experience, which may end up more in line with the slope of the mortality curve in the two tables used as standards. For the group as a whole, the ratio of actual to expected mortality seems to have remained fairly stable since 1960.

TABLE 7

NONDISABILITY SERVICE RETIREMENTS OF THE HOURLY MALE EMPLOYEES
OF A MANUFACTURING COMPANY

AGE GROUP	1955-59			1960-64			1965-69			1970-74		
	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths
	UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM	
55-59	156%	184%	104	141%	166%	101	188%	222%	15	127%	150%	58
60-64	143	161	735	133	150	1,124	121	136	434	128	151	541
65-69	123	125	1,359	109	111	1,605	115	117	1,230	111	125	1,199
70-74	129	134	773	106	110	1,256	105	109	1,738	114	116	1,643
75-79	128	129	258	98	99	519	103	104	1,686	111	116	1,835
80-84	140	146	50	93	97	155	92	96	1,051	107	108	1,612
85-89	140	146	50	93	97	155	92	96	298	105	110	770
90 and over	100	116	21	71	82	21	84	97	61	97	112	165
Total	130%	136%	3,300	111%	116%	4,781	111%	116%	6,513	111%	117%	7,823

* Set forward one year.

VIII. NONDISABILITY MALE PENSIONERS OF A MANUFACTURING COMPANY, SALARIED AND HOURLY

This experience for salaried and hourly categories is summarized in Table 8 for the 1967-69 and 1970-74 periods. The experience for the latter period is shown both by number and amount.

First it will be noted that the hourly group has had somewhat less favorable experience than the salaried group, with the differences ranging from 12 to 21 percent in total depending on the time period and the mortality basis used for determining the expected deaths.

Second, although the experience by amount is more favorable than by number for the salaried group, there does not appear to be very much difference for the hourly group. This may be pretty much as expected, since the amount of pension payable to individual hourly workers generally falls in a fairly narrow range.

Finally, there has not been any measurable mortality improvement from the 1967-69 period to the 1970-74 period for the salaried group, al-

though for the larger hourly group the same general magnitude of improvement noted for other experiences is noted.

TABLE 8
NONDISABILITY MALE PENSIONERS OF A MANUFACTURING COMPANY

AGE GROUP	1967-69			1970-74					
	A/E		No. Deaths	A/E		No. Deaths	A/E		Monthly Benefit (00)
	UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM	
Salaried									
65-69	96%	105%	92	91%	101%	393	84%	94%	\$1,116
70-74	87	88	146	98	100	521	87	89	1,392
75-79	105	108	194	90	93	482	87	90	1,335
80-84	82	83	111	97	97	403	87	87	1,003
85-89	87	91	62	92	97	229	104	110	719
90 and over	144	163	13	79	93	84	77	90	221
Total	93%	96%	618	93%	97%	2,112	88%	92%	\$5,786
Hourly									
65-69	103%	115%	235	103%	115%	786	101%	112%	\$1,185
70-74	108	110	412	108	110	1,001	105	107	1,348
75-79	122	126	516	107	109	1,086	103	107	1,318
80-84	119	119	374	105	105	860	104	104	946
85-89	103	108	154	103	108	495	101	107	474
90 and over	85	100	23	102	120	191	106	124	176
Total	113%	117%	1,714	105%	110%	4,419	103%	108%	\$5,447

* Set forward one year.

IX. NONDISABILITY PENSIONERS OF A RAILROAD

In Table 9 we have summarized the mortality experience of nondisability pensioners (including about 10 percent females) of the defunct Penn Central Railroad, which is now the major portion of Conrail. There were 4,501 deaths from this group during the 1970-74 period. Since there were only 431 deaths from the related disability pensioner group, it was not felt that this latter experience was of sufficient significance to summarize.

The actual-to-expected mortality experience for this group is significantly lower than for railroad retirement. The difference in mortality

TABLE 9

NONDISABILITY RETIREMENTS OF A RAILROAD

(Normal Retirement at Age 65. For Agreement Members, Reduced Benefits Equal to Approximate Actuarial Equivalent Available Upon Early Retirement between Age 60 and Age 65. For Nonagreement Members, No Reduction in Benefits for Retirement after Age 62, or after Age 60 with 30 Years of Service. Data Include about 10 Percent Females. All Nonagreement Employees Covered, and Agreement Employees Hired before 1961 May Elect to Join Plan When Current Earnings in a Year Exceed the Railroad Retirement Wage Base.)

AGE GROUP	1948-54			1955-59			1960-64			1965-69			1970-74			1970-74		Monthly Benefit
	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		
	UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM	
60-64.....	†	†	4	112%	132%	18	144%	170%	33	100%	118%	25	133%	156%	79	114%	134%	\$ 18,584
65-69.....	164%	184%	302	125	141	456	94	106	414	87	98	352	86	97	393	68	76	45,769
70-74.....	122	123	374	123	125	620	106	107	858	111	113	841	109	110	996	99	101	93,098
75-79.....	107	112	166	145	150	450	113	117	856	111	115	1,055	106	110	1,199	98	102	86,405
80-84.....	110‡	110‡	35	137	138	145	118	118	478	116	117	838	107	107	1,090	109	109	71,795
85-89.....				122‡	127‡	27	113‡	118‡	156	120‡	125‡	430	109	114	588	117	122	37,424
90 and over.....													111	129	156	100	116	7,437
Total.....	130%	136%	881	130%	136%	1,716	109%	113%	2,795	110%	114%	3,541	106%	110%	4,501	97%	102%	\$360,512

* Set forward one year.

† Less than ten deaths.

‡ Includes a few in higher age groups.

measured by the UP-1984 Table is equivalent to about a one-half year difference in age. The lower mortality probably results from the fact that a relatively greater proportion of the coverage is with the higher paid, nonagreement group of employees, who are all covered, whereas only those agreement employees who were hired before 1961 and who earn in excess of the railroad retirement base are eligible to participate if they agree to contribute. Also, many of the agreement employees were encouraged to withdraw their contributions and withdraw from coverage under the company's pension plan, since they could then receive the full railroad retirement supplement.

The actual-to-expected mortality is shown for this group by monthly pension for the 1970-74 period, a reason for including this group even though it is a part of the much larger railroad retirement experience. By amount, the actual-to-expected ratios are 8-9 percent more favorable in total than by number of lives, again representing about a one-year adjustment on the UP-1984 mortality basis.

The improvement in mortality from 1965-69 to 1970-74 was at the rate of about 0.8 percent per year. However, it did not appear that there had been much mortality improvement for the ten-year period prior to 1970, although there was some considerable improvement just before 1960.

X. NONDISABILITY AND DISABILITY EXPERIENCE OF SALARIED AND HOURLY GROUPS OF A CHEMICAL MANUFACTURING COMPANY

The mortality experience of pensioners from a chemical manufacturing company has been summarized in Table 10.

This experience has been shown by sex for nondisability pensioners, as in prior reports, but the analysis has been expanded to show separately the experience of disability pensioners, and also it has been reworked to conform to the five-year experience groupings. Total deaths during the 1970-74 period from this experience came to 4,101, of which 1,434 were among disability pensioners (about 35 percent, as compared with less than 10 percent for Penn Central). Since disability pensioners accounted for a high proportion of deaths, thus implying a more select experience among the remaining nondisability pensioners, it was felt desirable to show each experience in the usual way.

The nondisability pensioner mortality experience is given in the first part of Table 10 and the disability mortality experience in the second part. Mortality experience is also shown for salaried and hourly categories, with the salaried nondisability experience generally being more favorable than the hourly. However, this is not the case as consistently

TABLE 10

PENSIONERS OF A CHEMICAL MANUFACTURING COMPANY

I. NONDISABILITY PENSIONERS

(Compulsory Retirement at Age 65)

AGE GROUP	1940-44			1945-49			1950-54			1955-59			1960-64			1965-69			1970-74		
	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths
	UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM	
Salaried Males																					
50-54																					1
55-59																					14
60-64				†	†	3	122%	143%	10	138%	162%	20	118%	139%	1	110%	†	5	126%	149%	84
65-69	†	†	9	90%	102%	22	96	108	53	73	69	99	111	125	81	92	139	80	90	228	
70-74	225%	229%	10	110	112	22	146	148	56	108	109	86	108	109	143	98	100	169	97	99	230
75-79	†	†	5	161	168	11	83	87	20	112	116	46	96	100	88	99	103	154	88	92	179
80-84				†	†	1	†	†	7	94	94	23	111	112	45	110	100	98	99	152	
85-89				†	†	1	†	†	1	†	†	4	145	152	23	85	89	29	96	100	68
90 and over													†	†	6	†	†	3	90	104	25
Total	167%	180%	24	109%	118%	60	111%	119%	147	96%	101%	248	106%	112%	459	96%	101%	650	91%	97%	981
Salaried Females																					
55-59																					2
60-64																					9
65-69	†	†	1	†	†	2	†	†	6	†	†	4	†	†	2	57%	92%	3	†	†	27
70-74	†	†	1	†	†	1	†	†	3	†	†	7	77%	104%	12	73	99	20	58	78	21
75-79				†	†	1	†	†	2	†	†	6	†	†	7	110	120	22	82	89	29
80-84							†	†	1	†	†	5	†	†	5	109	111	12	119	121	29
85-89										†	†	1	†	†	2	†	†	6	100	99	10
90 and over																†	†	2	†	†	4
Total	261%	400%	2	75%	112%	3	107%	148%	12	94%	127%	25	71%	93%	37	83%	106%	78	84%	104%	131

* Set forward one year for males and set back four years for females.

† Less than ten deaths.

TABLE 10—Continued

AGE GROUP	1940-44			1945-49			1950-54			1955-59			1960-64			1965-69			1970-74		
	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths
	UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM	
	Hourly Males																				
50-54																		1	†	†	6
55-59																		5	†	†	20
60-64				†	†	3	272%	320%	15	132%	155%	12	†	†	4	†	†	44	126%	149%	99
65-69	87%	98%	21	117%	132%	75	119	134	117	108	121	149	101	113	188	97	109	209	107	120	334
70-74	84	86	13	116	118	64	115	117	110	116	118	164	106	107	205	100	102	262	111	113	326
75-79	†	†	4	117	122	30	129	134	80	118	123	127	131	137	208	126	131	276	111	116	325
80-84				†	†	9	103	104	25	133	134	74	123	124	119	116	117	163	115	116	227
85-89				†	†	2	†	†	5	155	162	26	124	129	42	121	126	82	118	123	113
90 and over				†	†		†	†	3	†	†	2	†	†	8	122	141	23	126	146	41
Total	81%	87%	38	116%	124%	183	122%	129%	355	118%	124%	554	114%	120%	793	109%	115%	1,065	112%	119%	1,491
Hourly Females																					
50-54																			†	†	1
55-59																			†	†	7
60-64													†	†	1	†	†	2	†	†	10
65-69	†	†	1	†	†	2	†	†	1	†	†	3	†	†	4	†	†	9	52%	83%	17
70-74									5	†	†	4	†	†	5	†	†	5	84	114	14
75-79				†	†	2	†	†	3	†	†	7	†	†	6	†	†	5	99	108	7
80-84													†	†	5	†	†	6	†	†	5
85-89													†	†	1	†	†		†	†	2
90 and over													†	†	1				†	†	
Total	149%	206%	1	156%	207%	4	151%	210%	9	152%	198%	16	111%	146%	22	69%	91%	27	86%	111%	64
Grand total			65			250			523			843			1,311			1,820			2,667

* Set forward one year for males and set back four years for females.

† Less than ten deaths.

TABLE 10—Continued

II. DISABILITY PENSIONERS

(Permanently Incapable of Performing the Duties of Their Position with the Degree of Efficiency Required by the Company, and with at Least 15 Years of Continuous Service at the Time of Retirement)

AGE GROUP	1940-44			1945-49			1950-54			1955-59			1960-64			1965-69			1970-74		
	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths
	UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM	
Salaried Males																					
35-39				†	†	1							†	†	1						
40-44				†	†	4				†	†	2	†	†	1				†	†	2
45-49	†	†	2	†	†	4	†	†	2	†	†	5	†	†	2	2,699%	3,333%	10	†	†	6
50-54	†	†	2	†	†	7	†	†	3	1,554%	1,809%	17	†	†	7	1,586	1,846	24	814%	947%	18
55-59	†	†	5	†	†	8	334%	395%	14	662	782	34	364%	430%	21	564	667	42	528	624	51
60-64	436%	513%	16	246%	290%	14	402	473	33	340	400	47	313	369	48	412	485	87	339	399	100
65-69	†	†	8	254	286	21	186	210	21	302	340	42	242	273	52	245	276	62	259	292	85
70-74	113	115	12	124	129	9	121	123	11	180	183	22	176	179	25	131	133	29	185	188	48
75-79	96	100	11	124	129	16	122	127	12	210	219	20	173	180	18	133	138	19	129	134	31
80-84	138	139	11	143	144	15	152	153	16	113	114	10	†	†	4	182	183	17	172	173	19
85-89	†	†	7	†	†	5	†	†	8	154	161	12	†	†	8	†	†	6	†	†	6
90 and over	†	†	2	†	†	2	†	†	3	†	†	6	†	†	3	†	†	4	†	†	6
Total	156%	165%	76	178%	189%	102	193%	208%	123	285%	310%	217	229%	250%	190	279%	304%	304	255%	277%	366
Salaried Females																					
35-39										†	†	1									
40-44										†	†	2	†	†	3	†	†	1	†	†	1
45-49	†	†	1	†	†	1	†	†	3	†	†	2	†	†	1	†	†	8	†	†	7
50-54	†	†	1	†	†	1	†	†	3	†	†	2	†	†	5	900%	1,719%	11	†	†	6
55-59	†	†	3	†	†	3	†	†	2	†	†	6	458%	787%	14	526	905	18	377%	649%	12
60-64	†	†	3	†	†	3	†	†	1	†	†	4	†	†	3	†	†	8	176	283	10
65-69	†	†	1	†	†	1	†	†	3	†	†	1	†	†	1	265	358	10	192	260	12
70-74	†	†	1	†	†	3	†	†	2	†	†	2	†	†	3	†	†	6	†	†	6
75-79	†	†		†	†		†	†	1	†	†	2	†	†	3	†	†	4	†	†	4
80-84										†	†	1									
85-89										†	†	2									
90 and over										†	†	2									
Total	226%	329%	7	219%	306%	11	174%	230%	13	209%	275%	23	209%	279%	33	358%	480%	75	228%	301%	59

* Set forward one year for males and set back four years for females.

† Less than ten deaths.

TABLE 10—Continued

AGE GROUP	1940-44			1945-49			1950-54			1955-59			1960-64			1965-69			1970-74		
	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths
	UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM		UP-1984*	1971 GAM	
Hourly Males																					
35-39	†	†	2	†	†	2	†	†	5	†	†	2	†	†	2	†	†	2	†	†	3
40-44	†	†	2	†	†	1	†	†	5	†	†	7	†	†	3	†	†	2	†	†	8
45-49	†	†	2	162%	2,000%	11	1,144%	1,413%	13	884%	1,091%	12	849%	1,048%	13	1,246%	1,538%	22	651%	804%	16
50-54	944%	1,099%	10	897	1,044	19	824	959	28	420	489	22	974	1,134	55	939	1,093	61	609	709	66
55-59	435	508	18	581	686	38	474	560	45	487	575	65	419	495	76	548	647	121	368	435	133
60-64	398	469	50	383	451	66	384	452	86	306	361	99	347	409	152	351	413	190	309	364	265
65-69	215	242	58	248	279	62	244	275	82	222	250	91	193	217	111	251	283	191	194	218	173
70-74	155	157	60	185	188	53	159	161	39	164	167	56	193	196	84	218	221	131	170	173	136
75-79	164	171	72	147	153	60	145	151	40	145	151	37	191	199	64	189	197	70	122	127	69
80-84	114	115	33	150	151	54	88	89	31	154	155	37	148	149	29	156	157	35	151	152	42
85-89	152	159	17	164	171	27	127	132	27	134	140	31	98	102	12	133	139	15	104	108	17
90 and over	†	†	5	†	†	8	†	†	5	122	141	13	113	130	16	119	138	11	179	207	12
Total	195%	206%	335	224%	238%	401	218%	234%	401	224%	243%	472	247%	270%	617	283%	309%	851	228%	250%	940
Hourly Females																					
40-44				†	†	1	†	†	2	†	†	2	†	†	2	†	†	1	†	†	2
45-49				†	†	1	†	†	2	†	†	2	†	†	3	†	†	1	†	†	4
50-54				†	†	1	†	†	1	†	†	1	†	†	3	†	†	6	†	†	4
55-59	†	†	1	†	†	1	†	†	1	†	†	1	†	†	3	†	†	8	152%	262%	13
60-64	†	†	2	†	†	1	†	†	3	†	†	4	†	†	3	†	†	3	†	†	7
65-69				†	†	1	†	†	3	†	†	2	†	†	†	†	†	3	166	†	14
70-74	†	†	1	†	†	1	†	†	1	†	†	2	†	†	5	†	†	3	311	339	13
75-79				†	†	1	†	†	1	†	†	2	†	†	4	†	†	†	†	†	13
80-84	†	†	2	†	†	1	†	†	1	†	†	†	†	†	3	†	†	1	†	†	6
85-89				†	†	1	†	†	1	†	†	†	†	†	1	†	†	1	†	†	1
90 and over				†	†	1	†	†	1	†	†	†	†	†	1	†	†	1	†	†	1
Total	271%	323%	6	181%	240%	6	397%	583%	18	254%	373%	17	201%	299%	27	135%	204%	31	179%	260%	69
Grand total			424			520			555			729			867			1,261			1,434

* Set forward one year for males and set back four years for females.

† Less than ten deaths.

for the disability experience. Also, the nondisability mortality improvement from 1965-69 to 1970-74 was more pronounced for salaried males than for salaried females. For hourly employees, there appears to have been a deterioration in experience during this period. For the disability experience, there was improvement from 1965-69 to 1970-74 for all groups except the hourly females.

XI. NONDISABILITY UNISEX EXPERIENCE OF
A LIGHT MANUFACTURING COMPANY

The nondisability mortality experience of a manufacturing company is shown in Table 11 for the nonretired and retired categories separately. For the two quinquennial age groups 55-59 and 60-64, the nonretired and retired experiences are also shown on a merged basis. Since unisex procedures are being used for valuing this plan, the experience data have not been made available separately by sex. Therefore, the actual-to-expected mortality ratios have been developed only on the basis of the

TABLE 11
NONDISABILITY UNISEX EXPERIENCE OF A
LIGHT MANUFACTURING COMPANY FOR 1970-74

AGE GROUP	NONRETIRED		RETIRED		NONRETIRED AND RETIRED	
	A/E*	No. Deaths	A/E*	No. Deaths	A/E*	No. Deaths
Under 25	55%	46				
25-29	62	123				
30-34	60	120				
35-39	62	132				
40-44	58	147				
45-49	76	212				
50-54	73	215				
55-59	81	191	97%	12	82%	203
60-64	63	96	86	66	71	162
65-69			112	232		
70-74			125	197		
75-79			111	153		
80-84			111	77		
85-89			75	17		
90-94			125	11		
95 and over			155	2		
Total	67%	1,282	111%†	767		

* On basis of UP-1984 Table without adjustment, since unisex procedures were used and there is a significant female content.

† On basis of amounts, the comparable ratio is 105%.

UP-1984 Table without any set-forward or setback in age. The group is approximately 16 percent female.

For the nonretired group, the overall actual-to-expected mortality ratio is 67 percent, and the ratios may suggest a relatively higher female content at the younger ages. This is in fact borne out by data distributions for 1971, which were available by sex. Even during the early retirement period, where there is an overlap with the retired group's experience from age 55 to age 65, the actual-to-expected mortality ratios are well below 100 percent. One reason for this is the handling of disability cases, which are excluded from both the nonretired and retired group experience.

As for the retired group experience beginning with age 65, the disability cases are included and so are treated as a part of the nondisability experience. The actual-to-expected ratio for all of the retirement experience was 111 percent for the 1970-74 period. However, when amounts being paid are considered, this percentage reduces to 105 percent.

This is the *only* sizable experience for which the nonretired and retired groups are shown separately and then merged. Hence it was felt that this experience should be included for consideration. Moreover, the downward trend of the actual-to-expected ratios noted for older ages of other groups is not as pronounced for this experience, possibly due to the paucity of data above age 80.

XII. NONDISABILITY RETIREMENTS OF THE HOURLY MALE EMPLOYEES OF A MANUFACTURING COMPANY

This experience is shown in Table 12 and covers less than 1,000 deaths during the 1970-74 period, but it was felt that it warranted inclusion because the group has been included in prior reports and because about one-fourth of the older pensioners were insured. During the previous five-year period there were 1,624 deaths.

Although the 1965-69 experience showed some deterioration from the prior five-year period, there appeared to be a very significant improvement in the most recent experience. In fact, the improvement was at about 4 percent per year, which is over four times that indicated for other groups. However, this improvement was not uniform, since for the age group with the most deaths for the 1970-74 period the improvement averaged only about $\frac{4}{3}$ percent per year. Hence the apparent improvement may have been illusory because of the small size of the experience. Another reason for including this relatively small group is to indicate the problem of analyzing the experiences of small groups.

TABLE 12

NONDISABILITY RETIREMENTS OF THE HOURLY MALE EMPLOYEES OF A MANUFACTURING COMPANY
 (Normal Retirement at Age 65; Compulsory Retirement at Age 68; Early Retirement between Age 55 and Age 62 with
 Reduced Benefits Equal to Approximate Actuarial Equivalent. About One-fourth of
 Older Pensioners Were Insured in the Early 1970s.)

AGE GROUP	7/50-6/55			7/55-6/60			7/60-6/65			1965-69			1970-74		
	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths	A/E		No. Deaths
	UP- 1984*	1971 GAM		UP- 1984*	1971 GAM		UP- 1984*	1971 GAM		UP- 1984*	1971 GAM		UP- 1984*	1971 GAM	
55-59.....										†	†	6			
60-64.....	†	†	4	123%	145%	55	121%	142%	51	151%	178%	131	132%	155%	68
65-69.....	141%	159%	40	126%	142%	244	116%	130%	260	115%	129%	279	103%	116%	167
70-74.....	105	106	40	128	130	267	116	118	362	116	118	398	84	85	169
75-79.....	109	114	30	127	132	150	108	113	298	114	119	395	110	115	258
80-84.....	102	102	13	129	130	71	115	116	168	113	114	282	86	86	167
85-89.....	†	†	2	98	102	15	117	122	62	98	102	101	90	93	111
90 and over.....				†	†	1	88	102	15	121	140	32	75	86	35
Total.....	121%	127%	129	126%	134%	803	114%	120%	1,216	116%	122%	1,624	96%	101%	975

* Set forward one year.

† Less than ten deaths.

