

**RECORD OF SOCIETY OF ACTUARIES
1992 VOL. 18 NO. 4A**

CURRENT TRENDS IN PENSION DEMOGRAPHICS

Moderator: JOSEPH A. APPLEBAUM
Panelist: LINDSAY J. MALKIEWICH
Recorder: JOSEPH A. APPLEBAUM

Mortality: How much improvement will the new table show from the mortality rates under 1971 GAM? 1983 GAM? 1984 UP? What should the pension actuary's strategy be relative to reflecting improvement in mortality rates? Should improvements be anticipated on a continuous basis? What are the implications for contributions? For *SFAS 87/CICA* expense?

Turnover: How does recent turnover experience compare with that under the Sarason tables? Has the shape of the curve changed? The results of a study performed by members of the SOA Pension Research Committee will address these issues and more.

MR. JOSEPH A. APPLEBAUM: Lindsay Malkiewich, who works for the New York City Office of the Actuary, works on a variety of the New York City retirement systems. Lindsay is also chairman of the Annuity Valuation Table Committee (AVTC). Previously he served on the Group Annuity Experience Committee. Lindsay is going to talk about recent work on pensioner mortality studies. After that I'm going to talk about recent studies of employee turnover.

MR. LINDSAY J. MALKIEWICH: Our session is going to start by discussing trends in group pensioner mortality. In that discussion I'll be looking at recent, and not necessarily too recent, group annuity experience studies. I'll discuss some of the current trends, what their implications might be, and what my annuity valuation table committee is doing.

It struck me as I was coming to talk here in Washington, DC, looking at the recent polls and what they're showing, that it is very likely we'll see an outgoing Republican administration and that it might be interesting to study the mortality on outgoing Republican appointees. However, I don't know what's going to happen and that's not what my talk is about. It's about group pension mortality.

I'll start by discussing the two committees that are now looking at group pension mortality experience. My committee, the AVTC, is looking at recent insured inter-company mortality experience, collected by what has been called the Group Annuity Experience Committee. We have data for calendar years 1981-91.

The Retirement Plans' Experience Committee, chaired by Ed Husted, collects interplan experience on a quinquennial basis. The most recent covers the period 1985-89. In both cases, when looking at the group insured and the group uninsured experience, you would think that the rates are comparable. However, we find that the Unisex Pension 84 table (UP84) was based on experience that was not necessarily comparable to the group pension intercompany experience. But now it looks like the rates are coming much closer together, as we would have expected from the beginning.

One more point should be made. The insured intercompany mortality tables that the AVTC is preparing a recommendation on are generally going to be based on income. That is the primary risk that the insured companies face. In contrast, uninsured tables have generally been based on lives. There's a slight difference here but nevertheless that's part of the process.

I thought it would be interesting in talking about this material to look at intercompany studies going back to 1951 that have shown insured intercompany experience, including how the tables were actually developed. This will give everybody an idea of how the tables that we're looking at now might be developed before they're actually recommended. The recommendation would initially be to the Society's Board of Governors, then hopefully to the National Association of Insurance Commissioners (NAIC) and eventually adopted by at least 26 states. At that point, it could be used as a tax standard, at least under the current law.

Table 1 has nine columns. I have 1951, 1971, 1983, and 1984. Columns two and three are the 1951 table. The second column shows the basic experience, as I'm calling it, including the base year 1948. The central year of the core experience used to develop the Group Annuity 1951 Mortality Standard was 1948. It was based on intercompany insured experience collected by the predecessor of the Group Annuity Mortality Experience Committee. That experience was used to develop the first insured intercompany standard specifically for valuation of reserves on a pension basis or of a pension nature.

The base year experience for 1948 was projected three years with the ongoing operating projection scale, projection scale B to project the experience from 1948-51. By the way, scale B was developed with the a-49 table. The 1951 core table was then loaded with a margin for males of 10%. The corresponding female experience was loaded with margins of 12.5%. Margins were meant to cover potential future mortality improvement, differences in the companies contributing to the studies, differences in the type of business contributed to the experience, and general safety margins covering interest and other types of fluctuations.

When the GA51 table was produced, female experience was not nearly as credible as male experience. And so it was generally felt that an approximation to the male table would be needed to more clearly define the female table. It was felt that a five-year set-back in the male rates would reasonably approximate the female table for the group annuity 1951 year. Although both male and female tables were developed, a male table has been the general standard used for developing reserves on pension business, with a five-year set-back for females, when reserves are based on the GA51 table.

One more point, the GA51 table was based on lives rather than income. You can see the similarity between the GA51 and UP84 table (which was also based on lives) in Table 1. Keep this in mind and remind yourself of it as we continue. The 71 Group Annuity Mortality (GAM) Table, the fourth and fifth columns of Table 1, was the first table developed based on income. At the time of its development, group pension income was believed to be the more proper determinant of what the risk really was. Again, also keep in mind at this point I'm talking about insured experience.

CURRENT TRENDS IN PENSION DEMOGRAPHICS

Most tables, including those developed in the 1940s and early 1950s, such as the a-49, the 37 standard annuity, as well as the more current 71GAM, and the most recently developed 83GAM, have not been used to reserve both insured lives and to fund uninsured pension plans. But they weren't developed necessarily with that particular intent. It is left up to the individual actuary, the individual insurance companies, and the individual firms to make their best estimate of what is appropriate mortality for their unique circumstances.

TABLE 1
Comparisons of "Group" Annuity Tables Developed Since 1951
All male rates.

GA 1951 Table			1971 GAM Table		1983 GAM Table		UP 1984 Table	
Age Base Year	Basic Exp 1948	Standard	Basic Exp 1966	Standard	"Proj" Exp 1983	Standard	"Proj" Exp 1984	Standard
65	2.805%	2.442%	2.359%	2.126%	1.732%	1.559%	2.485%	2.485%
66	3.121	2.719	2.623	2.364	1.953	1.758	2.723	2.723
67	3.452	3.011	2.918	2.632	2.200	1.980	2.963	2.963
68	3.778	3.299	3.234	2.919	2.470	2.223	3.207	3.207
69	4.113	3.594	3.591	3.244	2.757	2.482	3.474	3.474
70	4.494	3.930	3.993	3.611	3.059	2.753	3.767	3.767
71	4.932	4.318	4.420	4.400	3.373	3.035	4.087	4.087
72	5.415	4.748	4.837	4.383	3.708	3.337	4.450	4.450
73	5.934	5.208	5.236	4.749	4.076	3.668	4.850	4.850
74	6.495	5.708	5.642	5.122	4.488	4.039	5.291	5.291
75	7.095	6.243	6.084	5.529	4.955	4.460	5.778	5.778
76	7.756	6.835	6.603	6.007	5.488	4.939	6.314	6.314
77	8.513	7.513	7.239	6.592	6.084	5.476	6.863	6.863
78	9.355	8.269	7.964	7.260	6.742	6.068	7.465	7.465
79	10.274	9.095	8.734	7.858	7.458	6.713	8.126	8.126
80	11.243	9.968	9.572	8.743	8.230	7.407	8.852	8.852
81	12.243	10.871	10.439	9.545	9.054	8.148	9.622	9.622
82	13.267	11.798	11.330	10.369	9.924	8.932	10.431	10.431
83	14.309	12.744	12.258	11.230	10.836	9.753	11.282	11.282
84	15.368	13.707	13.207	12.112	11.783	10.605	12.208	12.208
85	16.440	14.685	14.173	13.010	12.760	11.484	13.217	13.217
86	17.531	15.684	15.161	13.932	13.797	12.417	14.318	14.318
87	18.653	16.712	16.168	14.871	14.874	13.387	15.515	15.515
88	19.814	17.779	17.213	15.849	16.008	14.407	16.821	16.821
89	21.023	18.892	18.305	16.871	17.207	15.486	18.246	18.246
90	22.288	20.059	19.451	17.945	18.479	16.631	19.803	19.803
91	23.617	21.256	20.627	19.049	19.802	17.821	21.504	21.504
92	25.018	22.516	21.817	20.168	21.162	19.046	23.298	23.298
93	26.503	23.852	23.017	21.299	22.556	20.301	25.255	25.255
94	28.085	25.277	24.456	22.654	24.212	21.790	27.388	27.388

Note: The above rates are shown as approximate percentages for legibility.

The insured standards are specifically designed to give an overall assessment as to the level of the base reserves for the group pension business. A more recent example is the 71GAM which was based on insured income. It was developed from experience centered in the year 1966, as you see in Table 1. The 1966 experience was projected with a then currently developed projection scale, to 1971. That 1971 core experience was then loaded after an adjustment by a 7% margin for males and a 9% margin for females. The 7% margin was originally 10% but was reduced due to an

RECORD, VOLUME 18

adjustment resulting from late reported deaths. The original 8-10% margins were moved down to 7-9% margins to produce the final 71GAM table.

Projection scale D was a shift from the scale C associated with the GA51 table. There are a lot of letters going around and there will be a lot more letters associated with these tables. I'm going to encourage my AVTC committee to get away from letters, but I may or may not be successful.

Nevertheless, scale D projected the 1966 base year or central year experience to 1971. I'm calling it a base year but actually central year is more appropriate. That 1971 table, loaded 7-9% with margins, is the 1971 group annuity valuation standard. It was eventually adopted as a recognized standard for group pension business under insured lives. As with the GA51, a set-back in the male table was used as a reasonable representation of female rates. The set-back arrived was six years, rather than the five-year set-back established with the GA51 table.

There's been recent discussion whether that six-year set-back is more like seven. Whether it's going back to five or it's still six, I'm not going to answer that debate. But nevertheless, with the 71GAM, and we'll see with the 83GAM, a six-year set-back was adopted.

The 1983 intercompany table, the 1983 GAM as we commonly refer to it, was developed as an interim valuation standard. In 1980-81, regulators felt a new mortality standard was warranted. The current standards, the 71GAM, and the 1971 individual annuitant mortality (IAM), and other tables then being used, were not indicative of mortality then being observed. So they asked the SOA to form a committee to specifically address this concern. The intercompany insured experience that had been collected on an annual basis from the early and mid-1970s had not been consistently collected for awhile.

In addressing this request, the Interim Standard Committee found that they did not have a lot of credible insured experience on which to base a new group annuity pension standard. They decided that they should look at the 1966 central year experience that was used for the 71GAM table. They looked at then current trends of mortality on uninsured business, the Civil Service Retirement System, and Medicare. They also looked at the recent U.S. life tables and any other sources of information they could find, including the experience of several large plans. This information was used to develop what they called scale X and scale Y.

The Committee separated the period between 1966-83 into two parts and then geometrically combined these two periods to develop a scale Z, which was used to project the 1966 central year crude graduated rates to 1983. These rates are called the projected 1983 base year experience shown in the sixth column of Table 1. A true intercompany collection of experience was not done, because they did not have reasonable experience with which to go forward. They used the old 1966 experience but projected it with current standard trends. They also published, in association with that projection, a new projection scale H. This new scale H was and is still currently recognized as a reasonable approximation to future mortality improvements of group pension mortality. There was also scale G, which was published with the 1983 Individual Annuity Mortality table, and was felt to be an approximation of mortality

CURRENT TRENDS IN PENSION DEMOGRAPHICS

improvement for the individual annuities. Scale H differed from scale D. Scale D differed from scale C. Scale C differed from scale B. Together, these were the four central projection scales that were used in developing this insured intercompany mortality experience.

The 83GAM was published in 1983. That is, 1983 was the year that it was generally put into published format. It was eventually, as most of you know, adopted as an allowed standard in 26 states in 1985. It was required by most states as the minimum in 1987.

There was also the Manhart. In part, because of these cases, the uninsured pensioner experience community, i.e., most of us in this room felt that we needed a table to reflect uninsured experience, not the experience for insured plans that each of these tables I've so far discussed reflected. Since it was felt important to address, it was decided to take a look at what data had been collected on uninsured plans to see if a table could be developed from this uninsured experience. At that point, they looked at what was then serving as the intercompany uninsured mortality collection process and found the predecessor to the current and ongoing Retirement Plans Experience Committee (RPEC). The committee had experience centered in the year 1967. I believe it was collected from 1965-69 at the time and published in the *Transactions*, I believe in 1970, and was based on uninsured experience. A large contributor was the Civil Service Retirement System. Medicare also provided a lot of information to that study. In addition, several large plans and other uninsured type experience was collected.

The committee took that central 1967 experience and then took a 10% cut off of that experience, which was felt by the people developing the UP84 table to approximate about 17 years of mortality improvement, therefore projecting it to 1984.

As a result, we now have a 1983 GAM table using 1966 centered experience projected with current trends to 1983 and 1967 centered experience projected with current trends to 1984. Here I stand with my Annuity Valuation Table Valuation Table Committee, originating from the Group Annuity Experience Committee, thinking, don't we have current accurate information? Well, yes we do. Obviously with all these trends we've already seen how future mortality improvement has been incorporated into these tables with an associated projection scale as our position paper further discusses. By the way, let me stress that any statements that I make are not necessarily the AVTC's opinions. Nor are they necessarily RPEC's opinions. They're generally my opinions. I may, however, hold some weight as a chairperson.

Nevertheless, our position paper talks about a very strong consideration being given to putting into place a generational table for insured intercompany experience. Not for the uninsured side but for the insured side. Why? In 1951-83, experience has improved dramatically.

Table 2 shows mortality improvement trends for six quinquennial age groups. It shows the mortality improvements from the GA51 to the 71GAM and from the 71GAM to the 83GAM for the central ages. Even if that experience is not quite as credible when you get to the central year ages of 90-94, there has been a definite improvement, on a geometrical basis, for each year of around 0.5% for the first 20

RECORD, VOLUME 18

years 1951-71. And for the 71GAM to the 83GAM, starting above 1% going down to 0.33% for the years (ages) as high as 90-94. So we've had steady improvement for a very, very long time. These improvements have continued and there is every reason to believe the trends will continue. The improvements may not be as great as they have been in the past, but they will still continue.

TABLE 2
General Mortality Improvement Trends in Group Tables

Quinquennial Age Group	Total Improvement From GA51 to 71GAM		Total Improvement From 71GAM to 83GAM	
	Ratio	(Geometrical Average)	Ratio	(Geometrical Average)
65-69	88.178%	0.560%	75.293%	1.110%
70-74	93.108	0.334	75.601	1.098
75-79	87.596	0.586	83.181	0.780
80-84	88.003	0.568	86.242	0.647
85-89	88.993	0.523	90.136	0.471
90-94	89.513	0.500	94.536	0.266

Given this, shouldn't we now put into place a generational table? Well the AVTC is seriously considering that. Furthermore, the position paper does talk about it. The RPEC, on the other hand, is not considering generational tables. The RPEC has not yet discussed whether they will, in fact, replace the UP84 table. But I think from what we are seeing that a decision probably will take place. However, they have not made that decision. There will be a committee meeting that will be addressing that issue among others. And I believe that they will probably elect to replace it, but they have not done so at this time.

Nevertheless, both new standards are going to reflect continued improvement in mortality and there may just be a difference in how they reflect that mortality. In one case they might be looking at generational tables. The other case we will definitely be looking at is a static table. They may or may not associate the latter with a projection scale. That is a decision that is yet to be made.

Let's look at the meat and potatoes of the issue. And excuse me for using potatoes as a metaphor in Washington, DC. With apologies to Vice President Quayle, I'm going to call them Slowly Procrastinating Unyielding Decrease (SPUD) in mortality. Table 3 shows recently compiled intercompany insured experience. Now these are preliminary data, I want to stress that. They are not current, they will be modified, and they will be looked at on an ongoing basis. Nevertheless, the information is what we have at the time. These tables were run off on October 22. They show the complete experience that we have been looking at for ages 65-94, for calendar 1985-90. And overall experience from 1981-90.

CURRENT TRENDS IN PENSION DEMOGRAPHICS

TABLE 3
Group Annuity Mortality Study/Male Data

Age	Actual Deaths	Lives Exposed	Annual Income Deaths	Annual Income Lives	Lives Ratio	Income Ratio
Experience Year(s) = 1985						
65-69	6,254	224,542.23	17,771,372	760,149,867	0.027852	0.023379
70-74	9,032	207,850.74	21,260,670	540,809,534	0.043454	0.039313
75-79	9,230	137,133.94	18,203,490	297,242,802	0.067306	0.061241
80-84	7,166	71,946.72	11,957,670	133,121,806	0.099601	0.089825
85-89	4,301	28,643.87	6,281,313	46,180,420	0.150154	0.136017
90-94	1,817	8,406.94	2,566,694	11,624,900	0.216131	0.220793
Experience Year(s) = 1986						
65-69	5,743	228,456.41	17,662,399	829,897,448	0.025140	0.021283
70-74	8,171	216,039.64	20,015,384	591,242,578	0.037823	0.033853
75-79	8,704	146,072.80	17,739,053	325,673,049	0.059587	0.054469
80-84	7,228	77,991.67	12,590,714	140,708,158	0.092677	0.089481
85-89	4,062	31,439.09	6,198,920	51,741,981	0.129202	0.119804
90-94	1,695	9,080.02	2,224,909	12,184,263	0.186674	0.182605
Experience Year(s) = 1987						
65-69	5,759	239,565.11	18,419,964	938,835,852	0.024039	0.019620
70-74	8,703	223,939.89	22,491,897	655,591,300	0.038863	0.034308
75-79	9,430	157,510.79	20,339,337	366,789,141	0.059869	0.055452
80-84	7,669	83,821.95	13,985,227	162,672,688	0.091492	0.085972
85-89	4,591	34,082.13	7,081,577	58,676,517	0.134704	0.120688
90-94	1,919	9,829.78	2,884,512	14,830,419	0.195223	0.194500
Experience Year(s) = 1988						
65-69	5,779	244,376.60	20,216,264	1,027,753,434	0.023648	0.019670
70-74	8,689	227,775.29	24,047,825	727,031,712	0.038147	0.033077
75-79	9,817	165,910.45	22,186,823	416,277,912	0.059170	0.053298
80-84	8,213	89,812.68	15,629,455	187,374,758	0.091446	0.083413
85-89	4,807	36,512.58	8,003,694	65,271,843	0.131653	0.122621
90-94	2,048	10,656.40	3,100,461	16,811,420	0.192185	0.184426
Experience Year(s) = 1989						
65-69	5,487	251,211.25	21,966,723	1,185,230,618	0.021841	0.018534
70-74	7,656	225,847.89	24,477,638	817,671,721	0.033899	0.029936
75-79	8,784	162,450.99	22,429,135	456,424,221	0.054071	0.049141
80-84	7,363	88,253.16	16,747,172	205,647,644	0.083430	0.081436
85-89	4,491	36,212.75	9,076,732	70,675,184	0.124016	0.128429
90-94	1,868	10,405.75	3,425,400	17,590,528	0.179516	0.194730
Experience Year(s) = 1990						
65-69	7,115	305,507.37	28,609,621	1,382,735,690	0.023290	0.020691
70-74	10,593	279,890.83	33,638,228	1,027,443,572	0.037847	0.032740
75-79	12,868	215,869.74	32,154,362	596,693,912	0.059610	0.053888
80-84	11,468	124,715.60	25,280,047	285,940,924	0.091953	0.088410
85-89	7,659	54,708.98	14,330,535	103,688,360	0.139995	0.138208
90-94	3,287	16,872.55	5,508,740	29,627,428	0.194813	0.185934
Experience Year(s) - 1981-90						
65-69	58,224	2,288,656.86	178,264,372	8,322,255,732	0.025440	0.021420
70-74	82,832	2,071,939.13	208,175,179	5,916,186,158	0.039978	0.035187
75-79	87,976	1,422,422.36	183,816,945	3,278,001,467	0.061849	0.056076
80-84	71,407	762,842.17	129,757,970	1,478,065,240	0.093606	0.087789
85-89	43,102	311,002.56	68,767,513	520,420,209	0.138590	0.132138
90-94	17,730	89,750.43	25,791,556	131,683,080	0.197548	0.195861

Let me take a step back. In the position paper we also show some overall actual-to-expected (A/E) ratios through 1989. Again they are preliminary ratios. There is a little blip between 1985-86 which showed a marked decrease, or improvement, that is mortality rates are less than anticipated, between 1985-86 and beyond. Remember, at the time, 1986 was the central year when 26 states allowed the 83GAM to be used but did not necessarily require its use as a valuation standard. So there was a tax advantage to selling a lot of single premium business. The laws certainly allow this as appropriate business. But nevertheless, the bottom line is that it seems that the business mix shifted from 1985 and prior years to 1986 and subsequent years. This mix is being felt permanently. The mortality trends that are showing from 1986 forward are definitely more so improved than the trends from 1985 and prior. Both had shown improvement from the 83GAM central experience. Again, I don't know if you recall, but the experience in 1966 was projected with scale Z.

So altering any of our company's tables will probably be based on insured experience from 1986-90. It would be nice to use 1991, but I don't think I want to wait that long. For 1991, you would have to wait until 1993 to compile credible experience. You see, we have a problem with the reporting of pension information. For a given calendar year of experience, let's say 1990, the collection of this experience in the intercompany collection process does not begin until 1991. In 1991, we basically have crude information for experience year 1990. Late reported deaths are generally not reflected in this experience until the 1992 contribution -- that is, the calendar year 1991 experience received in 1992. After we receive that late reported death experience we'll have an idea where we are. In October 1992 we still have only six of the expected 13 contributors that have given us their 1991 calendar year experience for 1990. Therefore, we have the preliminary data in Tables 3 and 4. If I waited to include 1991 experience, and later years, we would be going into the middle of the 1990s. I don't believe that the rates and trends allow us, if we are to act in responsibly, and given the charge that the Society has given to us, to develop a table based on information contributed much, much later than this point (being 1990 experience). Plus we have a very good idea of what it is showing.

As I stated, the RPEC has also collected uninsured experience, most recently from 1985-89. Table 4 has Civil Service Retirement System (CSRS) information. This is shown as a draft copy because this information is also changing. Table 5 shows Medicare trends through calendar year 1989. These are expressed as A/E ratios relative to the UP84 table. There is a definite trend still continuing toward improvement. For the CSRS experience for the central age year's 1967-92, the actual to expected range is about 75-90% of the expected UP84 rate. That's a decent decrease for what is reported to be only a three-year shift. Remember the UP84 table was intended to represent mortality in 1984. Here we have central experience in 1987 on CSRS, which is the largest contributor to the central uninsured intercompany experience, showing a marked improvement already as of calendar year 1987.

Let me just say that the overall rates and the intercompany tables have also shown similar improvements to the uninsured intercompany experience. It appears that a new table is very definitely warranted. Again, the RPEC has not yet decided to do so. I believe they will and this information appears to suggest that the time has indeed come.

CURRENT TRENDS IN PENSION DEMOGRAPHICS

TABLE 4
Civil Service Retirement System by Age
1985-89 Actual Deaths Compared to UP84 Expected
Five Year Moving Average

Age	Actives		Pensioner		Disabled	
	Male	Female	Male	Female	Male	Female
22	63.4%	22.0%				
27	67.1	28.1				
32	65.4	37.8				
37	52.8	44.7			1044.5%	1421.0%
42	49.7	46.2			624.9	745.0
47	45.8	40.0			425.5	542.3
52	47.2	35.5	64.2%	74.8%	336.0	347.7
57	44.8	30.0	69.8	76.7	257.3	249.5
62	34.7	26.5	74.7	66.5	187.7	169.3
67	32.9	23.3	75.0	67.3	144.1	123.3
72			79.9	70.2	133.0	112.2
77			84.1	77.0	122.7	105.8
82			89.2	87.5	112.6	107.0
87			93.2	101.6	110.8	104.9
92			91.7	104.9	98.2	113.1
97			86.3	104.5	89.1	111.6

TABLE 5
Trend in Medicare Mortality from 1972-89
Actual Deaths Compared to UP84 Expected

Year	Male	Female	Period	Male	Female
1972	120.2%	113.9%			
1973	118.7	111.8			
1974	114.2	107.6			
1975	111.0	102.7	1975-79	108.3%	99.5%
1976	110.4	102.2			
1977	108.0	98.8			
1978	107.7	98.8			
1979	104.5	95.7			
1980	106.5	98.8	1980-84	103.2	95.8
1981	103.8	96.0			
1982	101.1	93.4			
1983	103.0	95.6			
1984	101.9	95.2			
1985	102.7	96.2	1985-89	99.7	95.0
1986	101.0	95.4			
1987	99.4	94.7			
1988	99.6	95.7			
1989	96.1	93.1			

RECORD, VOLUME 18

Earlier in my discussion I had mentioned that the UP84 table did not quite look like the 83GAM table's central experience, partially because of the use of lives versus income. But, it was also felt that the underlying differences in mortality might present a difference in the mortality rates. Table 6 compares the male rates for the same central age years and up to age 97. The insured versus the uninsured rates are very, very similar. There is a very little difference. And you should note that these two columns show an income ratio, which is generally smaller than a lives ratio, in the insured intercompany experience. The per se lives ratio, which if you looked at intercompany *insured* experience reflecting such ratios, would be much closer, and these approximate 7% differences would almost be wiped out.

TABLE 6
Initial Comparisons of Current Experience

Central Age	Insured	Uninsured	Insured/Uninsured
Males			
67	0.021	0.023	92.6%
72	0.036	0.037	96.9
77	0.058	0.065	92.5
82	0.091	0.097	93.2
87	0.135	0.147	91.9
92	0.216	0.209	102.9
97	0.316	0.292	108.0
Females			
67	0.012	0.014	86.4%
72	0.020	0.021	95.3
77	0.035	0.037	93.3
82	0.056	0.057	98.9
87	0.102	0.086	117.8
92	0.166	0.139	119.5
97	0.250	0.243	102.9

Table 7 shows lives and income ratios in columns one and two as they compare to the projected 1983 base table. This is the base 1983 table before any margins are added. It also shows the income ratio relative to the projected 1983 crude rates. You're looking at an 85-90% shift. And this is just from 1983-88. This is a five-year shift and we've already seen a marked decrease in the overall mortality rates at the key retirement years.

Look now at the column 5 versus column 1 results. You're going to see almost identical qx's on the lives side between the current, current being 1986-90, insured intercompany experience, and the current, 1985-89, uninsured intercompany experience. These results are implying that the underlying difference in mortality may, in fact, not exist.

What does all this mean? Well as I've already stated, the AVTC has been charged by the SOA to come up with a recommendation. I want to restate that. We are only recommending that a new standard be adopted. We do not have the power to adopt

CURRENT TRENDS IN PENSION DEMOGRAPHICS

a new insured valuation standard. That is the purview of the NAIC and the individual states.

TABLE 7
Currently Estimated Insured Intercompany Mortality Rates:
Current Mortality Improvement Trends in Group Tables
(Basic Insured Experience Years 1986-90)

Quinquennial Age Group	Lives	Deaths	Lives "qx" Ratio	Exposed Income (\$ millions)		Income "qx" Ratio
				Lives	Deaths	
65-69	1,269,118	29,883	2.355%	5,364.5	106.9	1.992%
70-74	1,173,494	43,812	3.733	3,819.0	124.7	3.265
75-79	847,815	49,603	5.851	2,161.9	114.8	5.312
80-84	464,595	41,941	9.027	982.3	84.2	8.575
85-89	192,956	25,610	13.272	350.1	44.7	12.767
90-94	56,845	10,817	19.029	91.0	17.1	18.830
Comparison to Underlying 1983-GAM Table & Current Uninsured Mortality Rates						
Quinquennial Age Group	(1) Lives "qx"s	(2) Income "qx"s	(3) Average "Proj"-83 Rates	Income "qx" Ratio to (3)	(5) Uninsured Rates	Lives "qx" Ratio to (5)
65-69	2.355%	1.992%	2.223%	89.635%	2.3%	102.375%
70-74	3.733	3.265	3.741	87.274	3.7	100.905
75-79	5.851	5.312	6.145	86.446	6.5	90.011
80-84	9.027	8.575	9.965	86.044	9.7	93.066
85-89	13.272	12.767	14.929	85.518	14.7	90.289
90-94	19.029	18.830	16.400	114.822	20.7	91.928

But we can certainly recommend a new standard. We have been asked to do so by the Society's Board of Governors. They will then turn around and probably recommend it to the NAIC. Hopefully in the form that we anticipate. That will very possibly incorporate a generational system where each year of birth has its own static table.

The UP84 table will probably be replaced. Either the RPEC or a successor task force, given the Society's new structure, will develop a replacement for the UP84. The AVTC's current plan for the insured side is to publish an exposure draft next year, probably around this time. So maybe we'll be talking about it next year at the annual meeting, with a final draft in 1994. Therefore, the first year that we can see this table being adopted or being recommended for adoption is 1994. If, in fact, we go forward with our liberal plans, to use the word that our President does not like using, I don't think we can require companies to adopt this standard in 1995. We'll probably have to give them a period of time, 1996, 1997, or maybe even 1998. It would be nice if we could do it that fast but we can't.

So as it stands, we will probably publish something in 1994. It'll probably not be required on an initial basis at the earliest until 1997, or maybe 1998. By that time, I fully anticipate the UP94 table will be developed because the RPEC does not have to worry about the projection of mortality rates. The purpose of the insured standard is

to determine a certain base minimum reserve to protect solvency. On the uninsured side we have a funding issue. What is the realistic anticipated mortality under a pension plan?

In New York City, each of the five major systems use their own mortality rates. They have a few lives so they can generally base mortality on their own information, as most large companies can. On the insured side we're looking at a standard that is adopted country wide and, in fact, world wide for business written in the U.S. and for business reserved for a U.S. domiciled company. Therefore, there has to be a little bit more of an overall encompassing of differences, which require time. If we go to a generational table, margins may not have to be as large. We might be closer to the uninsured base experience than we have been in the 1983, 1971 and 1951 GAM tables as I've recently just spoken about.

What does all this mean for annuity rates? When the 1983 Interim Study was done they looked at results for 7.5%, 10% and 12%, they found a 4-5% increase in regular life annuity values. We probably won't see a 4-5% increase from the 83 GAM rates initially, but we're going to see steadily increasing annuity values to 1996 let's say. And 1997 for the same age. But remember, those pensioners that were valued in 1996 with a generational table annuity value for age 67 will be tracked at the same improvement rate for the following year age 68, and each successive year thereafter. So it will look a little different. But the 4-5% trend ratio, you might say, might be an indication of the levels we'll see.

We haven't yet looked at rates for the uppermost ages for the table. We will probably use Social Security old age rates. We'll be more than likely graduating the retirement lives into the uninsured table that Ed's group, the RPEC, is developing for the UP94 standard.

The comparisons in part 2 of Table 7 indicate the UP94 table will probably show a marked improvement over the UP84. It's also going to be based on much more current experience. The central years, 1966-67, were the base years for the 83GAM and the UP84, respectively. We're now looking at 1987-88 central years, approximately 20 years later, for the UP94 and the 1994 GAM, respectively. They are much more reflective of current experience. We believe they are a much better statement of current mortality as required. We believe an overall more appropriate table will ensure that, at least our committee hopes, will be considered appropriate for many, many years to come.

I would like you to leave this discussion with one thought in mind. As actuaries, whether for an insurance company, a consulting firm, or as in Joe's and my case, our own employer's systems, we must make our best estimate of what future anticipated mortality is whenever we adopt any mortality table. So while each of these committees might be producing a UP84 or UP94, GAM83 or GAM94 table, we have to make an assessment as to whether that reflects our mortality.

As an insured valuation standard, you might have a minimum reserve that you have to hold. But with your cash-flow testing you have to do that anyway, this change may increase cash flows and may increase required reserves in that context. But it is probably a better statement and it will force those that maybe shouldn't be in the

CURRENT TRENDS IN PENSION DEMOGRAPHICS

business to maybe not be in the business. That may be a good thing. We don't know. It's not our purpose, we are just looking at current information. We are just making our best estimate. Our job is not to determine what pricing is. Our job is to determine what current mortality indicates.

MR. APPLEBAUM: I'm going to talk about a topic which may have more than passing interest in this city, employee turnover assumptions. In contrast to others on this topic, my talk will have no political content. Before I turn to the substantive part of my remarks, I must make a disclaimer. My remarks reflect my personal views and do not necessarily reflect the views of my employer, the U.S. Department of Labor. Also, they do not necessarily reflect the views of the Joint Board for the Enrollment of Actuaries, of which I am a member.

Most of my discussion will be an exposition of Roger Vaughn's recent paper entitled, "Employee Termination Study" which appeared in the August 1992 *Pension Forum*, and most of the tables and graphs are also from that paper. Before getting to the results of Roger's research, I'll make some general observations about the methodological difficulties in performing studies of employee turnover and testing them. I will also briefly talk about some results about turnover assumptions from a survey of forms 5500. Finally, I'll touch on some limitations that I believe actuaries should consider in using Roger's study as a basis for the employee turnover assumption.

Choosing an employee turnover assumption is one of the more difficult, if not the most difficult, choice that pension actuaries make. Why is measuring employee turnover difficult? Further, what implications do those difficulties have for the practicing actuary? At its most basic level, the difficulty lies in the fact that the turnover patterns are employer specific. The fact that an employer's experience will be unique, if interpreted literally, is trivially true for any part of an employer's experience.

But some aspects of pension cost are expected to be similar from one employer to another. For example, one employer's expected mortality experience is likely to be close to that for other, similar employers. This is also likely to be true with respect to investment experience – at least to the extent that two employers have similar investment policies for their plans.

However, turnover experience, reflecting as it does an employer's philosophy on the value of retaining employees, is likely to vary from one employer to another. Further, economic theory leads us to believe that, leaving other demographic characteristics fixed, turnover rates are a function of attained age and years of service. This theory is applicable to any employer, but the particular incentives of a defined-benefit plan as part of the wage package bring the issue to the fore, and are an especially important consideration for pension actuaries. The theory carries with it the desirability for a select and ultimate table for accurate projections of employee turnover. This makes the actuary's job doubly difficult – he has a difficult job establishing statistically reliable rates because, even for large employers, the experience cells are small. And judging whether the assumptions are tracking experience well can also be a problem. Grouping can relieve some statistical difficulty for an experience study. However, the greater number of cells, with their correspondingly smaller size and consequently greater random fluctuation, makes analyses tougher.

As if this were not enough, the actuary has to recognize that turnover will vary over the business cycle. Other than for reasons such as death or disability, employees will leave a firm voluntarily or involuntarily. Clearly involuntary quits, and to a lesser extent voluntary quits, will increase with declines in an employer's business results. However, the employee benefit plan actuary must choose a turnover assumption and the importance of that choice has increased for a variety of reasons. For example, the use of realistic, explicit assumptions in valuing postretirement medical programs is required under *FASB 106*. Practicing actuaries require a reliable, hopefully simple to use, method for making an employee termination assumption.

Last, but certainly not the least, difficulty for pension actuaries is there is little guidance in the actuarial literature on employee turnover. The major published tables, the so-called T tables, were published by Crocker, Sarason, and Straight in the *Actuary's Pension Handbook* in 1955. I don't know how much they are still used, but it is reasonable to expect some changes in patterns of employee turnover in the last 37 years. An additional problem with the *Actuary's Pension Handbook* is that it gives no indication of the sources of data used to construct the tables or any other details of the tables' construction. This should give today's actuary pause. In any event, it would appear the time is more than ripe for a reinvestigation of employee turnover.

One of the main duties of the Pension Research Committee is to provide practical research for the pension actuaries. The committee felt that it would be useful to the community to provide research on employee turnover for many of the reasons I've outlined. One important goal is to provide information based on actual plan experience. The committee wanted to do surveys of what assumptions were being used by pension actuaries but this was not possible.

Roger Vaughn, who was then a member of the committee, was performing a study based on the turnover experience of some of his firm's plans. The Committee encouraged Roger to publish his results. As you know, they were recently published in *The Pension Forum*. We as actuaries owe Roger a debt for making the fruits of his efforts publicly available. Roger's study produced a select and ultimate termination rate table with a select period of three years. More specifically, the select period consisted of employees with more than one but less than four years of service with their employer – the ultimate period employees with four or more years of service. The table's rates bear the relationships that one would expect – termination rates decline with increasing age and increasing job tenure. These trends are evident in the raw data and are not merely a product of smoothing techniques used to produce the table. The pattern is clearest for the ultimate rates where there is the most exposure. They are also evident for the select portion of the study but smaller exposures for the select portion of the study produced some anomalies.

One important finding of the research was the difference between the shape of the ultimate termination curves. The T table curves and the ultimate termination rate curve in this study have different slopes. And, while the *level* of termination rates varied from employer to employer studied, the shape of the ultimate termination rate curves was rather similar for employers in different industries and in different economic conditions.

CURRENT TRENDS IN PENSION DEMOGRAPHICS

Roger also compared termination patterns for employee groups for 1978 and 1980 with those for similar employee groups from 1987-89. The comparison was made for employees of financial services, health care services and manufacturing organizations. Each employee group within the industry studied, as well as among the various industries studied, exhibited very consistent patterns of termination rates. Table 8 is the termination table Roger developed.

TABLE 8
V Select & Ultimate Table
Number of Employee Exits Per 100

Age	Years of Service			
	1	2	3	4 or more
20	29.8	25.0	21.0	18.6
21	29.4	24.5	20.5	17.6
22	29.0	24.0	20.0	16.6
23	28.6	23.5	19.5	15.6
24	28.2	23.0	19.0	14.6
25	27.8	22.5	18.5	13.6
26	27.4	22.0	18.0	12.6
27	27.0	21.5	17.5	11.6
28	26.6	21.0	17.0	11.1
29	26.2	20.5	16.5	10.6
30	25.8	20.0	16.0	10.1
31	25.4	19.5	15.5	9.6
32	25.0	19.0	15.0	9.1
33	24.6	18.6	14.6	8.7
34	24.2	18.2	14.2	8.3
35	23.8	17.8	13.8	7.9
36	23.4	17.4	13.4	7.5
37	23.0	17.0	13.0	7.1
38	22.6	16.6	12.6	6.9
39	22.2	16.2	12.2	6.7
40	21.8	15.8	11.8	6.5
41	21.4	15.4	11.4	6.3
42	21.0	15.0	11.0	6.1
43	20.6	14.7	10.7	5.9
44	20.2	14.4	10.4	5.7
45	19.8	14.1	10.1	5.5
46	19.4	13.8	9.8	5.3
47	19.0	13.5	9.5	5.1
48	18.6	13.2	9.2	4.9
49	18.2	12.9	8.9	4.7
50	17.8	12.6	8.6	4.5
51	17.4	12.3	8.3	4.3
52	17.0	12.0	8.0	4.1
53	16.6	11.7	7.7	3.9
54	16.2	11.4	7.4	3.7

Average Ultimate Termination Rate = 7.8%

RECORD, VOLUME 18

Termination rates include all types of employee exits, including involuntary or voluntary quits, death or disability. The study excluded employees above the age of 54 to minimize the effects of companies' specific retirement plans. Since employees with less than one year of service are usually not eligible for participation in post-retirement benefit programs, the select period excludes employees with less than one year of service. An actuary who considered adopting this study as his employee turnover assumption would need to take this into account where an employer's programs reflected different participation requirements.

Table 9 gives details on the studies. It shows the average ultimate termination rate for the groups studied was 7.8% for all employers combined. Average termination rate means the rate obtained by dividing the total exits by the total exposure. The overall average termination rate was 13% and the average select termination rate was 21%. More industry data can be found in Roger's paper.

TABLE 9
Study Details

	Grand Totals
Total employees 1987-89 with 1 or more years of service and under age 55	79,157
Total employees 1987-89 with 4 or more years of service and under age 55	47,990
Overall average termination rate (with at least 1 year of service – all ages)	13%
Termination rate for employees with 4 or more years of service and under age 55	7.8%
Select rate for employees with 1-3 years of service and under age 55	21%

The study includes the experience of five banks, five hospitals, and four manufacturing firms. The employers had no unusual mergers, reorganizations, or other similar events during the period from 1987-89, and each employer had at least 1,000 employees during each year from 1987-89.

There were 79,157 units of exposure in the study. Most of the exposure, about 60% overall, was for employees with four or more years of experience. This was the experience used in developing the ultimate rates. About 40% of the exposure was attributable to the financial institutions, with the remainder almost evenly split between hospitals and manufacturers.

On average, an ultimate cell, which consisted of a five-year age grouping, had about 6,500 employee years of exposure. A cell for the select portion of the study had, on average, about 1,500 years of exposure. Considerably less smoothness in the select termination rates would be expected and this was indeed the case. These data bring to the fore some of the practical problems I talked about that actuaries face in

CURRENT TRENDS IN PENSION DEMOGRAPHICS

carrying out studies of employee turnover or in choosing and testing employee turnover assumptions.

Chart 1 is a graph of the ultimate table that the study produced. The termination rates decline, as would be expected, with increasing attained age. The ultimate termination rate at the midpoint of each quinquennial age group is the unadjusted rate for that age group. The rates for intermediate ages were obtained by straight-line interpolation. If you look carefully at the graph, you'll see that the graph is concave.

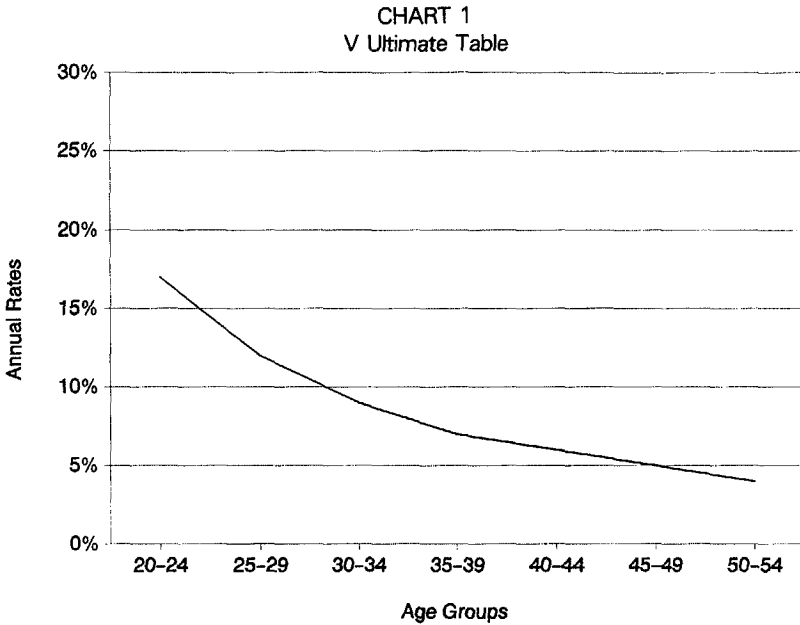


Chart 2 is a graph of some of the Sarason T-5 and T-9 tables. These show, respectively, lower and higher rates of employee turnover, than the ultimate table. Looking at the graph, you'll note that the T curves are slightly convex.

Chart 3 superimposes the last two graphs over one another; we see that the ultimate rates in this study lie somewhere between the T-5 and T-9 tables. This gives us a rough measure of the level of employee turnover observed in Roger's study. But what is perhaps more striking is that these graphs are differently shaped. One of the more striking results in this study is how similar the shapes of the ultimate curves are by industry. When we look at Chart 4 showing industry data versus the ultimate table, the industry results for the ultimate period tend to clump around the ultimate table -- after all, the ultimate table is just a weighted average of the individual industry results -- but it is surprising that the shapes of the curves are so similar even though the level of turnover is slightly higher for bank employees than for employees of hospitals and of manufacturing organizations overall.

RECORD, VOLUME 18

CHART 2
T-5 and T-9 Tables

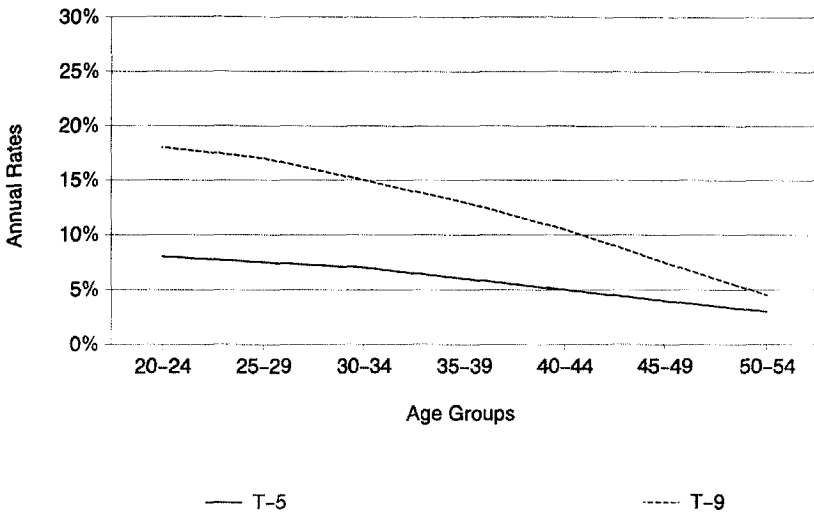
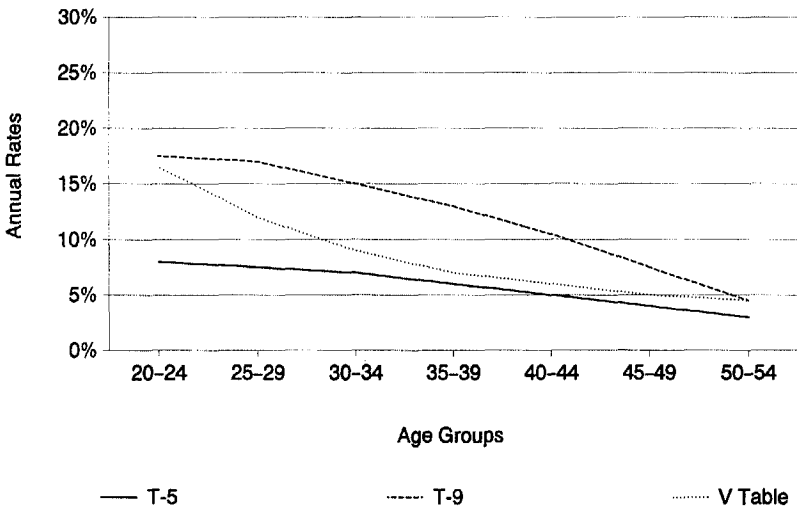
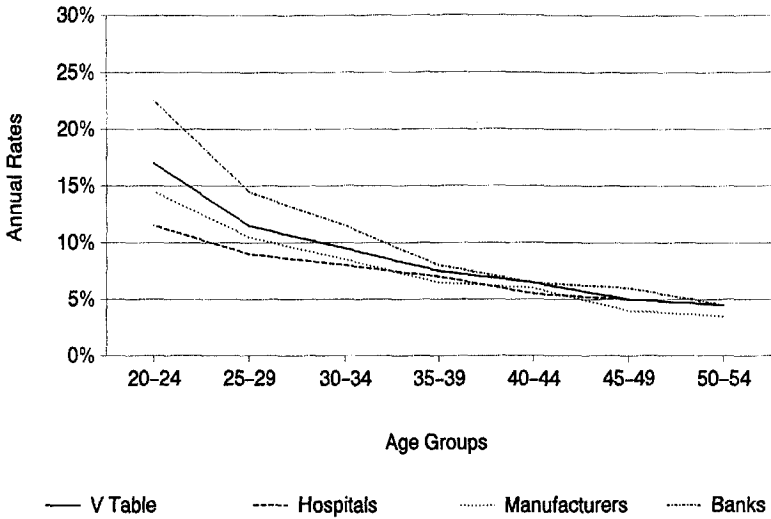


CHART 3
V Ultimate Table vs. T-5 and T-9 Tables



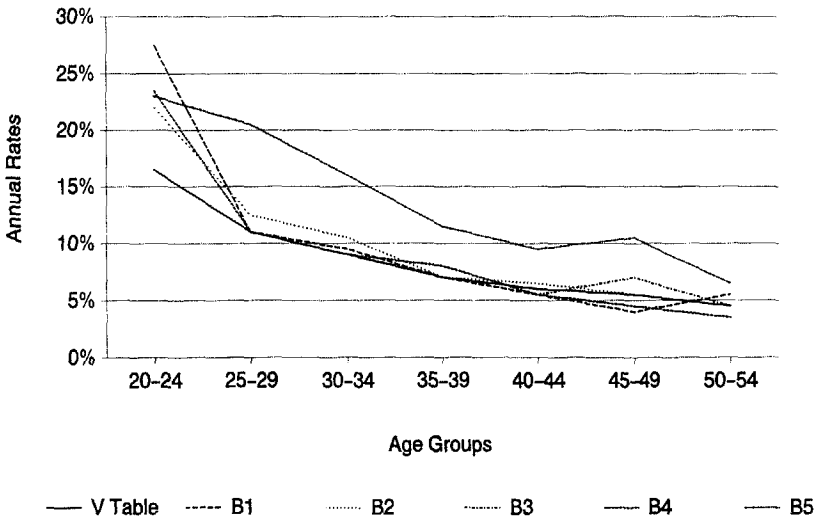
CURRENT TRENDS IN PENSION DEMOGRAPHICS

CHART 4
Industry Data vs. V Ultimate Table



Charts 5, 6 and 7 graph the turnover experience of individual employers within an industry group versus the ultimate table.

CHART 5
Individual Bank Data vs. V Ultimate Table



RECORD, VOLUME 18

CHART 6
Individual Hospitals vs. V Ultimate Table

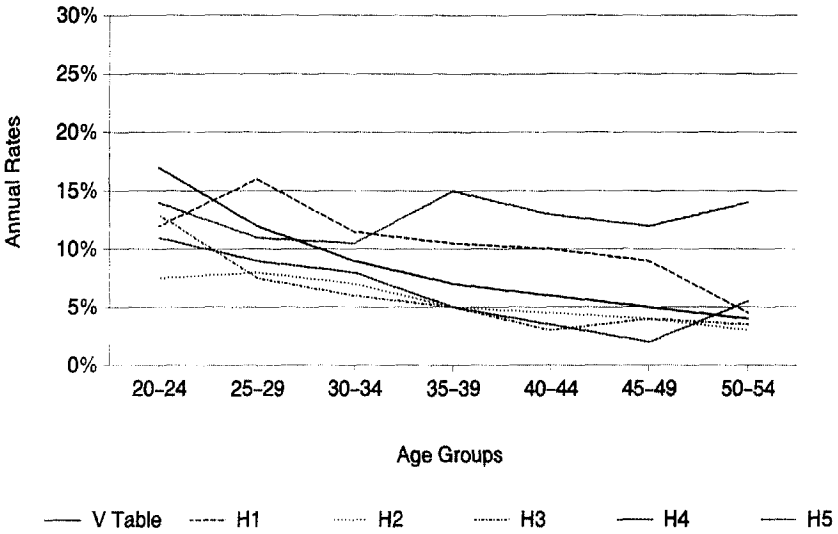
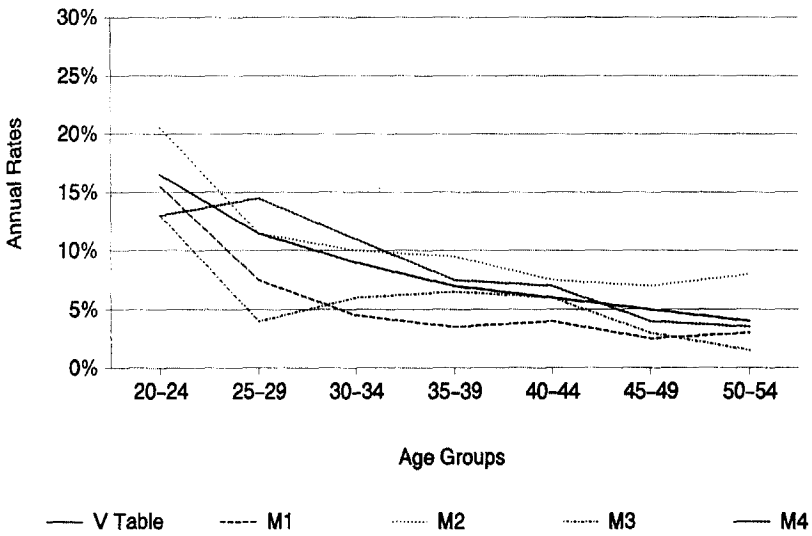


CHART 7
Individual Manufacturers vs. V Ultimate Table



CURRENT TRENDS IN PENSION DEMOGRAPHICS

As you would expect, the patterns are not quite as uniform. However, even at this micro level some resemblance remains between the ultimate table and the individual employer's ultimate experience. The hospital's turnover experience was the most erratic. This may be due to employer size since hospitals one and five had 1,703 and 1,493 employees, respectively, in the ultimate period study.

Before discussing the study's comparison of recent turnover experience with earlier experience, I would like to present some survey data on withdrawal assumptions drawn from a recent study that I did at the Department of Labor. This appears in a chapter in the book *Trends in Pensions 1992*, published by the Department of Labor. Table 10 shows the distribution of assumed withdrawal rates, and the median assumed withdrawal rate, at attained ages 25, 40 and 55 from a sample of forms 5500 filed for the 1987 plan year. The survey seems to indicate that there are somewhat lower assumed rates of withdrawal than the corresponding ultimate rates in Roger Vaughn's study. I'd be interested in any explanations that you would care to advance.

TABLE 10
Distribution of Annual Withdrawal Rate Assumption for
1987 for Plans With 100 or More Participants

Assumed Withdrawal Rate	Age 25	Age 40	Age 55
0 or missing	16%	8%	18%
1.0-2.9%	0	1	18
3.0-4.9%	6	7	24
5.0-9.9%	37	43	25
10.0-14.9%	15	16	5
15.0-19.9%	10	11	2
20.0-24.9%	5	5	2
25.0 or higher	9	9	5
Total	100%	100%	100%
Median	9.0%	9.0%	3.0%

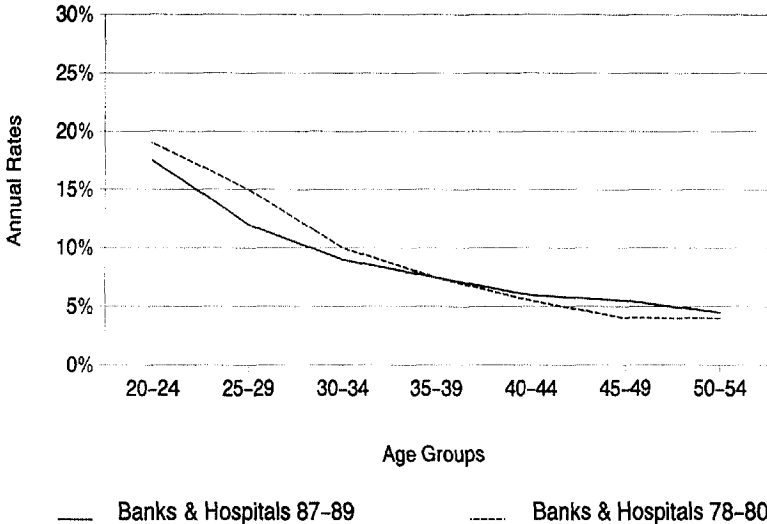
Earlier, I mentioned the difficulty distinguishing voluntary and involuntary exits presents in carrying out studies of employee turnover. Are the results from the study reflective of the level of economic activity of the plan sponsors whose experience comprises the study? Or, how valid will the study be when applied to a period in which there is a different level of economic activity?

Roger's firm, *Booke & Company*, had conducted an earlier study of employee turnover at banks and hospitals for calendar years 1978-80. The results of that earlier study were compared with the current study. The results for financial institution employees were almost identical and the termination rates for employees of health-care providers were slightly lower in the more recent study. Overall, the pattern of terminations was remarkably consistent from one era to the other.

The data included in both studies were mostly for employers located in the southeastern U.S. Economic conditions in the southeastern U.S. differed markedly in the late

1970s from the late 1980s. In the earlier period, the Southeast was in a period of relatively weak economic activity, while in the late 1980s economic activity there was quite robust. Nevertheless, as Chart 8 demonstrates, the ultimate termination patterns appear to be remarkably between these eras.

CHART 8
87-89 Experience vs. 78-80 Experience/Ultimate Rates



I'll now turn to the results of the select study. Chart 9 shows the unadjusted turnover rates with all years of the select period combined. This experience confirms our intuition, *ceteris paribus*, turnover rates decline with increasing age. In this study, turnover rates decrease from 26% for the 20-24 year old group to 12% for the 50-54 year olds with an average turnover rate of 21%.

Chart 10 shows the unadjusted turnover rates for each year of the select period and the ultimate turnover rates. The raw select rates do not decrease uniformly with increasing age as do the ultimate rates, but there still is a definite downward trend. There are some anomalies. The select rates for year three do not consistently decline with increasing age. On the whole, the unadjusted select rates have the expected relationships. The exposure for the select period was limited – 13,965 in year one, 9,885 in year two, and 7,013 in year three – and importantly there was very little exposure at the upper ages of the study. This probably would be observed in almost all tabulations of employees by attained age and years in their current job. This adds an additional problem for those constructing employee turnover tables. Such anomalies as were observed are probably attributable to normal statistical variation.

Chart 11 shows the smoothed select and ultimate rates. The select rates were adjusted to reflect a slightly flatter trend in the first year of plan participation (with one year of service but less than two) and becoming more age sensitive in the second and third year.

CURRENT TRENDS IN PENSION DEMOGRAPHICS

CHART 9
1987-89 Select Experience
Years 1, 2, & 3 Combined

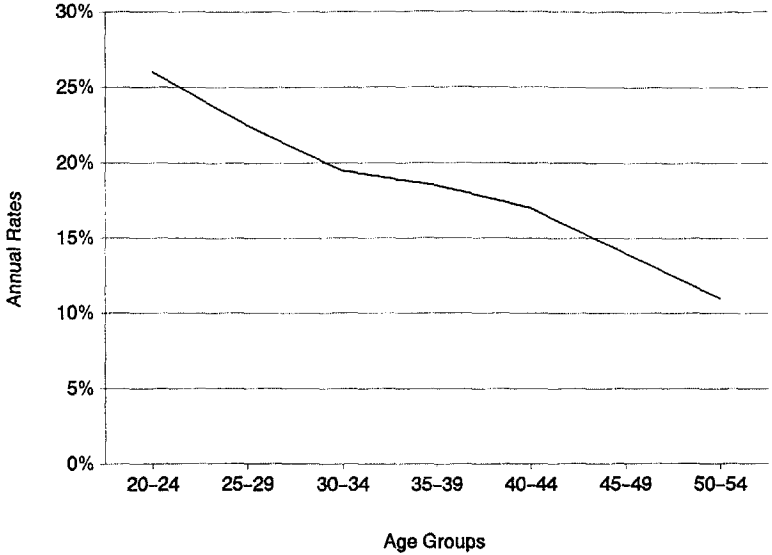
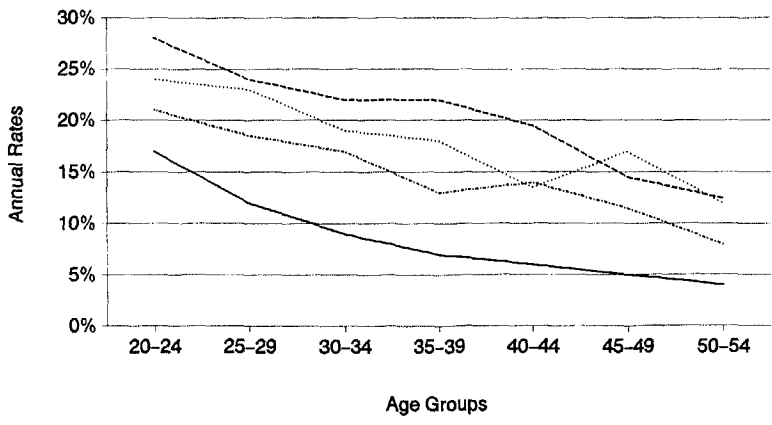
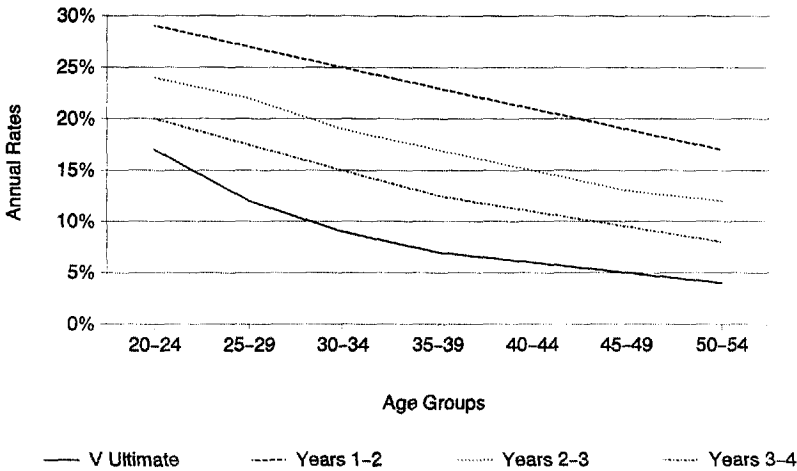


CHART 10
1987-89 Unadjusted Data
3 Year Select and Ultimate



— Ultimate - - - - Years 1-2 ····· Years 2-3 - · - · Years 3-4

CHART 11
Smoothed Select and Ultimate Rates



As a test, the employee termination pattern for a major public utility located outside the southeastern U.S. was studied. The objectives were as follows: to determine whether the results of the study were more widely applicable; to judge whether the ultimate employee turnover curve for this employer had the same shape as had been earlier observed; and to test the "fit" of the experience study by adjusting the table to the overall level of the termination activity. I will explain the table adjustment a little later.

The utility's turnover study had ultimate exposure of 114,077 employee years and 5,948 employee years for the select period. This group is far more stable in terms of job tenure than most. Its average ultimate employee turnover rate was 2.9%. There is a very close fit between male and female turnover rates.

Charts 12 and 13 show the utility's unadjusted turnover rates for both the select and ultimate portions. By and large the select data show turnover rates decrease as attained age and job tenure increase but the results are not uniform. However, given the small exposure for the select period, the lack of smooth trends among the select rates is not startling.

The study's ultimate table can be adjusted to use with an employer group. The ultimate termination rates may be adjusted to fit the overall termination activity expected in the group by multiplying the rates by the ratio of the actual average termination rate of the group under consideration to 7.8%, the average ultimate termination rate for the groups in the study. If the average ultimate termination rate for the group is not available, the vested termination rate can be used.

CURRENT TRENDS IN PENSION DEMOGRAPHICS

CHART 12
 Test Case – Public Utility
 Ultimate Rates



CHART 13
 Test Case – Public Utility
 Unadjusted Data

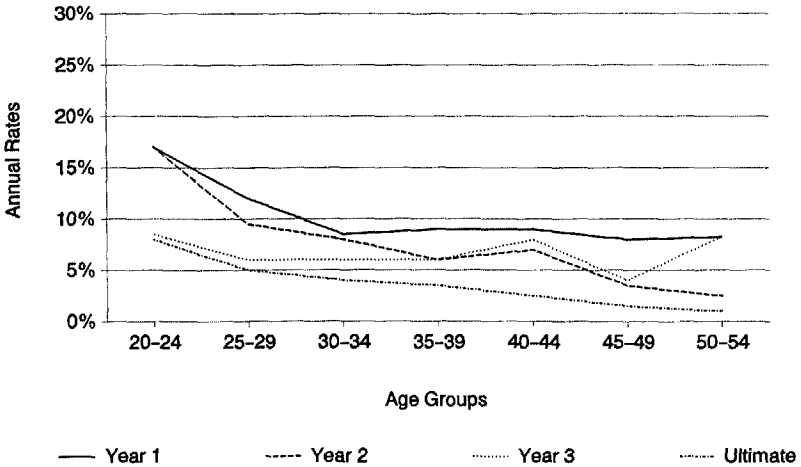
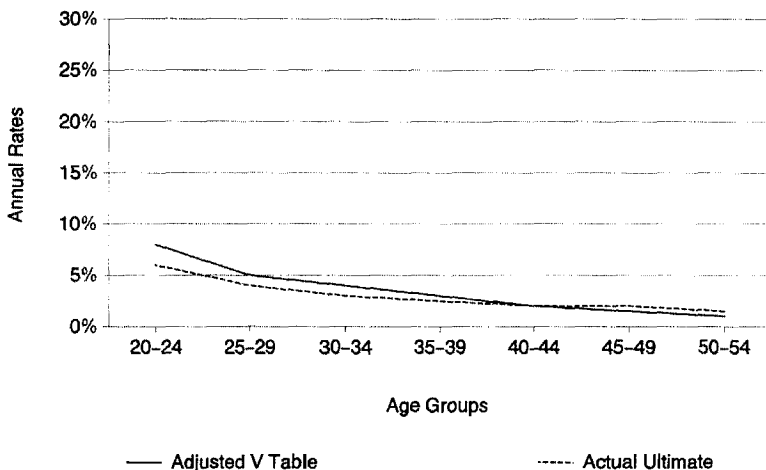


Chart 14 demonstrates the adjustment technique for the utility. The utility's average ultimate termination rate was 2.9%. Thus, the table was adjusted by taking the ratio of 2.9 to 7.8% and multiplying the table's ultimate rates by that ratio. Chart 14 shows the adjusted rates table provides a reasonably good fit to actual experience.

CHART 14
 Test Case – Public Utility
 Actual vs. Adjusted V Ultimate Table



The tables Roger constructed seem to produce fairly reasonable results. However, there may be what I see as some difficulties with this study. I'm sure that when we get to the discussion, many of you will point out other difficulties and these will provoke further thought.

The employers whose experience were used in developing the study were all fairly large. An actuary who wanted a turnover assumption for smaller plans might have concerns as to the appropriateness of the table. The test case involved an even larger employer. Thus, we still have no direct experience with smaller employers either as individual cases or in an aggregated study.

Also, as Roger told me, one distinguished pension actuary made the observation that the study is in terms of lives rather than in terms of financial effect. It's unclear what effect that would have on the rates. But I'd note that basing a study on liabilities rather than lives might make the study less broadly applicable. Also, select exposure was thin and greater testing may be necessary. One suspects that select experience may vary more widely from employer to employer.

Also, the employers studied were in one part of the country. And it would appear that at least two of the three industries included in the study, banks and hospitals, were ones with somewhat more stable employment than other firms. These issues

CURRENT TRENDS IN PENSION DEMOGRAPHICS

would at least make me as an actuary want to look at the applicability of these tables, and the suggested modification for its use with a particular employer, with care.

Notwithstanding these criticisms, I would point out that actuaries should exercise great care in adopting any assumption. That's the heart and soul of our work -- studying assumptions and testing them against reality. Ours is an empirical profession -- we make no absolute conclusions but let actual experience be our guide.

The study I've presented is one that can be so tested -- I, on behalf of the Society's Pension Research Committee, encourage you to do so. Also, let me encourage those of you who do studies based on this table to let the Committee know how plan experience compares with that assumed by this study. For those of you who wish to communicate such results, Judy Anderson at the Society's office has agreed to be a contact person. The Committee would also be interested in other turnover experience studies or tables that have been done.

MR. RONALD L. HANEBERG: I want to make two comments with regard to the mortality tables. Before I was an itinerant actuary, I was with Buck Consultants. It should be pointed out that there are more current studies with regard to corporate noninsured pensioner mortality than were mentioned. For the last 20 years, Buck has published tables in the *Proceedings* of the Conference of Actuaries. Tables were published for 1974, 1979, 1984, and 1989. They do generally follow the trends that were indicated here and are a source of material. It should be noted that this is a study primarily of large companies. I would guess it is weighted more toward the northeast than nationwide.

My second comment also deals with mortality. It's my impression that projecting mortality improvements has been utilized by actuaries, particularly in one-person plans, for obvious reasons. It's incredible some of the projections that have been utilized. However, it is my distinct impression that actuaries generally have not projected mortality improvements, at least in noninsured plans. It is being done occasionally. I believe AT&T is starting to do it for its plans. I'm interested in whether my impression is consistent with the impressions of our speakers and also generally that of the audience?

MR. MALKIEWICH: To restate your question, have we observed that noninsured plans have not tended to project mortality? As I stated earlier, the projection that we're looking at is for the insured side. For the noninsured side, the one where we replaced the UP84 table, with what I'm calling potentially the UP94, would not project mortality rates. We may publish an associated projection scale, but the UP94 table would certainly be a static table. I believe that one reason the UP84 table has probably lost out of favor to the 1983 GAM, by those using the latter table as a mortality standard, is that the 1983 GAM table shows more current rates as opposed to projecting the UP84 into the future.

MR. DANIEL M. ARNOLD: I don't think we can get away from the uninsured and the pension side here as opposed to insurance company evaluation. So if you'll permit me I'd like to follow up. The IRS has changed the ball game by requiring explicit assumptions. And that change causes enrolled actuaries to look at each

assumption and try to make it stand on its own. If the actuarial profession, if the demographers are saying that there's every indication of continued improvement in mortality into the future, and if, indeed, the actuarial profession adopts as one of its base tables a generation mortality table, then how can the rest of the actuarial profession ignore that?

There are problems involved, mechanical problems. Problems with actuarial equivalence. Problems perhaps with AIDS discrimination. A number of other problems which may come out as a result of that. But how can the profession ignore on one side what is going on, on another side?

Within my firm one of the actuaries has consistently used age setbacks. He changes the mortality assumption with a further age setback every year. The firm's other actuaries have not done that, but this actuary is taking a very strong position and feels it is appropriate to do. So at least one of the actuaries of the 13 actuaries in our firm does do that.

MR. MALKIEWICH: I'll just refer back to the underlying purposes of the two standards. I'm not saying that should not be the case. Each individual actuary must make, as Dan stated, his or her best estimate of anticipated mortality. On the insured side we're looking at standard that will be used to cover experience for all companies that will be using that reserve, and reflecting a certain amount of conservatism for solvency. It is not intended to be a best estimate of mortality. It is intended to be an appropriate level of reserve to protect potential adverse risk. The best estimate would therefore not necessarily equal that best estimate of adverse risk or to protect that adverse risk. The purposes are different and that does not mean in and of itself, you should look at future mortality improvement. I personally think that you should, but I'm not the enrolled actuary of a plan, and as I do say, our New York City systems use their own experience which will be updated as the experience warrants.

MR. ARNOLD: Is it correct that the proposed mortality tables for insured lives are going to be subjected to some sort of stochastic analysis to give some sort of confidence about solvency?

MR. MALKIEWICH: Yes, Dan. As stated in our position paper we are going to be looking at all kinds of stochastic modeling and Monte Carlo simulations to give ourselves a confidence level of what the reserves might look like relative to what our future mortality projections might indicate and to give all those looking at it a chance to gauge that level of confidence. But let's face it, we are going to be producing a preliminary draft which would not necessarily be the final standard. My hope would be especially with such a drastic change in directions, that communications and discussion would develop a better statement of what that Standard might look like.

MR. EDWIN C. HUSTEAD: Let me clarify that the question before our committee was not whether to update the UP84 table, but whether to say that the new GAM table will suffice for both uninsured and insured mortality. As Lindsay has shown, the uninsured and insured experience are very close. But as we've been discussing, the needs are quite different. For the uninsured the committee felt what we need is a basic table without adjustment, but with an indication of what the projection factors

CURRENT TRENDS IN PENSION DEMOGRAPHICS

are so that each actuary is free to use a basic table as he or she wants. The uninsured experience does include the important Buck information.

Joe, let me pose a technical question to you. When you're analyzing the select and ultimate periods, it is very important how you measure those first couple of years. I notice in Roger's paper he's very terse about exactly how he did it. I assume that his first year is really the valuation year these people first appeared. It then becomes important which kind of exclusion was in that program. Can you characterize what he might have done there?

MR. APPLEBAUM: Ed, I have to admit that I have nothing to add to what you've observed. My understanding is, as I indicated in my prepared remarks, that Roger looked at people who had for inclusion in the select period, at least one year of service. Service was measured from there. A person was put into the one-year cell if he had more than one but less than two years of service. Does that help?

MR. HUSTEAD: Is there any further work contemplated on this?

MR. APPLEBAUM: No. I don't expect that the pension research committee will, but maybe Roger can be encouraged to elaborate on it either formally or informally by getting directly in contact with him.

MR. RALPH J. BRASKETT: I've found that for medium and small groups the GA51 projected to 1990 does an excellent job. It is slightly more conservative than the GAM83. And I really think that, at least for people who have to rely on a standard table, that a table like the GA51 with some projection scales is very helpful. Because remember, we're amortizing gains and losses over five years now. At least that's the case for those of us who do Projected Unit Credit (PUC) or entry age normal valuations. PUC I think will be more and more popular because we have to do it for FASB. So I think that the variations off of that can be dealt with through a gain and loss amortization. But I think a fancier table than that becomes just overly expensive for the purposes of an actuarial valuation. It's a different ball game for an insurance company reserve.

MR. MALKIEWICH: I just wanted to underline that last statement that you made. That the purposes, as Ed stated as well, are very unique and very different. The insurance company looks at solvency both currently as well as for future years. A pension plan makes a best estimate of what the underlying mortality rate really is. That can cover any myriad of tables. We haven't even looked at individual annuity mortality standards that may be appropriate in some cases. But that is something that each actuary must determine on his or her own.

MR. JACQUES DEMERS: I guess when I look at the termination rates it seems to me that service has much more impact. It's a much greater determinant of the probability of termination than age. I wonder, as we develop all these select and ultimate rates, the ultimate portion being based on age and the select period being based on service, whether anybody has gone in the other direction, having service as the characteristic for the ultimate portion and age for the select portion. Also, very few plans that I know of use a select and ultimate basis for determining liabilities. I'm

RECORD, VOLUME 18

just wondering, if we use only one basis age or service, whether service is not a better determinant of termination than age.

MR. THOMAS P. BLEAKNEY: I work on public sector plans, and we have one very large teacher system where we actually ignore age as far as attained age is concerned. We simply set up select groups according to entry age and then value each of the individual groups that way. That works very well. Not just for turnover purposes, which are very good, but also because teachers tend to have very structured salary bases. Salary is tied more to service than to age. So it works very well. In answer to the last question, at least there's one group that does that.

MR. APPLEBAUM: Tom, could I ask you a follow-up and get your reaction to it? Is it also true for this group that you have a relatively narrow band of entry ages?

MR. BLEAKNEY: No. I think we have something like eight different entry age groups and even the oldest which is up in the 40s has a substantial group. It is surprising how many teachers enter later. But that certainly would be a consideration.

One other point as long as I'm up here. The study that was presented showed the mortality rates differing between active employees and retirees, showing substantially lower mortality for actives. This is an experience that has constantly puzzled me. I look at the same group of employees and say, are you including everybody? You're not letting people go off and die from active status six months later and so forth. No matter how much effort we make, we see that for large groups substantially lower mortality rates among active employees than we do among retired employees. I'd be curious if anybody else has comments on that.

They did surveys as to why this was happening. And the impression was that when people retire, particularly males, there was a loss of interest in life. You know we talk about the "give-up-itis" in the Korean War where American prisoners of war actually went off in corners and curled up and died. I cannot recall the sources, but there have been a number of studies about this. The movement toward preretirement counseling, the American Association of Retired People chapters, and all of this has, I suspect, changed this. I wonder if a more current study wouldn't show, and future studies show, that as there's more involvement in the community among retired people that there will be an improvement of retiree mortality. Maybe, in fact, we've already seen that improvement.

MR. MALKIEWICH: My only comment on that is what I look at when I see what I call the late reporting death syndrome that the insurance companies suffer. I'm wondering if that might also be applying in the active life side. Intercompany mortality collection does not reflect active lives.