DEATH TAKES A HOLIDAY:
THE SELECTION OF MORTALITY TABLES

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This panel will discuss the latest trends in mortality including:
- The new 1993 (or 1994) mortality table(s)
- Should future improvements be built into the table? If so, how?

MS. MARILYN MILLER OLIVER: I'm with W.F. Corroon. Bill Wright is with Coast Consultants. What we will be saying is our opinion, not necessarily that of the Society of Actuaries.

First we are going to go through a general discussion of the traditional uses of mortality tables with an emphasis on retired lives. Then we'll go through some recent tables that are commonly used in pension plan valuations, trends in mortality, progress on the development of the 1994 Group Annuity Mortality (GAM) and 1994 Uninsured Pension (UP) tables, and then an update on what the Society retirement plan's experience committee is doing in some other areas.

Any discussion of the uses of mortality tables needs to be broken down between insured uses and noninsured uses. Bill will start by speaking of the insured uses.

MR. WILLIAM S. WRIGHT: The principal use of a standard mortality table in the insurance field is to implement the standard valuation and the standard nonforfeiture laws that prescribe the minimum basis for the valuation of the liabilities of a company and of the granting of cash or other values under the contract. As such, these tables must be published: they must appear, actually or by reference, as part of a statute or a regulation of each of the states. They are uniformly applicable to all companies and must be conservative enough to cover the experience of the preponderance of companies and to provide a margin for adverse deviation in any company at most times. Because there are over 50 jurisdictions a change is slow to implement and must aim at anticipating company needs for the period during which it is expected to be in effect.

Traditionally the table will apply to new business only -- it is said to be locked in for the block of business issued while it is in effect. The table should not directly conflict with the tables used in the establishment of adequate premium rates, and initially, through the use of a contingency margin, that will be the case. However, as time goes on, the secular trend of rates and innovations of the business have always caused such a conflict giving rise to the need for another revision to restore the contingency margins.

The valuation of liabilities is done, of course, for use on the company balance sheet and under the scrutiny of the state insurance authorities. A company can also make provision for future contingencies through the use of special or contingency reserves but only if earnings are favorable and they forego deductions for that reserve in their corporate federal income tax. Deductions must be in accordance with tables

established by the legal sanction of a majority of the states and are a material part of pricing and solvency considerations. When earnings are unfavorable, it may be difficult to fund reserves of any kind so that solvency of the company is in question.

The actuary's responsibility in these valuations is to adhere to the state law prescribing the table without any question of its adequacy, but there is a growing movement -- the valuation actuary movement -- which may expand on that responsibility and require each actuary to develop a rationale for the mortality tables that he uses. There may be similar responsibilities of the actuary in the use of mortality tables to the public and in particular to CPA firms. These responsibilities may depend on the attitudes of the particular CPA firm and on its undertaking of the moment, but they will usually include responsibility for the choice of a table as well as the proper use of it. In my experience these requests will have to be done much more quickly than need be done, if at all, in responding to state insurance department authorities.

Other uses within the insurance field include the setting of cash values that is at a level somewhat below reserves. This gives priority to the protection of the insurance company and future participants under possibly adverse conditions. Early cash-outs are not paid out in an amount more than the funds that have been set aside, as is currently required, for instance, by the Pension Benefit Guarantee Corporation (PBGC) in its deferred annuity factors.

The pricing function is at the opposite extreme from the valuation function in that it is certainly not public or slow to change. The basis is proprietary and, in my experience, seldom documented. Rates are diverse among companies and tailor-made for many special situations. They are, of course, subject to competitive constraints on the one hand and the valuation constraints on the other hand.

MS. OLIVER: In the retirement area the most important mortality table uses are in setting the contribution rates and evaluating the financial status of pension plans. For small plans a standard table is generally used after retirement, and a standard table, or none, is generally used before retirement. For larger plans, especially in the public sector, experience studies are performed periodically to evaluate mortality experience. The results are used to either develop a special table, or to adjust or project a standard table. In the private sector explicit mortality assumptions are required by the IRS.

Of course there are other items that are impacted by mortality assumptions, including actuarial equivalence factors for optional forms. Unisex factors must be used for this purpose. In the private sector, if you're going to change equivalence factors, you must preserve the accrued benefit. Since mortality is improving, preservation of the accrued benefit with respect to optional forms is generally not as big an issue as it would be if mortality were worsening.

As far as cashouts are concerned, there is currently an anomaly with respect to the use of the PBGC rates and a current mortality table. Since the total PBGC present value factor reflects insurance company annuity pricing, but the PBGC uses a mortality table that is less conservative than the tables used by insurers, the PBGC interest rate becomes a balancing item. It follows that, if the PBGC interest rate is

combined with a current mortality table to calculate cashouts, the resulting present value factor may be overconservative.

Also, mortality tables may be used in deriving employee contribution rates, primarily in the public sector. When mortality tables are being used as the basis for employee contribution rates, use of a current table is important to insure a fair allocation of costs.

Also important is the use by the PBGC in testing for plan sufficiency.

With that background we'll go into some of the tables that are currently being used.

MR. WRIGHT: The first table we want to discuss is the 1971 GAM. It is typical of older practice in several respects. In the late 1960s the valuation basis had fallen far behind the basis at which companies were placing their business. The low interest rate of the reserve basis was far different from the new money interest rates that the companies had developed for pricing purposes. The downward secular trend of mortality rates had exacerbated the problem. As a consequence the NAIC asked the Society of Actuaries to review the current mortality basis and to comment on its adequacy. The reviewers had to anticipate a lengthy period to implement a change since at that time these changes had to be dealt with as legislation that, in some states, required two sessions of the legislature. The Society, through a committee, then studied the current experience and suggested that a new table be constructed. The experience was from the Society of Actuaries' *Reports* of group annuity coverages for 1964-68 and called the 1966 experience table. The rates were smoothed by a graduation process and loaded 8% for males and 10% for females. In conjunction with this study the committee members proposed a projection Scale D that had a rate at male age 65 of about two-thirds of 1%. For future use they recommended a Scale E that was slightly higher but less than Scale D – about 0.6% at male age 65.

The committee members also discussed in their paper what I would call a fully prospective use or a generation use of the projection table. This is where -- upon placing an annuity at age 65 – you would calculate your reserves using the age 65 mortality rate, the age 66 mortality rate projected one year, the age 67 mortality rate projected two years, and so forth. It was not included in the statute then nor has it been widely used, but it is now under discussion for inclusion in the new requirements.

The committee members recommended that females rates be treated by a setback from the male rates in the amount of six years. For active life they followed past practice of looking to group life experience and to merge the pensioner experience into that over a short period of years.

The next table and the most recent one used for group annuity mortality is the 1983 GAM.

In 1979 the Society was asked on very short notice in conjunction with an urgent proposal to use a dynamic interest rate standard. Unfortunately the committee members had to decide that the data that they had on hand was too limited in quantity, was erratic, and was not homogeneous. They were able to conclude that

the experience showed an improvement in mortality greater than that of Scale D, but they were not able to construct an age/sex specific set of rates. The committee members decided to update the 1966 experience table by use of trend factors obtained primarily from census data. The 17 years of the projection was made up of two periods. The first period was the nine years from 1966-75 that gave a projection table X – the male age 65 factor was about 1.5%. The second period was from 1976-78 and projected to 1983 and was called Scale Y. The comparable factor was 2.25%. A 10% loading was added. They recommended a continuation of the use, for females, of a six-year age setback of the male table, and they inaugurated the collection of data to do a good job the next time. The next time is now.

The UP-1984 table (as used at that time to mean Unisex Pension) came about for very different reasons than the valuation tables so far discussed. ERISA was prescribing that actuaries use a best estimate standard, and it was felt some effort at getting a best estimate mortality table was desired. It was also felt that unisex rates in the valuation as well as in benefit option factors would be required by the Equal Employment Opportunity Commission (EEOC), and a table so designed from inception was desirable. Society committee members subscribed to the past practice of recognizing the difference of female and male mortality rates by use of an age differential but did so by having each relate to a common blended table. That table was constructed using the female data in the same way as the male data so that for the first time a table reflected the female experience directly.

The committee members did add a margin of 10%, but it is considered not as a contingency margin for solvency purposes but rather as a 17-year projection of the rates from 1967-84. They commented that from 1950-60 there was little improvement in the rates and that in 1960-70 there was only a slightly greater improvement. They did not anticipate any breakthroughs in the causes of mortality and expected only slow future improvement in mortality rates. I note that the PBGC uses the table not as a unisex table but with the five-year differential between males and females implicit in the construction of the table. In particular the PBGC uses a set-ahead of one year for healthy males, a setback of four years for healthy females, a four-year set-ahead for disabled males, and a one-year setback for disabled females.

MS. OLIVER: I'll start the discussion on mortality improvement with some observations regarding historic mortality patterns. Looking at the general population, it's clear that, though there's been substantial mortality improvement since the 1900s, it's not been consistent or in a smooth pattern. An example is the experience from 1900 to the present. On a combined basis for the general population, there was about a 1% per year rate of mortality improvement between 1900 and the mid-1930s, then it increases to about 2% per year through the mid-1950s. Starting in the mid-1950s through the late 1960s, it reduces to about a half a percent per year. Then in the late 1960s through the early 1980s, you see larger improvements averaging about 2% per year. In the mid-1980s, though, mortality reduced significantly.

Also there's less improvement at the older ages. If you compare the probabilities of death for the white males in 1980 to those in 1900, for a person age 40,

there's a 75% reduction in the probability of death, but if you look at a person age 50, you'd see a 50% reduction. At age 65, you see a 33% reduction. And then at age 90, you see a 25% reduction.

The difference in the mortality between the sexes is currently fairly substantial, although it has not always been the case. The experience in the 1920s shows a one-year differential in the life expectancies for age 65-year-olds in the general population. That had expanded to around four years by the end of the 1970s. There follows what looks like a stop in that trend and, in fact, what might be some contraction in the difference between the life expectancies for the two sexes.

Looking at some of the factors behind mortality improvements, in the 1970s there were major improvements in mortality, and those were primarily due to improvements in the mortality from cardiovascular and heart diseases. In the 1940s there were tremendous improvements, and those were due, to some extent, to medical advances in the acute diseases, for instance the use of penicillin. During the 1970s part of the improvement may also have been due to lifestyle changes.

When you look at the narrowing of the gap between female mortality and male mortality, there are quite a few theories. One predominant theory concerns women smoking. It became more socially acceptable for women to smoke in the World War II era, and these women, who have spent a large portion of their lifetime smoking, are now in the retired population. Another factor that has been pointed out is an improvement in men's lifestyles, in other words, towards more healthy living. It's also been pointed out that women changing their lifestyle and becoming more of a factor in the workforce may have put stresses on them that would lead to increases in their mortality rates. However, that theory is controversial. One study has shown that working women actually are healthier and live longer.

Factors we may see in the future are improvements in medical, diagnostic, surgical and life-sustaining procedures, improvements in medicine, the impact of environmental pollutants, which could either be a positive or a negative force (depending on whether they decline or increase), variances in medical coverage throughout the population, exercise and nutrition, and DNA research. Certainly something that has been relevant is the introduction of new diseases and their impact, and it seems that a very large factor is cigarette smoking and the potential decline in smoking. If you look back at studies, smokers usually experience at least a 50% higher mortality rate than nonsmokers. It's also interesting to note that when people quit smoking, studies have shown that it takes perhaps ten years before you start seeing some significant improvement in their mortality rates. The last factor that I can think of is alcohol, and certainly if there were trends toward less use of alcohol, that would affect mortality rates.

Does anybody have a feeling for any other factors they might consider to be important?

FROM THE FLOOR: Safer cars.

FROM THE FLOOR: Use of seat belts.

FROM THE FLOOR: And air bags.

FROM THE FLOOR: We don't have the draft anymore.

MS. OLIVER: This points out that there are a tremendous number of factors that could affect mortality rates over the future.

FROM THE FLOOR: Aren't we forgetting a major factor, that's almost impossible to measure, and that's what medical science does for us?

FROM THE FLOOR: How do we measure that? They say that many heart bypass operations aren't necessary, but there are an awful lot of bypass operations going on, and they are probably doing something.

MS. OLIVER: Improvements in the treatment of cancer affect mortality rates. To date there's not been an improvement in that like we've seen for heart disease.

FROM THE FLOOR: In the other direction we have the AIDS pandemic.

MS. OLIVER: Generally, although we probably don't see too much impact of AIDS among our pensioner mortality at this point, I guess if scientists found a way to prolong the life span of younger people who are HIV-positive, the impact would come about.

FROM THE FLOOR: We're also talking about insurance.

FROM THE FLOOR: There is a book about Chernobyl and the effect of that and comparable events around the world, and the author attempted to make a statistical demonstration that there was a blip in mortality. At least, as I recall, he analyzed early mortality after birth, and claimed he had shown a different blip.

MR. WRIGHT: Well, that could easily be, but it would escape most of our experi-ence studies of pension or insurance mortality.

MS. OLIVER: Any other factors?

FROM THE FLOOR: There's another thing that's awfully hard to measure, and that's that with the increasing population on the earth, there's increasing pollution of all kinds, and it's almost impossible to measure what effect it has, but it seems that it's increasing.

MR. WRIGHT: Well, it could go either way. If some of the efforts, of the clean-up and so forth, work.

FROM THE FLOOR: They would just be reducing some increase that's already underway.

MS. OLIVER: We will now discuss some experience that was compiled by the retirement plans experience committee and should be coming out in the SOA reports. The data used include Medicare recipients, Civil Service, the Canadian pension plan,

private sector data, and the U.S. military. The private sector data included 24 private sector employers and one public sector employer.

The private sector data were contributed by several consulting firms. The Canadian data are from Public Service of Canada.

Table 1 shows actual-to-expected deaths compared to UP-1984 for males, and it's clear that there's been mortality improvements since the UP-1984 table was constructed. Medicare has the biggest exposure. The numbers that are shown there represent 141 million life years of exposure over the five-year period (1985-89). The next biggest exposure is the Civil Service Retirement System (CSRS) at 20 million, and then the private sector and the military at seven million each. The smallest is Canada.

TABLE 1
1985-89 Actual Deaths Compared to UP-1984 Expected – Males

	Medicare	U.S. CSRS	Canada	Private Sector	U.S. Military
Pensioners	N/A	82.6%	86.4%	86.2%	86.2%
Disabled retirees*	N/A	147.3	206.5	231.6	151.2
Subtotal retirees	99.7%	93.2	93.6	88.3	93.8
Active employees*	N/A	44.0	56.3	47.1	N/A
Total	N/A	86.5	85.2	80.7	N/A

*Not all of the private sector groups reported disabled and active experience.

Table 2 shows the results for females.

TABLE 2
1985-89 Actual Deaths Compared to UP-1984 Expected – Females

	Medicare	U.S. CSRS	Canada	Private Sector	U.S. Military
Pensioners	N/A	82.2%	78.0%	86.5%	79.9%
Disabled retirees*	N/A	130.8	153.7	219.4	138.0
Subtotal retirees	95.0%	90.5	83.6	88.0	87.2
Active employees*	N/A	35.1	52.8	49.1	N/A
Total	N/A	83.0	80.0	82.0	N/A

*Not all of the private sector groups reported disabled and active experience.

FROM THE FLOOR: What is the experience base for the UP-1984 table?

MS. OLIVER: It's uninsured pensioner mortality that was being summarized in the SOA reports at that time.

FROM THE FLOOR: What was the time frame?

MS. OLIVER: The center of the experience was 1967, but then it was projected 17 years forward to 1984. The projection was accomplished by using a 10% decrease factor; so, it did not mirror the mortality improvements that ensued.

MR. WRIGHT: So, 17 years before 1984.

FROM THE FLOOR: In Tables 1 and 2 is there some implication that if we had the exposure in 1984 that we would be seeing 100% actual-to-expected ratios?

MS. OLIVER: No. This just implies that if the UP-1984 table is used unadjusted, it may well be that mortality rates for males and females are being overstated.

Table 3 shows a history of CSRS pensioner mortality, actual-to-expected mortality ratios. For the females note the constant actual-to-expected ratio of 82% for the 1975-79, 1980-84, and 1985-89 periods. Table 4 shows the annual rate of improvement between five-year periods. It demonstrates that in the 1980s under CSRS there was not much improvement for females. Now more recent data, which are not included here and are just starting to come in, have indicated that improvements are starting again for females, but to a much lesser degree than for men.

TABLE 3
History of CSRS Pensioner Mortality
Actual-to-Expected Mortality Ratios on UP-1984

Year	Males	Females
1945-49	124%	125%
1950-54	120	112
1955-59	118	102
1960-64	114	99
1965-69	109	92
1970-74	101	90
1975-79	93	82
1980-84	86	82
1985-89	83	82

TABLE 4
Comparision of Annual Improvement in Mortality
Actual Deaths Compared to UP-1984 Expected

Period	CSRS	Medicare	Military
Males			
1975-79	1.5%	2.1%	N/A
1980-84	1.6	1.0	N/A
1985-89	0.7	0.7	1.7%
Females			
1975-79	1.8%	2.8%*	N/A
1980-84	0	0.8	N/A
1985-89	0	0.2	N/A

*Medicare data for 1975 to 1979 is the annual rate of improvement between the 1972 and 1977 experience. All other data are for the annual rate of improvement between five-year groupings of experience. For instance, the male CSRS rate of 1.5% is the annual rate of improvement between 1970-74 and 1975-79.

FROM THE FLOOR: That's for the CSRS.

MS. OLIVER: Yes. I think similar trends are also being seen in Medicare data.

FROM THE FLOOR: Since we have more females in the workforce one might think more stress, and so on, would be a causative factor in these trends. You indicated some studies have shown that this is not a detrimental change, but I'm wondering if this is really the case. We're finding out from government statistics that there are very few health research studies for women as far as heart disease, and so on. So, women are now exposed to many of the same types of day-to-day stresses that men are, but we're not really studying how those stresses affect women. That could possibly cause this convergence in mortality because we're not really studying the causes behind female health conditions. We don't really know what's causing their cardiovascular problems, and so on. I'm wondering if that's going to show more trends on into the future if we don't start to concentrate more on the female population.

FROM THE FLOOR: Another problem I think we might be seeing is that the CSRS data for females are probably a relatively small group, and between 1980-84, there might have been an influx of new retirees with a history of smoking who affected the class in some way. In other words, you could have had a general improvement in female mortality that was masked by this strange influx. In other words, you had a small class at the beginning of the period. A lot of female smokers come into the class. That results in slightly higher mortality rates masking general improvements in mortality that everybody's experienced.

MS. OLIVER: I guess it depends on how you define improvement in mortality.

FROM THE FLOOR: It looks like there wasn't any improvement in mortality for females as a result of this study. I'm just saying that we shouldn't assume that female mortality improvement has disappeared and is going to stay gone forever because the influx of smokers will be causing this slowing of mortality improvement temporarily.

MR. WRIGHT: Looking at these tables it's very impressive to me that the decreases are not uniform by any means. It'll decrease, then be level, decrease, level, and your conclusion may well depend on which, say, three- or four-year period you look at. You have to look at a much longer period to see the downward trend.

FROM THE FLOOR: I have another question along that line. Consider the Census Bureau mortality that every decade has tended to be separated white/black. I don't know if there's anything to come out yet on the 1990 census, but the earlier census showed higher black mortality rates, and I'm wondering if the proportion of blacks, let's say 1985-89, in this data would be significantly higher thus impacting the overall rate.

MS. OLIVER: You can also ask yourself why the mortality is worse, and if nonwhites are more prevalent in the workforce, does that mean that the aggregate mortality deteriorates or will the change in the nonwhite lifestyle cause their mortality to improve?

FROM THE FLOOR: In the nonwhites you have a large number of blacks, and you have a smaller but growing group of Asians. Asian mortality is lighter than white, so, the trend in nonwhite mortality is largely a function of how many Asians are in the study.

MR. WRIGHT: Well, still, doesn't it depend on the economic class more than on race?

FROM THE FLOOR: I've always made the assumption that if we could get a true study of people in the same economic class, of all the same characteristics, that we probably would find little difference between Asian, black and white mortality so long as they were all living similar lifestyles, eating the same thing, doing the same thing, living in the same area, and all those sorts of things.

FROM THE FLOOR: You have to prove that to me because the census data actually shows a significant difference in black mortality.

MR. WRIGHT: But census data doesn't break out socioeconomic class.

FROM THE FLOOR: When you are doing foreign country work using our mortality tables, there's a basic assumption that people who are living and working within the same sort of economic environment as you will find in this country are displaying basically the same mortality, regardless of what the sociological makeup is. Now, one of the problems, of course, is that you may be in a type of environment where you have a lot of endemic diseases that we are not exposed to. If you live in a tropical country, you're more likely to get malaria no matter how satisfactory your economic situation is. That's a problem, but I would agree that the socioeconomic factors and general lifestyle are far more important than anything else.

FROM THE FLOOR: The gentleman that spoke on Asian mortality – are you considering Asian mortality in America or Asian mortality in Japan?

FROM THE FLOOR: Well, both.

FROM THE FLOOR: Is there data on Asian-American mortality?

FROM THE FLOOR: I have some cases in Hawaii and they live forever.

FROM THE FLOOR: But Japanese mortality in Japan is not as good as that of the U.S.

FROM THE FLOOR: The life expectancy in Japan is longer.

MS. OLIVER: How many of you think that it's a factor of lifestyle? [Most of the group.]

FROM THE FLOOR: I would then suggest that industry or socioeconomic condition of the employees would be a factor in retiree mortality. There is a difference here between the CSRS and the private sector companies. We have one large group life

and one large state plan, and the mortality seems to be significantly higher than what you would experience in a white-collar employer plan.

MR. WRIGHT: I'd say yes. I think this is shown by the Buck tables. One table reflected a lot of steel workers, and it showed quite different mortality rates than other tables.

FROM THE FLOOR: Since we are being politically correct, are we also saying that the difference between female mortality and male mortality is merely a matter of lifestyle?

MR. WRIGHT: Some people say so.

MS. OLIVER: I would not agree with that.

FROM THE FLOOR: The point I'm making is that I think as actuaries we have to be careful not to jump to a conclusion that merely seems nice. We have to deal with what the facts show. It's obvious that we don't have all the data that we really should have to answer some of these questions.

FROM THE FLOOR: I think one of the issues is that in our society race is not a biological characteristic. It's a social characteristic. When a person fills out the census form and the form asks if they are white or nonwhite, it's obvious that, for example, a child of a nonwhite parent and a white parent will more often be considered nonwhite. So, I don't think that it makes much sense to try to draw a biological conclusion about something that's really more of a social characteristic than a biological characteristic.

FROM THE FLOOR: That's exactly what I mean. You're going to a politically correct conclusion because it's what you'd like to have be true, and we should be very careful as actuaries how fast we move in that direction. That bothers me a lot. I'm just saying let's, as actuaries, try to produce the evidence that will demonstrate these things rather than trying to rationalize. The politicians can rationalize it. It is something where I feel you can get yourself in fairly serious trouble as actuaries.

FROM THE FLOOR: But I would suggest to you that, if you're looking at two candidates for life insurance who are socially and economically the same and one is European white and one is not European white (possibly Hispanic, Asian, or Afro-American), you're basically saying we should look at the Afro-American in terms of the overall bulk of Afro-Americans as taken from the census data. We should ignore the possibility that the individual is, indeed, demonstrating mortality and morbidity that is characteristic to the socioeconomic class, and I would say that is equally a deficient viewpoint for an actuary to take.

FROM THE FLOOR: Well, I agree with you, but that's not what I'm saying. I was saying let's try to rely on the data and not on assumptions. Take the women versus men.

MS. OLIVER: For women versus men, one line of thought is that maybe 50% is biological, and the other 50% is lifestyle.

MR. WRIGHT: Of course, our statistics have a particular purpose, to run a pension plan, or an insurance company. It's not to answer public health issues or sociological issues.

MS. OLIVER: Moving on, Charts 1-4 show comparisons of mortality rates under Medicare, CSRS, UP-1984, and 1983 GAM. Then Table 5 is a comparison that illustrates the differences in ratios of actual-to-expected on 1983 GAM, for the private sector group, between salaried and hourly employees.

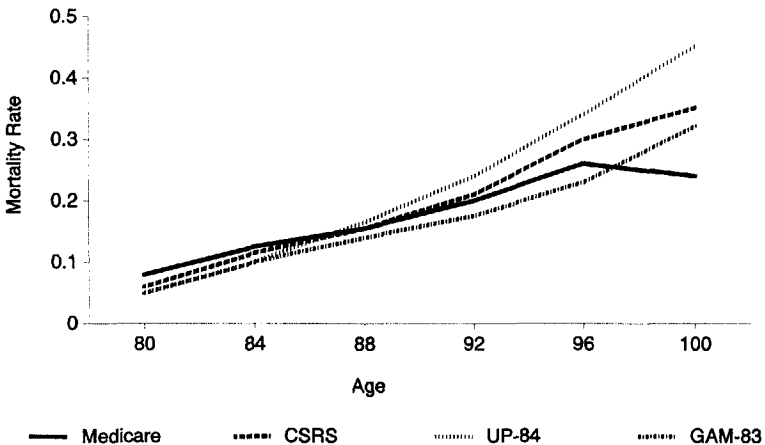CHART 1
Male Mortality Rates Age 66-81
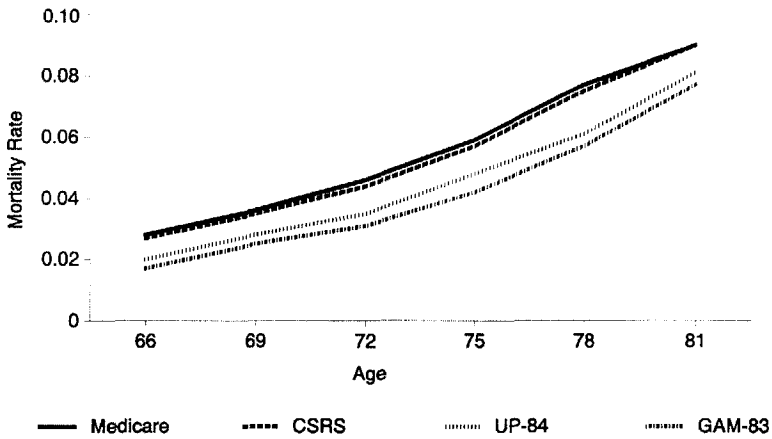
CHART 2
Male Mortality Rates Age 80-100

CHART 3
Female Mortality Rates Age 66-81
Actual 1985-89 to Expected
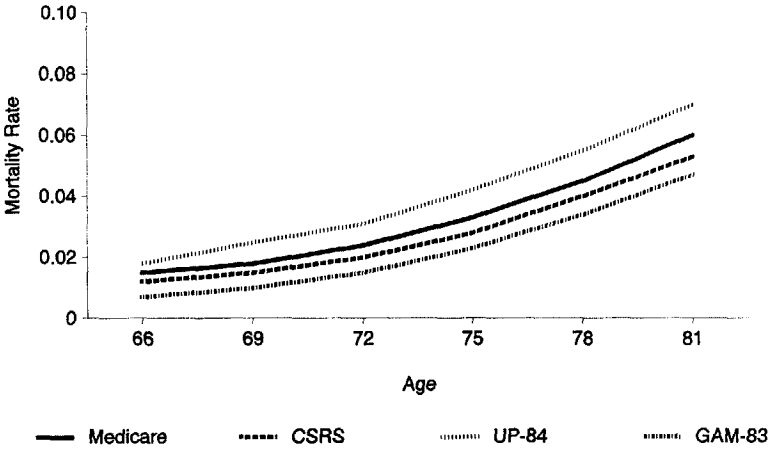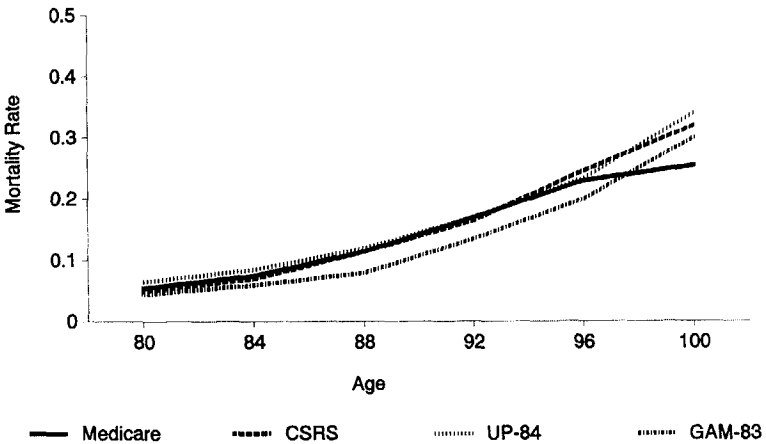

CHART 4
Female Mortality Rates Age 80-100
Actual 1985-89 to Expected

TABLE 5
Salaried and Hourly Experience -- Private Sector Groups with
Both Types of Experience GAM-83 Expected

	Males	Females
Pensioner		
Salaried	91.6%	108.3%
Hourly	108.1	116.4
Actives		
Salaried	60.5	71.4*
Hourly	85.1	75.4*

*Less than 1,000 deaths.

Now, let me give a little background on the new tables. The Society of Actuaries' 1994 GAM Committee is developing a basic table, which, if appropriate, is going to be used by the Retirement Plans Experience Committee as a basis for creating a new UP-1994 table.

FROM THE FLOOR: Do you know if the same thing is being done in the individual area? Usually they've done the group and the individual concurrently.

MS. OLIVER: I've not heard of anything in that area.

MR. WRIGHT: The 1994 GAM table as currently proposed is expected to depart from past practices. I understand the states can now act by regulation and not by statute, which may speed up the process of adopting a table. The interest component of the valuation is now self-adjusting, so-called, so that the only cause for problems with the reserve standard should be the changes in mortality. I also wonder if that self-adjusting feature will actually work out, but I have not heard of any concurrent review of interest rates. This table is done to fulfill the commitments made in the 1983 work to do a truly modern age/sex specific study. There is a great amount of data, so the committee members do not need to graduate the table with any of the mathematical formulas, and we are able to spare you a discussion of graduation. They will have a projection scale. Scale H is deemed a little bit heavy, that is, the expectation is that the future projections will not be quite as extreme as Scale H. In utilizing this for group annuity the committee members will probably propose that the table be used on a fully prospective basis or a generation basis. This will mean that insurance companies will have a more conservative margin for that period of a contract that is far into the future and a less conservative margin for the near future, for whatever age the contract has been sold at. The margins are generally to be constant by age because that will reflect the trend of the standard deviation of the data at each age. It will not grade up or down.

FROM THE FLOOR: I just had a question when you were talking about the projection of the 1994 GAM or UP table. I can't believe it would be a projection of, say, 1% improvement forever. Usually they only do it for 10 or 20 years or something like that.

MR. WRIGHT: I don't know how long the trends might last. All of these scales, D, A, B, and C are still only projections of current trends. I'm not aware that anyone has prescribed a limit on their use, though it might be prudent in some cases.

Aside from trends another way of constructing these projection scales is to look at the very ultimate level of rates that might occur. Some government people do that but then somebody has to decide what calendar year to attach to that perfect ultimate level of rates, and current rates must be extended by some kind of asymptotic approach to that ultimate level.

FROM THE FLOOR: When I was with the CSRS we took Social Security projections, and Social Security actually has projection factors that go on forever. It does its projections by predicting the improvement for each of 12 different diseases. We used that to project the cost of the CSRS. What was the effect, for instance, on the normal cost of the system? It was just an incredible increase in the cost of the system if you project your mortality all the way out indefinitely. The CSRS has benefits that increase with cost of living. Projecting mortality has dramatic effects on medical benefits and cost-of-living-increase pension benefits. We did a 100-year open-group valuation, too, which was very dramatic.

MR. WRIGHT: What salary scale did you use for the 100-year projection?

FROM THE FLOOR: That's why a private sector group said that we should not project mortality ad infinitum. We just stopped it after 10 or 20 years.

MR. WRIGHT: These scales are exponential. So, in theory they can keep going. They will never cause the rate to become negative, for instance. So, you are spared that particular problem.

FROM THE FLOOR: That gets into your limiting age, and one of the things that Ed Hustead is talking about is that there not be a fixed age as the limit of the life span, that you just have a set of mortality rates that you keep on multiplying.

MR. WRIGHT: There's some theory of the life span in opposition to the squaring of the table concept. It says that the mortality rate, after maybe age 90, then becomes one-third, say, every year thereafter and without any change or improvement.

MS. OLIVER: That was somewhat motivated by the use of the tables for medical plan valuations, where high premium increases mean that the mortality at these older ages becomes a lot more important.

FROM THE FLOOR: The Buck tables were mentioned. I was involved in the last one -- (the 1989 Table of Mortality from 1970-87). Buck has produced in-house tables since 1960. It was a study of a select group of corporate clients.

FROM THE FLOOR: I was surprised to find that though women's mortality improved during the 1970s and the 1980s, it was only at about two-thirds as much as the improvement for males, which is against what was usually happening. I see now the other studies that are coming out are finding the same thing. I

was surprised that CSRS showed no improvement during the 1980s. We had im-
provement for the females, but it was only about two-thirds of what the males'
were.

MS. OLIVER: I've run into that on public sector clients where the female rates
were not improving over the experience period.

FROM THE FLOOR: A book has come out, *RX2000*, by Dr. J. A. Fisher discussing
life expectancy. This was a medical researcher who checked with other research-
ers, and he is predicting that AIDS is going to end within ten years. They're going
to find a cure for that. Cancer is going to be about wiped out within 20 or 30
years. And he predicted by 2025 the life expectancy at birth would increase to 100
years.

FROM THE FLOOR: A few years ago I worked on a first mortgage program --
that's where a person signs off on the equity on their house, and the first mortgage
company agrees to pay them an annuity, basically, for the rest of their lives. This
fellow had gone to an insurance agent and a mathematician. The insurance agent
had given him a mortality table that turned out to be one of the commissioners
ordinary life insurance tables, and the mathematician took the table and did the
mathematics to work out the annuity values. The company became a little worried
about this, so it came to ask me to take a look at it, and, of course, I ended up with
a very substantially higher projected cost and less amount that the company could
pay the annuitant. The company was quite incensed that the idea of projecting
mortality and all this had to be built in. It was just doing a lot of damage to the
company's ideas of how much money it could make out of this program, and it sort
of illustrated to me that we do have a public relations job as well as an actuarial job.

MS. OLIVER: Moving on to the derivation of the UP-1994 tables, the UP-1994 will
not be a unisex table. It will be sex distinct, and so the U in UP is going to be
changed from unisex to uninsured.

FROM THE FLOOR: We recommended that they change it to NP for noninsured
pension because a lot of people are going to think that U stands for unisex still.

FROM THE FLOOR: UP is now in the public consciousness, and you're going to
mix up everybody.

MS. OLIVER: The basic table is going to be passed over to the SOA Retirement
Experience Committee from the 1994 GAM Committee when it's completed. The
midpoint of the members' data is 1988. So, they are going to do a projection to
1994. They're going to get started in May 1993. When they pass it over to our
committee, we will review the basic table to see if it's appropriate for use for
noninsured pensioner mortality, and then address the issue of a projection table. We
have in mind producing a series of tables or at least a prescribed series of adjustments
for different types of uses, for instance, beneficiary versus pensioner or blue collar
versus white collar, and safety versus general. We would like input on the types of
tables that you might want to see.

DEATH TAKES A HOLIDAY: THE SELECTION OF MORTALITY TABLES

FROM THE FLOOR: I came out with an hourly table as part of the last Buck study, and I'll just tell you, unfortunately, it's hardly ever used.

MS. OLIVER: So, you feel more comfortable adjusting a basic table based on your own experience studies?

FROM THE FLOOR: I think it would be worthwhile if we could gather the data to do a table for the construction trades or unions or something like that because I feel the shape of the curve is different. In many plans the only thing you ever see is a rating age of some kind. That's only useful if the shape of the curve that you end up with is useful, but we don't know that.

FROM THE FLOOR: The shape of the curve may be significantly different.

FROM THE FLOOR: The question is, if we take 1983 GAM and rate it up a year, do we end up with a curve that works throughout the life span, or is the shape of the curve such that it works okay at 65 or works okay in the average, but at 80 it isn't any good?

FROM THE FLOOR: To the degree that it's reasonable, the more refined the study is, the better. If you want to provide a pension plan for coal-mining retirees, you are interested in their average health situation at retirement versus your general experience, are you not? So it's good to get hourly versus professionals or whatever, if data are available.

MR. WRIGHT: I think the concept here is to have some overall adjustment factors, not to have anything too elaborate. I doubt if the shape of the curve would come out of what I've seen of this proposal. Maybe it would. Certainly if there are enough people interested and there's enough data.

MS. OLIVER: I think that there's a possibility that we could generate some separate tables in these areas.

FROM THE FLOOR: I'll suggest airline pilots and steel companies.

FROM THE FLOOR: Just to know that it's a higher level of mortality would not be much help since most groups are not homogeneous.

MS. OLIVER: The Retirement Plans Experience Committee has divided into two subcommittees. One subcommittee is currently engaged in looking into the feasibility of gathering material to derive retirement rates and termination rates that could be used generally.

MR. WRIGHT: The committee is asking again for input on your usage or interest in having a study of these other factors, termination rates, whatever.

FROM THE FLOOR: I think that is almost certain to be a waste of time. The variation in retirement rates and termination rates in all the various groups is so enormous that putting an average of some kind together I think doesn't do anybody any good. What use would we make of it?

MS. OLIVER: Some firms have several different tables of basic withdrawal rates, and so for smaller cases where there is not much experience, one of the tables can be picked based on the plan's experience. I think this is the concept being considered.

FROM THE FLOOR: Then I think the database ought to be collected for small plans. I think the retirement and termination data for large plans are very company specific. From my own background, if the plan is large enough, then you develop retirement rates and termination tables based on that plan's characteristics and experience, taking into account unique events that have occurred. If it's not large enough to do that, then using aggregates of large plan experience I think doesn't serve the small plan. I think you end up fooling yourself into thinking you have something that's got some support, rather than just using an arbitrary table, knowing it's arbitrary and just watching out.

FROM THE FLOOR: I think we need to update the Sarason tables, which are so old that they are useless.

MR. WRIGHT: Well, they never had any data basis or basis of experience, did they?

FROM THE FLOOR: When Robert Vaughn was putting together some of those new termination tables, he noticed that the shape of the curve is different than the Sarason tables, and so at least we have something new, where maybe the shape is appropriate.

FROM THE FLOOR: Termination rate tables will need to be specific probably by profession and size of the group.

MR. WRIGHT: What about incidence of disability? Would anyone be interested in that? Because that certainly affects your interpretation of the mortality statistics, it certainly is part of the numbers we're looking at.

FROM THE FLOOR: It would have to separate the good times and the bad times.

MR. WRIGHT: The different economic conditions all bear on your understanding of mortality rates that we are discussing at great length.