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1985–89 Intercompany Group Life Study

Track: Health
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Panelists: CHARLES C. DEWEESE
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Recorder: FRANCIS E. KEENAN

Summary: Panelists present the results of the 1985–89 Intercompany Group Life Study. A comparison of the 1985–89 study with other data is made.

Mr. Francis E. Keenan: We're going to start out with Charlie DeWeese. Charlie is a consulting actuary. He has many years' experience in the group life insurance area, and he has been a member of the Group Life Insurance Experience Committee. Charlie is going to go through some of the results of the current study. John is with Met Life and he also has many years' experience in the group life area. He's currently a member of the Group Life Insurance Experience Committee, and he is going to compare the results of the current group life study with some other benchmarks.

First, the study is finally completed. I know that many of you who use this information have been waiting a long time for this study, so I'm pleased to report that we have finally completed the study. We're doing what I would call finishing touches—editing the tables and the text. I expect that it will be available in the latter part of July. At that time we're planning to make it available through Actuaries Online.

I'd like to make another announcement. I'm currently chairperson of the Group Life Insurance Experience Committee, and I've been chairperson for a long time. I've stayed on to see that this study finally got completed, but I want to retire. I think I've been on the committee too long, and I want to get some new blood on the committee.

Mr. Charles C. DeWeese: I am an alumnus of the Mortality and Morbidity Liaison Committee, but have been off the committee for several years and can't take any personal credit for the latest version of the Group Life Insurance Experience Study. That leaves me in an objective position to congratulate Mr. Keenan and thank the committee for doing a wonderful job in pulling this study together. This study reports death, disability, and accidental death experience under group life policies, as many of you may know who have used the study in the past. It has been a very important study for me because there really isn't another good source of group mortality data. None of the companies has enough experience on its own to put together this kind of experience base.

I was first on the committee overseeing the group life study over 20 years ago, and at that time Equitable compiled the study. It had an actuarial staff who worked on it, and some of them were nearly full time, and provided all the resources. They collected contributions on punch cards from most of the major companies in the format requested. While that was a lot of work, it was rather straightforward, and the committee's role was really oversight and guidance. Since then, like many other experience studies, the individual companies could no longer support them in the way they used to. If the studies were going to survive, the Society was going to have to take a much more active role. In the case of the mortality study, the compilation was contracted out to the Medical Information Bureau (MIB). Because MIB doesn't have actuaries, the role of the committee became much more intensive in terms of evaluating and editing the data, suggesting areas where corrections needed to be made, and interacting with the contributing companies to deal with problems or questions about submissions.

Another thing that happened during the time I was on the committee was that many of the contributors revamped their systems in the late 1970s and early 1980s. When they were putting together specifications for those systems, they considered their own business needs. In many cases, their perception of their business needs didn't include collecting the kind of data that we used to put this study together. So we found that contributions were drying up. Around the time I rotated off the committee, about ten years ago, I recall that we had only one company that was able to contribute for experience in the early 1980s, and we were really in a state of despair as to whether we'd ever be able to have another group mortality study. We really owe a great deal of thanks to the committee for its work in convincing companies to adapt their systems to be able to make contributions, and to the companies that did contribute for making a special effort to put together the contributions they could. In many cases the contributions weren't in exactly the desired form, so there was an additional burden on the committee to try to salvage what it could from the various contributions, and pull something together that I think turns out to be a very meaningful document.

When the movie comes out of this study, I think it will be rated something like “AG-13”—young folks trying to read it will need the advice of an actuary. There are 128 pages of tables in here. One of the things that became very apparent to me as I was going through it is that the mix of business is a very important determinant of the mortality experience. As you get down to cells with relatively small exposure, you can get anomalous results, and sometimes even with fairly large exposure there are results that at first glance may not make much sense. It will take some thought and analysis on the part of people using this study to interpret it properly.

The committee looked very hard at many areas where individual results may not be sensible when you first look at them and decided not to try to make any adjustments, but rather to make the data as correct as possible and then to just publish all the results and let actuaries make the best use of them that they can. I think the results are very useful, but it’s important to be careful in interpreting them.

The exposure in this study comes from 18 companies that were able to contribute data for 1985–89. The data for 1980–84 were basically nil. The last study published was for the 1975–79 experience. The study used to be compiled every five years, but we’ve missed a five-year cycle, and it has taken the committee longer to pull this one together. The last study was published in the 1980 reports, and this long-awaited update is welcome.

Of the 18 companies that contributed, only 13 were able to provide data both by lives and amounts, and because this study includes experience by both lives and amounts, only those 13 were included in the final report. Of those 13, one of the tables shows relative results by company, although not identified by name, and there is really quite a range of variation in the actual-to-expected ratios from the highest to the lowest. Any division of the experience shows that kind of variation, so you have to understand some of the business mix relationships to interpret the results.

Only two of the companies that ended up in that final group of 13 were in the 1975–79 experience, too. So, it may be somewhat difficult to draw comparisons from one study to the next just because of changes in the exposure base.

Table 1 compares the exposure from the 1975 to the 1979 study where there were 24 million lives to the 17 million lives of exposure segregated by age and sex. There were actually 19 million total lives in the 1985–89 exposure, but the data with mixed and other disability classifications were not included in the age and sex tables. For the most recent experience, there was a slightly higher percentage of females than there were in the 1975–79 study, and a slightly lower percentage of sex unknown data at 8%. This is the first time that the exposure and claims

experience includes amounts of insurance, and there is \$600 billion in face amount exposed in the study in total. There were about 100,000 claims for about \$2 billion of claims. The average certificate amount was something over \$30,000, and the average claim was something around \$20,000. There were about 3,400 disability claims and about 4,800 accidental death claims in the experience.

TABLE 1
EXPOSURE DATA FOR GROUP LIFE EXPERIENCE STUDY

	1975–79 Study		1985–89 Study			
	Lives	Percent	Lives	Percent	Amounts (000,000)	Percent
Exposure						
Male	13,900,000	57%	10,000,000	58%	\$323,000	60%
Female	7,300,000	30%	5,900,000	34%	\$137,000	26%
Sex Unknown	3,100,000	13%	1,500,000	8%	\$76,000	14%
Total	24,300,000	100%	17,400,000	100%	\$536,000	100%

As I mentioned before, the 1980–84 experience was just about nil. The 1985–86 experience was also fairly scanty. Out of the experience that's in here, something close to 90% of the exposure was from 1987 to 1989, because the committee was more successful over time in getting companies to pull together the resources to be able to contribute.

There are 128 pages of tables analyzing the experience. One of the ways that the data are segmented is by type of disability, including eight different types of disability provisions that were compiled into four groups for analysis. One of the groups was no disability and extended death benefit. Another was waiver-of-premium plans. A third was plans that have premium payment continued. And the fourth was mixed and other, including lump-sum and installment total permanent disability plans. Waiver plans are included in the overall mortality experience at 75% of face amount, which is the same way they've been included in past studies.

Premium payment continued was a new category for this study. When the 1975–79 experience was compiled, that wasn't a category at all. This time it represents 20% of the exposure by lives and 33% by amounts. So it's really quite a difference. It seems to be mostly associated with the larger groups.

Another experience segmentation is by type of group, including single-employer groups, union groups, negotiated Taft-Hartley groups, professional associations, multiple employer trust, and mass-marketed business.

The single employer is the dominant kind of group. There are also tables by standard industrial classification code. I think that the industry tables in past studies have been some of the most interesting tables. It's really the only source that actuaries have had for trying to decide whether industry loads or discounts were appropriate. There is a table by size of group, and all the data are also shown by age and sex.

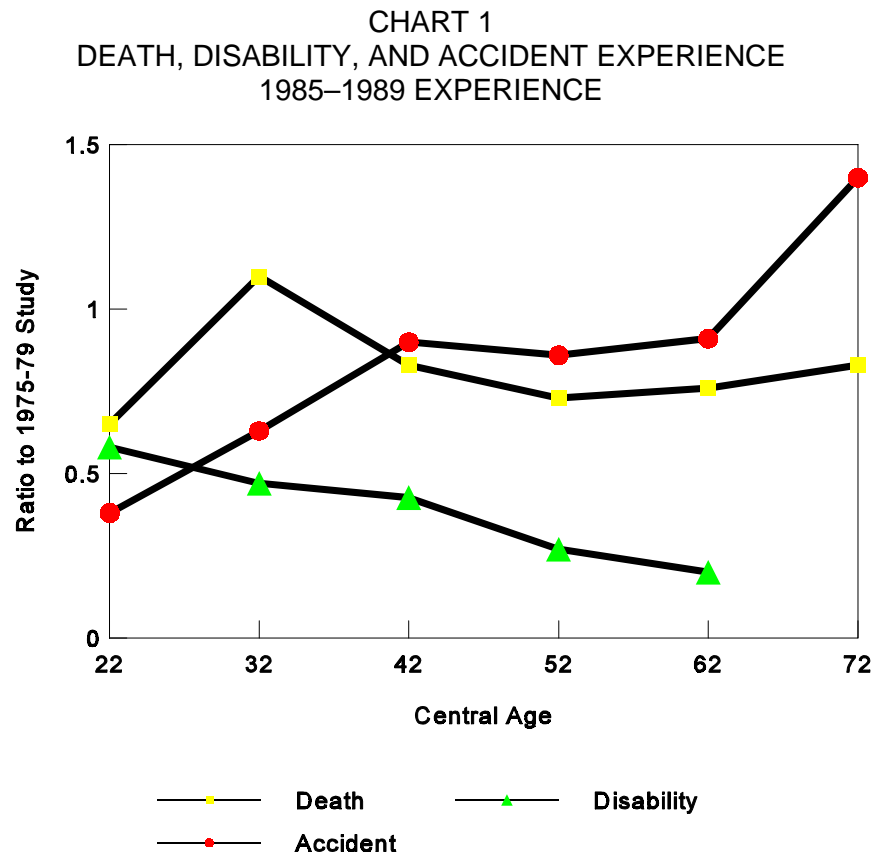
Every table in the study is shown both on a lives basis and an amounts basis. Finally, there are all permutations of these things so that you can see, for example, single-employer groups that have waiver of premium as compared to premium payment continued, and you can see union groups that have premium payment continued compared to no disability.

The changes that are in this study are the addition of the new disability categories, particularly premium payment continued, adding amounts as a way of presenting results and a way of having exposure, and the calculation of the actual-to-expected results. In the past, the experience was reported using claim rates compared to the 1960 Commissioner Standard Group table. That table has gotten old, and it is quite far out of shape compared to what might be going on. The committee felt that many companies are using the 1975–79 experience now for their pricing and that it might be most useful to have that as a standard for comparison. The expected results for this study are, therefore, based on the 1975–79 experience, and all the ratios make it very easy to see what the improvement has been in the interim.

Among the things that I thought were interesting in the study, the first is the issue of overall improvement in mortality. I think most actuaries I've talked to over the years have been aware that mortality has been improving as time goes on, but we haven't had an objective standard of that with regard to group mortality. I think the conventional wisdom has generally been that the improvement has been somewhere in the range of 1–2% a year, and the results of this study bear that out. The actual-to-expected ratio, and again this is a ratio to the study data from ten years ago, is 89% for death, 41% for disability, and 80% for accidental death—85% in total when you add the death and disability.

The committee was not able to reach a conclusion about why the disability experience is so much lower. I can think of some possible reasons, including that employers may be reporting disabilities less to their insurers or insurers may be doing more claims investigation and be slower to approve disabilities. I can't

imagine that the actual morbidity has improved that much, but Chart 1 shows the death experience as the squares. I just picked some ages rather than show them all. The interesting thing was that from ages 27 to 37 there really wasn't any improvement at all—ratios were around 100%. At ages 77 and up, which are not shown in this chart, there was no improvement, but in the middle range, ages 42–52, there is a consistently very high level of mortality improvement, and when weighted out, the average for all ages is about 89% in aggregate.



In the accidental death experience, there's enormous improvement at the younger ages, and that's where most of the accidents occur in the experience so that's why there was an 80% ratio overall. It shows the accidental death rates going way up at the upper ages, but this is one of those cases where you need the advice of the actuary to remind you that most companies don't extend accidental death benefits past retirement. I looked at the claims experience for the over-65 group, and I think the number of claims was only 1% of the total claims. So I suggest that this particular experience may not be statistically credible. To me the interesting thing was the great improvement at ages under 40, which is where you'd expect there to be many accidents.

The next thing that I think is interesting is the relationship of lives and amounts (Chart 2), where the experience for death only was 89% in aggregate by number of lives. By amounts it was 71%. The actual-to-expected ratio is about 20% better by amounts than it is by lives, and it's fairly consistent by age that the experience by amount is always better. There seems to be a bigger difference at the relatively earlier ages, but generally about 20% lower mortality ratio, with both the by amount and by lives experience compared to the 1975–79 lives experience. This is true for males and females as well, although the difference is a little bit less for females. The female experience by amount is about 10–15% better than the experience by lives, whereas for the males it's a little over 20%. This is the death-only experience. For both the disability and the accidental death experience, the data do not show much difference in lives versus amounts.

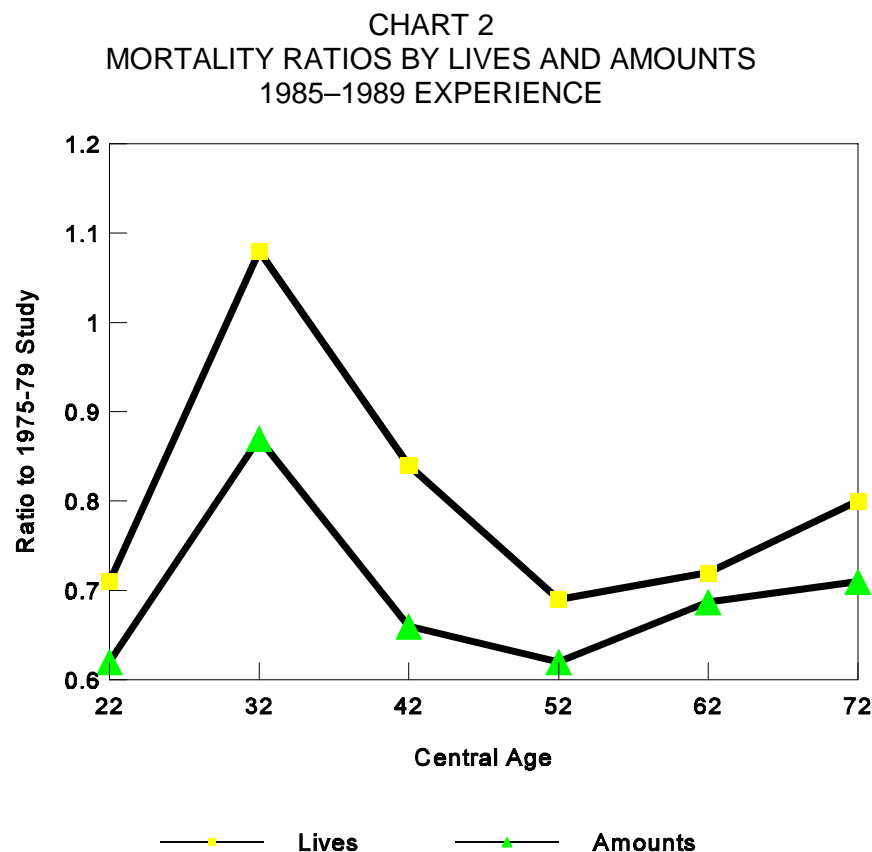


Chart 3 shows the extent of variation by type of group and by type of disability provision. If you look at the single employer groups that have waiver, you'll see the actual-to-expected ratio is 68% for death and 59% overall. So it's very favorable.

The most unfavorable groups have been the union groups that have premium payment continued, and they were at something like 100% for deaths. Really there's quite a wide range, and it's hard to say, well, is it high because it's a union

group? Is it high because they have premium payment continued? Is it high because it's a large group? We can track these different variables and know that all of these seem to contribute to higher experience, but then they're all the same group—or many are from the same group. So it's a little bit hard to draw conclusions, and this is where it pays to spend some time trying to understand the interrelationship of the various business mix factors.

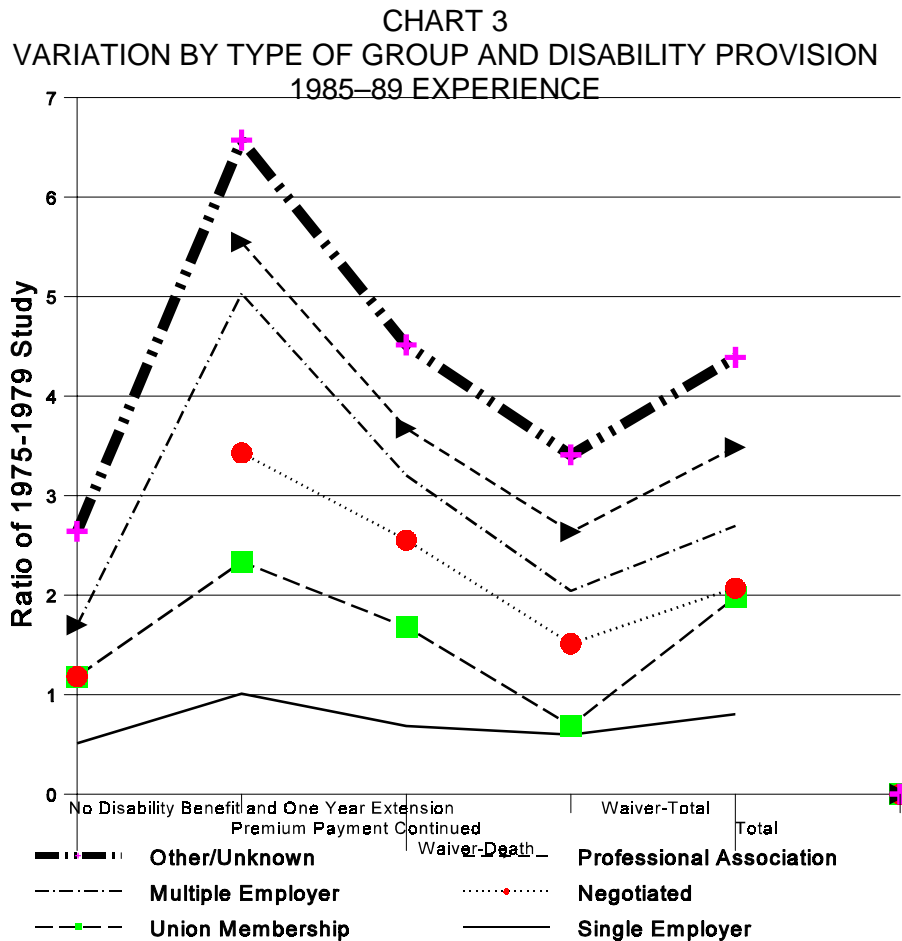


Chart 4 shows the mortality ratios by age and sex, and here again I just picked out some of the ages. In general what I concluded from this is that the male improvement in mortality was quite a bit more than the female improvement in mortality, and in aggregate, the male actual-to-expected ratio was 72%, and female was 85%. It's quite true at most ages. I don't think we have a good explanation for this, but, as you see, females at age 32 actually got worse as compared to the prior study, and that was true for ages 27-37. In aggregate, males and females together, at ages 27-37, did not show any improvement. The females got worse in that age range, and particularly females at age 32 had higher mortality experience than females age

37–42. It's an anomaly in the data. It is certainly something the committee tried to check to see if there were errors, but it wasn't able to find any errors.

If you notice, the males being at 72% overall mortality, including the disability, and the females at 85%, you might wonder, how does this weight out to 85% in total? The answer lies in the sex unknown experience. For some reason sex unknown experience at every age is over 100%. The sex unknown group represented 8% of the exposure, and 30% of the claims. I can see the headlines when this gets out: "Latest health hazard: not knowing your sex." I imagine that the people who were in this exposure really do know their sex, but the contributors weren't able to capture this for us. Again, there's a great deal of overlap with other factors. A large percentage of the sex unknown group was under premium payment continued disability kind of plans where we'd expect higher-than-average mortality because when somebody becomes disabled, they just stay in the population until they eventually die, but it is hard to explain with any precision why the sex unknown experience is so much worse.

CHART 4
MORTALITY RATIOS BY SEX.
1985–89 EXPERIENCE

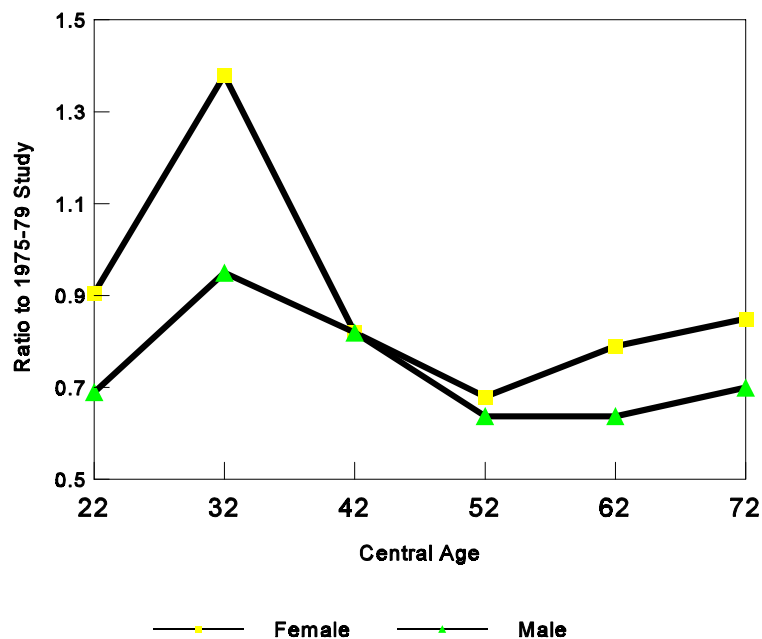


Chart 5 shows the ratio of female to male mortality. At most ages it's in the range of 40–45% or 50%, and if you were looking at it in terms of an age setback, you could probably justify something like 5–7 years. For some reason, at age 32, it's 90% or around 90%, and I don't know what's happening to these females, age 32, but they're taking quite a beating.

Chart 6 shows experience for the different disability provisions. What is meaningful is that the plans that have no disability benefit at all seem to have relatively more favorable mortality, and the plans that have premium payment continued tend to have the least favorable mortality. It was also interesting to see the disability experience under plans with waiver, which has almost disappeared. We think the exposures are right, we think the claims are right, but the experience is only 25% of what it was ten years ago. It's an interesting phenomenon, but so far unexplained.

CHART 5
RELATIVE MORTALITY BY SEX
1985-89 EXPERIENCE

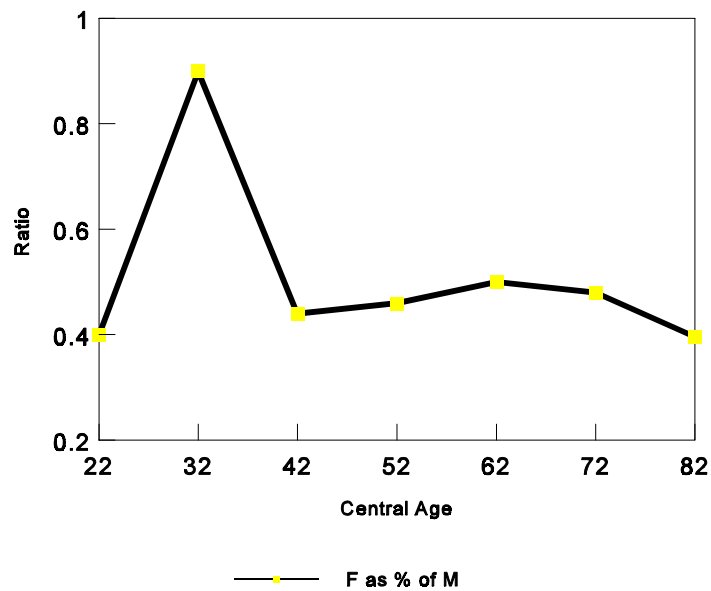


CHART 6
EXPERIENCE BY DISABILITY PROVISION
1985-89 EXPERIENCE

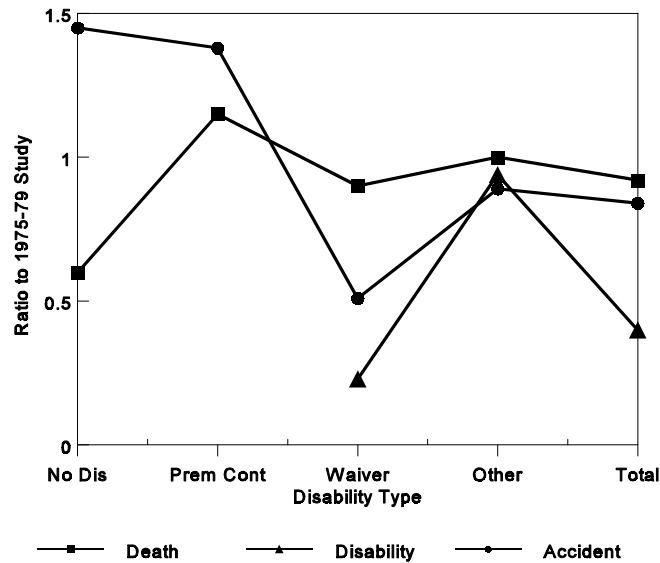
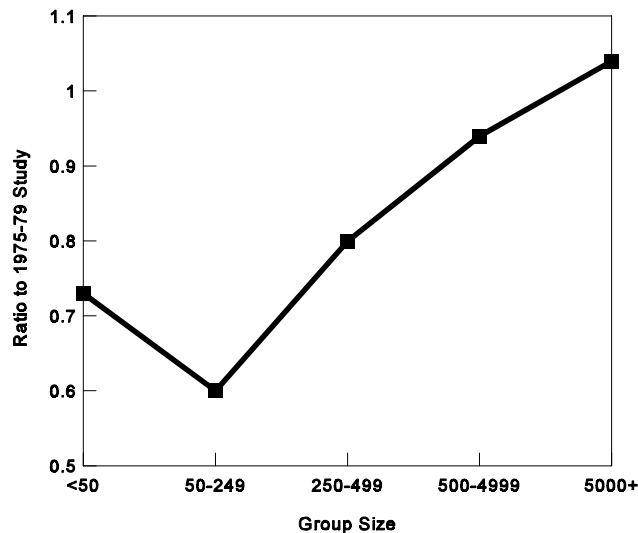


Chart 7 represents the experience by size of group, and this is consistent with the last study. These are ratios compared to aggregate 1975-79 experience. So it's not size-by-size, but the groups in the size range of 50-250 lives have the most favorable experience, and as the groups get bigger, it gets worse and worse. Some of the ideas I had about why that might happen might be that larger groups might have not quite as good exposure reporting or might have more relaxed eligibility requirements. This has been a feature of past studies as well.

CHART 7
MORTALITY RATIOS BY SIZE OF GROUP
1985-89 EXPERIENCE



The last thing I wanted to talk about is the experience by industry. I just picked out some of the industries that seemed to have a great deal of exposure and had results that ranged fairly widely. I was always interested in looking at accidental death and life experience to see what kind of different experience there was from industry to industry. A number of companies have used these studies to make industry loads or discounts or have different underwriting requirements for different industries. I found that for industries that had 100,000 or more exposed, the lowest ratios I found were for legal services and health services. Legal services was at 51%, and health services was at 61%. So they're really quite a bit better than the average, but again, it's hard to know what other contributing factors, in terms of mix of business, may have created this.

On the other side of things, transportation was 112%; oil and gas exploration are at 120%; and miscellaneous services are 154%. So I guess I'd say that somehow that meets with what my expectations might have been: that some of the things you think of as more white collar, cleaner things, like legal and health services would be lower, and oil and gas exploration might be higher, but there are a great deal of data there, and I think when you do get your hands on this, you'll have a good time digging through it. It will be very useful for setting the level and shape of your group life pricing. Once again, I'd like to thank the committee for doing a great job in pulling it together.

Mr. Keenan: Now I'll ask John Jordano to compare the results with some independent studies.

Mr. John T. Jordano: I would second Charlie's praise for Frank pulling this study together. It shows a great deal of dedication on Frank's part, which was certainly necessary. I owe Frank credit for helping to steer me to the tables that I'll be comparing to the SOA tables. I think you'll find that they're going to prove to be very interesting and useful comparisons to the SOA's new study. Charlie has made very interesting observations regarding the SOA data. We'll also see some of the data Charlie pointed out as anomalous information that will appear as we compare the SOA data to these other studies.

During my presentation I'll be comparing the SOA table to three other sources: (1) the U.S. population statistics, representing the period 1990; (2) federal employees mortality including the mortality of their retirees, and their disabled annuitants; and (3) the 1989 CIA group life mortality study. The comparisons that I'll be making will be made separately for males and females. For the U.S. population, the comparison will be made to the combination of the premium waiver and the premium pay plans. They appear separately in the study, but for these comparisons I've combined the two tables.

Because the federal employees' data were available by retirees and also separately available by people who are retiring by disability, we're able to compare their tables to not only the extended death benefit table, which includes no disability in the SOA study, but also to the premium waiver and premium pay plan in the SOA table. The CIA data included people who were disabled within one year of disability. I've compared that mortality study to the SOA combination table of extended death benefit plans and no disability plans. Mortality rates for the Canadian table were determined by both lives and amounts of insurance, as was the SOA study. For both studies the experience by amount of insurance is more favorable than it was by lives.

The federal employee data were made available to me by an actuary at the Office of Program Management named Mike Virga. He has done a very thorough study of the federal employee pension plans, and as part of that, he also tracks the active population. So I was able to combine his data that were available separately for the retirees and retirees on disability with the active population. Let me point out that in the federal employee program, people who are employed less than 18 months are not eligible for a disability retirement. I believe their experience is included in the active population. The data that we'll be using for the federal employees are not going to be crude rates of mortality, but they have been smoothed by Mike Virga. This might explain why some of the Society data that haven't been graduated shows some anomaly points.

We created three sets of mortality tables with the data for the federal employees. Set A is for actives and retirees who are not disabled. The second, set B, is for active employees, retirees not from a disability, and for retirees who are in their first year of disability. The Set C is inclusive of all retirees regardless of how many years retired, on disability, or retired but not disabled. The first set would be most comparable to a table which doesn't include disabilities, and the second set, B, would be most comparable to the extended death benefit table. But because the Society table combines those two sets into one, I'll be able to show, with the federal employee data, how a table that includes people disabled one year, compares to a table that does not. I would say Set C is most comparable to either the premium waiver or the premium pay plans.

Chart 8 compares Sets A, B, and C data from the federal employee plan. In this chart, I'm not yet comparing to the SOA data. The first line mortality graphs represent ages less than 65, and the second line mortality graph represents people older than 65. The bar charts show ratios of the mortality tables. Each one is being shown with the Set A as the denominator. The dark bars represent the ratio of Set B over Set A, and the light bars represent the ratio of Set C over Set A. What we see on the line graphs is a fairly consistent slope among all three disability types, but if

we look at the bar charts, we can more clearly discern the differences. By looking at the dark bars, we see that, in general, the differences are less than 10%. They start at about 4% at the youngest ages and then rise up to an 8% differential; then they start declining again. When you get above 65, the data do not include anyone disabled less than one year. So the dark bars are equal to one because all we're seeing there is people who are retired but not because of disability, which is just equal to the Set A. You might ask what is causing the dark bars to rise and fall?

Table 2 is looking at the mortality rates for people who are disabled one year. What we see surprises me. Mortality rates for the males in their first year of disability are not increasing with advancing age. They're starting at around 12 deaths per thousand, and then they decline to about eight deaths per thousand. This is the opposite of what I expect and is not driving the pattern of the dark bars in Chart 8. The driving force is that the number of people disabled less than one year is steadily increasing until age 50. After age 50 people are retiring early and less so because of disability. The number of people who take a retirement by disability starts declining. Therefore, their impact is less after age 50. For females, we see a similar pattern in lives exposure, it rises and then falls, but for the females, the mortality rate by age continues to increase rather than decline.

CHART 8
FEDERAL EMPLOYEE DATA COMPARISON FOR MALES (Death Rates/1000)
 A=Actives and Retirees Nondisabled
 B=Actives and Retirees Nondisabled and 1 Year Disabled
 C=Actives and All Retirees

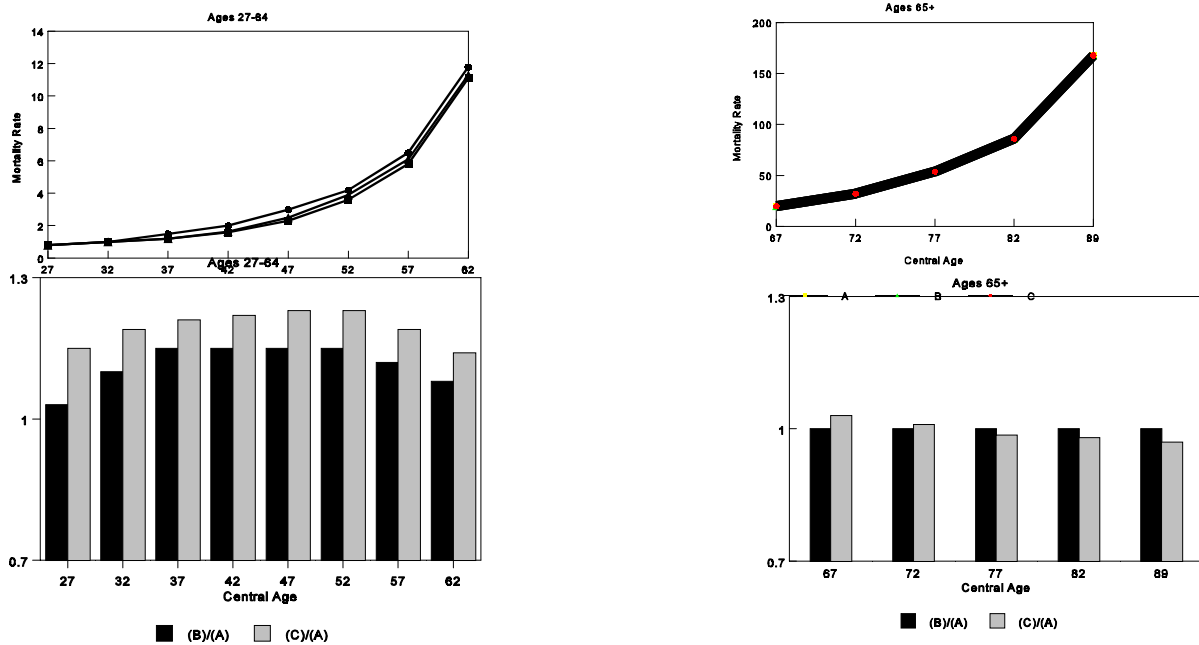


TABLE 2
RETIREES DISABLED 1 YEAR

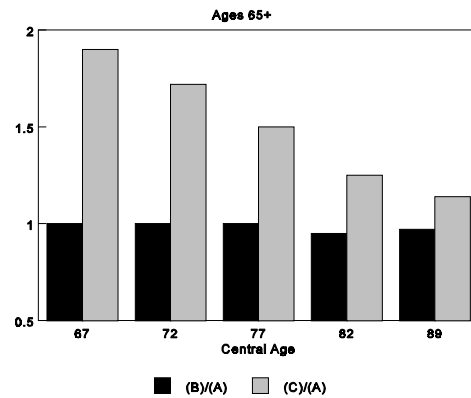
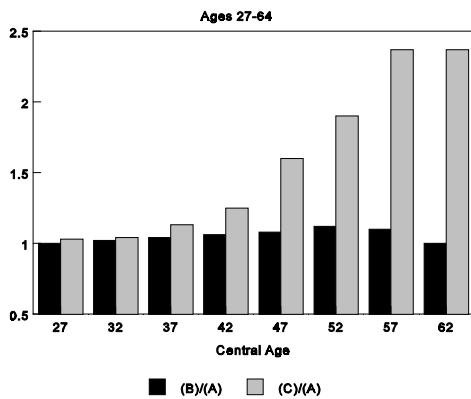
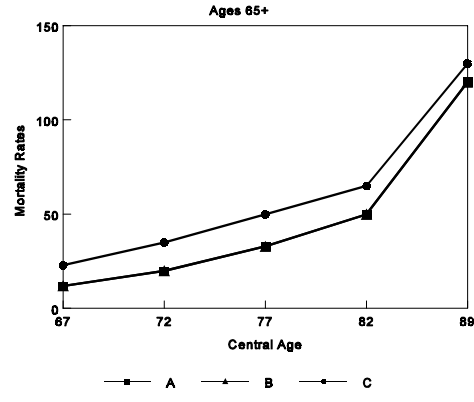
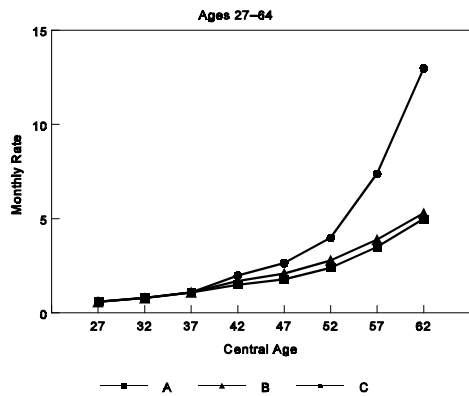
Age	Males		Females	
	Lives	Rate	Lives	Rate
27	5	0.119	4	0.057
32	19	0.115	12	0.050
37	51	0.101	27	0.059
42	98	0.088	46	0.072
47	109	0.086	52	0.082
52	150	0.089	70	0.086
57	156	0.090	85	0.083
62	84	0.082	46	0.074

Looking back to Chart 8, let's focus on the light bars for a moment. The light bars measure the ratio of the mortality that includes all the disability types to the mortality that doesn't include any disabilities. The ratio starts at about 108% at age 27, and it peaks at age 47 at around 119%. Then it declines to just around 100% at ages above 65. The surprising aspect of this decline is that the antiselection because of people retiring by disability has worn off at this point. We're almost getting to the point where people who retire on disability and those who have retired normally are about matching each other.

As we look next at the females in Chart 9, we'll see quite a different pattern for Set C mortality illustrated by the triangle lines. Set C represents mortality for people who are active and all retirees whether or not disabled. Unlike the males, Set C has a much steeper slope as we start advancing in age.

By looking at the light bars, we see that for ages 57 and 62 the mortality for Set B is more than double the mortality for Set A. The differential for Set C and the other two mortality tables narrows after age 65. There's a twofold cause for this. First, the disabled population represents a smaller proportion of all the retirees with advancing age. By age 89 they are only about 10% of the total retiree population, which is down from 40% at age 62. Second, the mortality difference is narrowing between people who retired on disability and the people who did not retire on disability. At age 62, mortality for the disabled retirees is about four times that of normal early retirees; by age 82 it is two times, and at age 89, it is only 50% higher.

CHART 9
 FEDERAL EMPLOYEE DATA COMPARISON FOR FEMALES
 (Death Rates/1000)
 A=Actives and Retirees Nondisabled
 B=Actives and Retirees Nondisabled and 1 Year Disabled
 C=Actives and All Retires



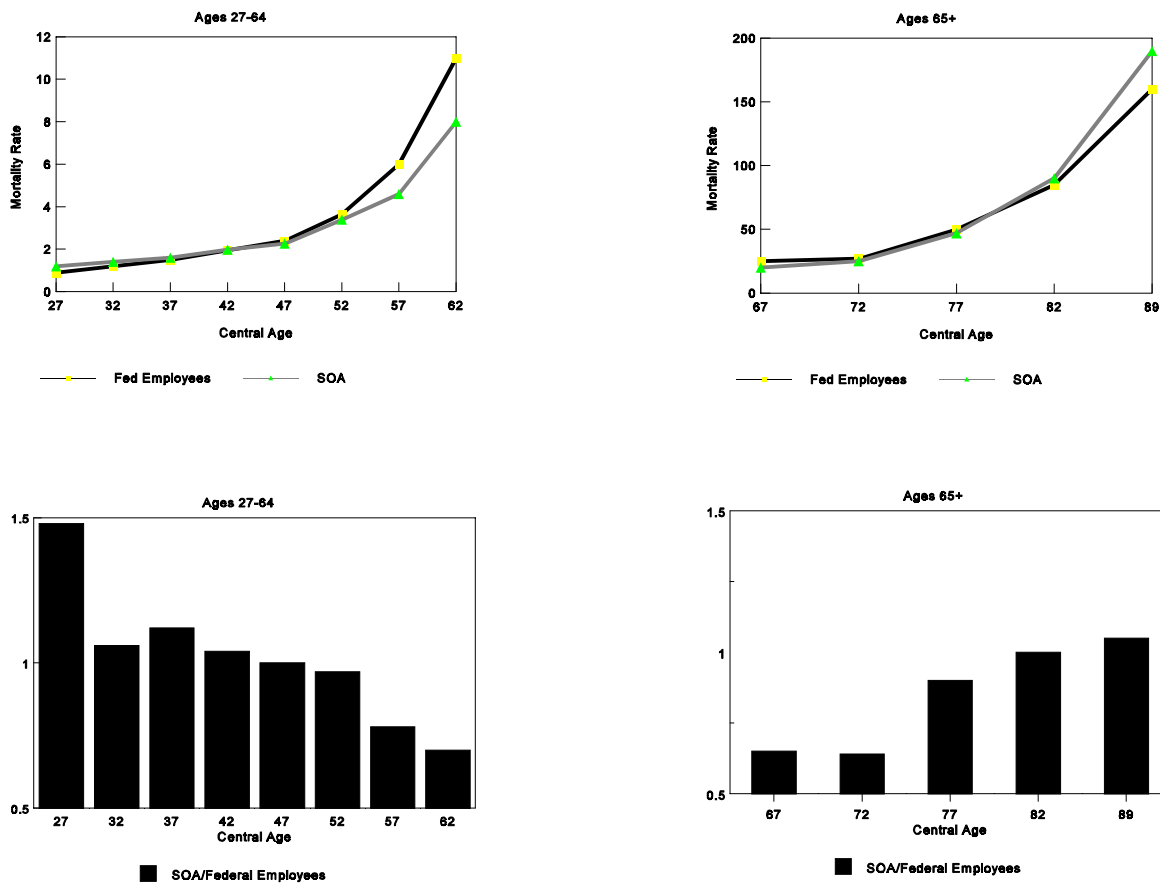
C=Actives and All Retires

There are a couple of noteworthy comparisons to be made to the male population. While the gap at advancing ages narrows for the females retiring on disability compared to the normal retirees, it doesn't close. You may recall that males became very close at the advancing ages, but they haven't done so here. One of the reasons is that the amount of people who are retired by disability in the female population is a greater percentage than it was for males. I cited for females about 40% of the population at age 62 were retired by disability compared to all retirees. For males, the differential was only about 10% of the total. So fewer people in the male population are retiring by disability.

Now let's see how the federal employee data compare to the SOA tables. The first one I'll look at will be the comparison to the SOA extended death benefit table. In

Chart 10, I compare the SOA table to the federal employee Set B mortality, which included people who were disabled within one year of disability. As in the prior charts, the line charts show the mortality rates and the bar graphs show the ratio of the SOA rates to the federal employee rates. The SOA male rates start out much higher than the federal employee rates. At age 27 they are 46% above. From ages 32 to 42, the SOA rates remain above the federal employee rates at a more moderate difference. From ages 42 to 72 the SOA rates increase less sharply. They drop below the federal employee rates at age 47 and fall as far as 34% below at age 72.

CHART 10
 MALE FEDERAL EMPLOYEE
 (ACTIVES + RETIRED NONDISABLED + 1 YEAR DISABLED)
 VERSUS SOA EDB —SOA RATES BASED ON LIVES
 (DEATH RATES/1000)

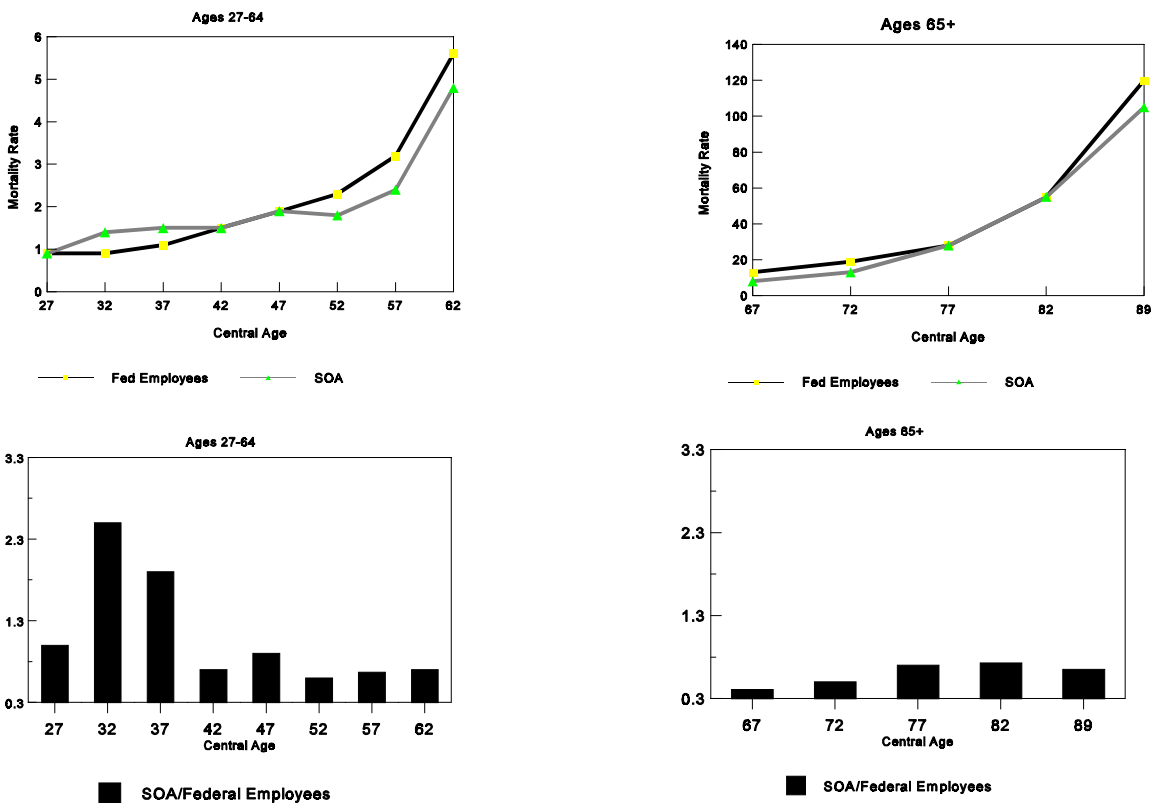


How much of this differential in the middle ages can be attributed to the fact that the SOA data include plans with a no disability provision? Recalling the comparisons among the federal employee tables, there was only a 10% differential between mortality with and without people in their first year of disability. We're seeing here a much greater spread between the federal employee rates and the SOA rates at the middle ages.

So what else can be causing this spread? One of the areas to consider is that the SOA data include mass-marketed groups. The mass-marketed groups have much better mortality. If you pull out the mass-marketed groups, the overall mortality rates for the extended death benefit group will go up 22%. These data are not available by age, but if they were, I predict we would see the mass-marketed groups pull on the EDB rates increasing with age. I am assuming these mass-marketed plans are subject to underwriting, and, therefore, their mortality experience reflects favorable selection. If enrollment in mass-marketed plans is skewed toward younger people, the pattern seen after age 75 can also be explained. This time favorable underwriting selection would wear off at the older ages, causing the EDB/nodisability rates to come into line with the federal employee data. Please remember, however, I don't know for certain whether the mass-marketed groups have underwriting.

If we look at the females in Chart 11, we see similar results. A notable exception is for ages 32–37 where the SOA rates bulge upward and are approximately two times higher than the federal employee rates. We'll see similar results when we compare the SOA rates to the CIA study.

CHART 11
 FEMALE FEDERAL EMPLOYEE (ACTIVES + RETIRED
 NONDISABLED +1 YEAR DISABLED) VERSUS SOA EDB—SOA RATES
 BASED ON AMOUNT OF INSURANCE (Female Death Rates/1000)

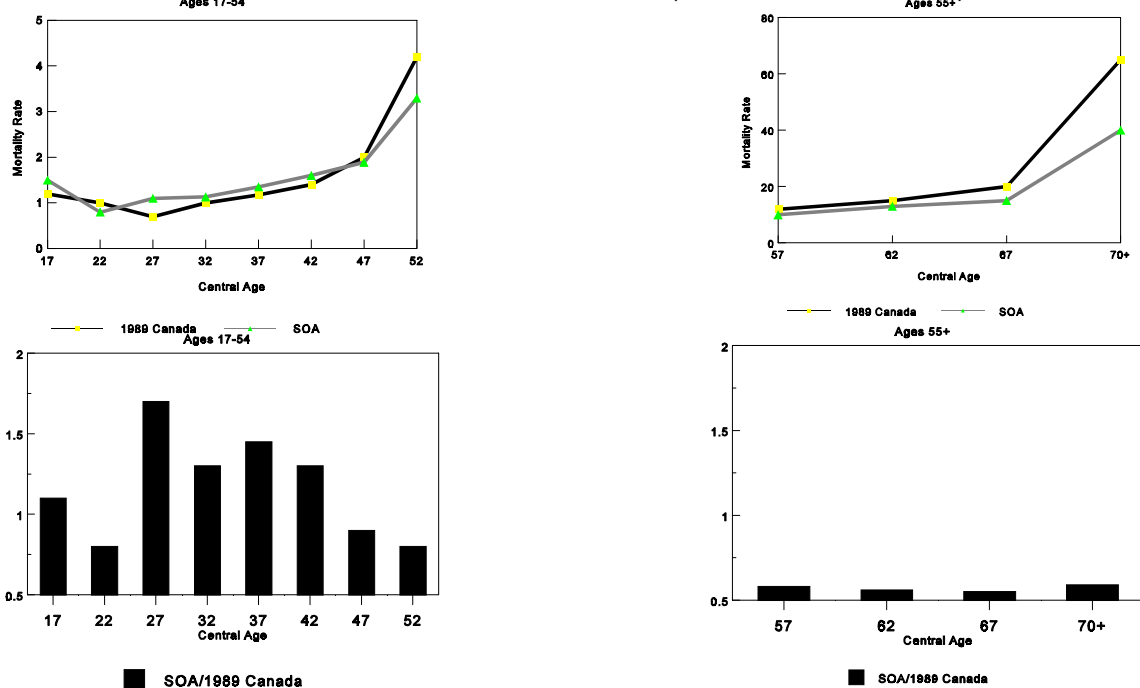


I'd like to turn to the Canadian study before continuing with the federal employee data, so that I may continue comparisons to the SOA extended death benefit and no disability tables. The report for the CIA is based on the submission of eight companies. The most recent final report was for 1989. The study is based on both lives and amount of insurance. It includes deaths for those disabled within one year of becoming disabled. There is a preliminary report available for the years 1990 and 1991, but those tables do not yet include the mortality for people who are disabled, nor do they include late-reported deaths. They're really not comparable yet to the SOA study.

The Canadian data experience is broken out by broad industry class, group size, province, age, and gender. For my comparisons I have consolidated the experience by industry, group, size, and province, and I'll only be showing it separately for age, gender, and also for lives exposures and amounts exposures. The Canadian data are grouped in five-year age bands, except that the under-20 age group is one band, and the over-age-70 group is one band.

As seen in Chart 12, the Canadian rates are declining in the early 20s. They decline, and reach a low point at age 27. This is the farthest point they drop below the SOA rates. Thereafter, as we saw with the federal employee comparison, the SOA rates do not rise as steeply as the Canadian mortality rates. We may again be seeing the impact of the mass-marketed groups pulling downward on the Society rates. The Canadian rates do not have a mass-marketed group classification.

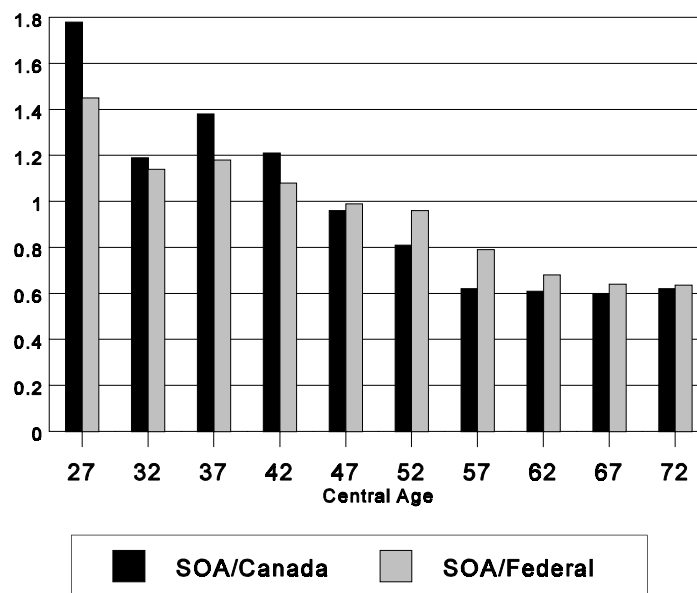
CHART 12
COMPARISON OF 1989 CANADIAN MORTALITY TO THE SOA (EDB/NONE)
DATABASSED ON LIVES FOR MALES (DEATH RATES/1000)



The Society rates drop below the Canadian rates for the first time at age 47 where they are 7% lower. Similarly, when they were being compared to the federal employee rates, they were 4%. From ages 57 to over 70 the SOA rates are running about 35–40% below the Canadian rates. There is a remarkable similarity between the comparison of the Society rates to the Canadian rates and the Society rates to the federal employee rates.

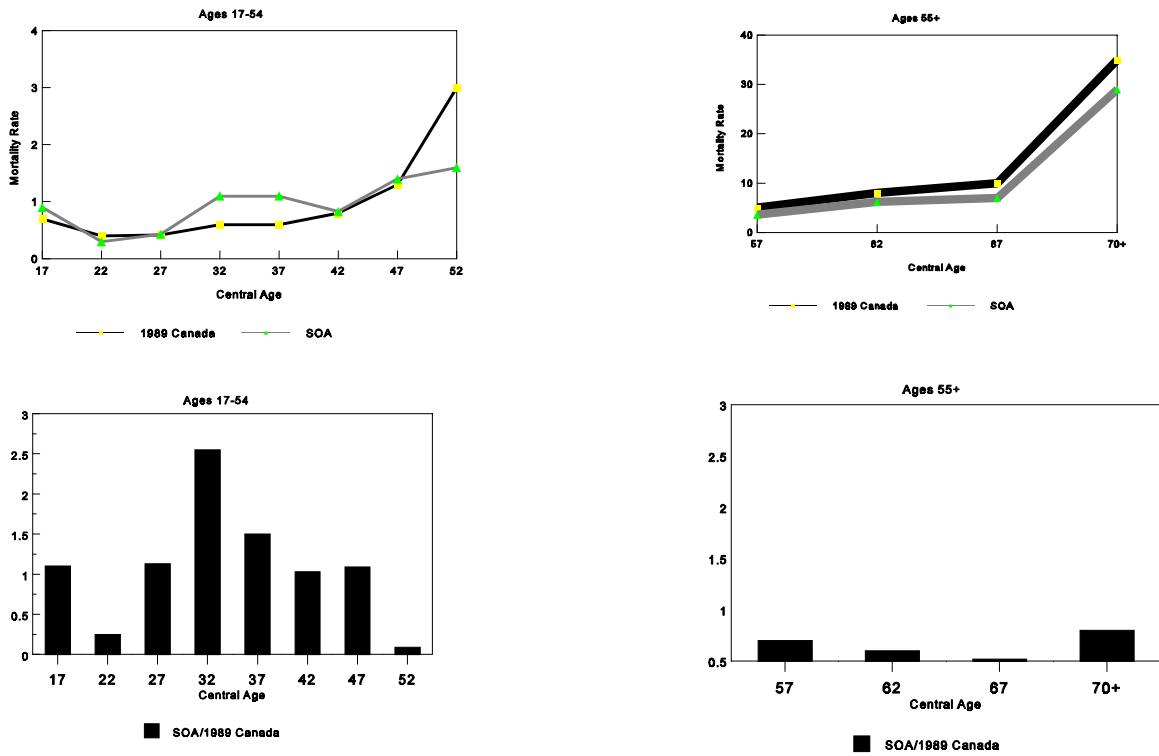
Chart 13 will highlight this comparison by overlaying the bar chart of Chart 10 with the bar chart on Chart 12. As they say, a picture is worth a thousand words, and I think Chart 13 speaks for itself. These two bar charts track each other remarkably well. The dark bars are the ratios of the SOA to Canada, and the light bars are the SOA to the federal employee ratios.

CHART 13
EDB MORTALITY RATIO COMPARISON—MALES



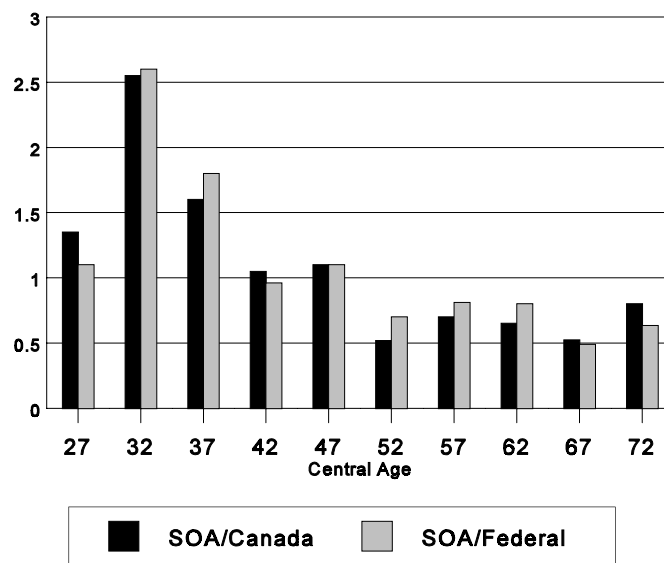
Looking at the comparisons of female mortality in Chart 14, we see both the SOA and the Canadian tables show declining mortality into the early 20s. The pattern thereafter is comparable to what we saw in the comparison to the federal employee rate. The bulge in the SOA data in the 30s shows up here again. Thereafter, the slope of the SOA data is gentler than that of the Canadian data and doesn't show any increase between ages 47–52. This creates gaps at the advanced ages even wider than for the males, with the SOA data as low as 50–55% of the Canadian data for ages 52–67. You might be wondering how does this bar chart compare to the federal employees bar chart? Well, let's see.

CHART 14
 COMPARISON OF 1989 CANADIAN MORTALITY
 TO THE SOA (EDB/NONE) DATA
 BASED ON LIVES FOR FEMALES (DEATH RATES/1000)



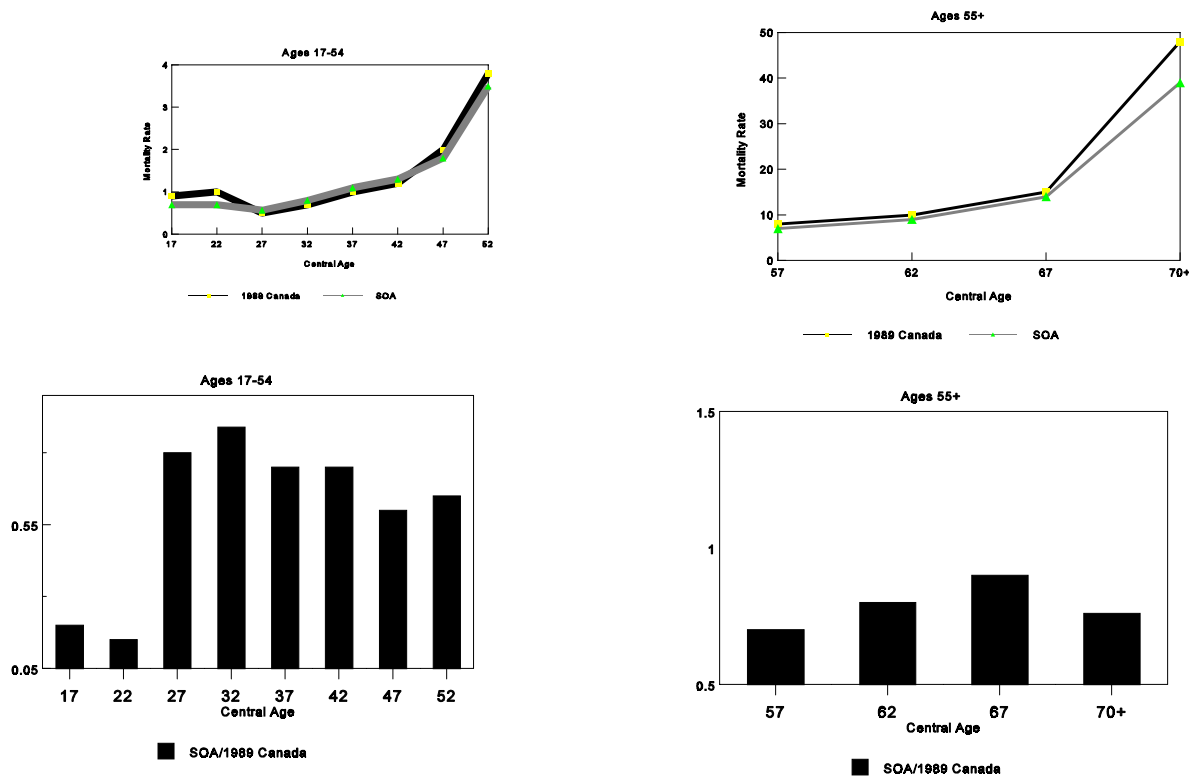
Here again on Chart 15, we see a remarkable similarity between the SOA and Canadian rate as for the SOA and the federal employee rates.

CHART 15
 EDB MORTALITY RATIO COMPARISON FOR FEMALES



Next let's turn to the comparison of the Canadian rates to the Society rates based on amount of insurance. Chart 16 is a comparison for males. Just as with the SOA data, the mortality by amount is better than it is by lives. We still see the SOA rates are lower than the Canadian rates in the middle ages. Overall, I would say the fit of these two tables is much closer than the table comparison based on lives. The exception would be ages under 25.

CHART 16
COMPARISON OF 1989 CANADIAN MORTALITY TO THE SOA (EDB/NONE)
DATA BASED ON AMOUNT OF INSURANCE FOR MALES (DEATH RATES/1000)

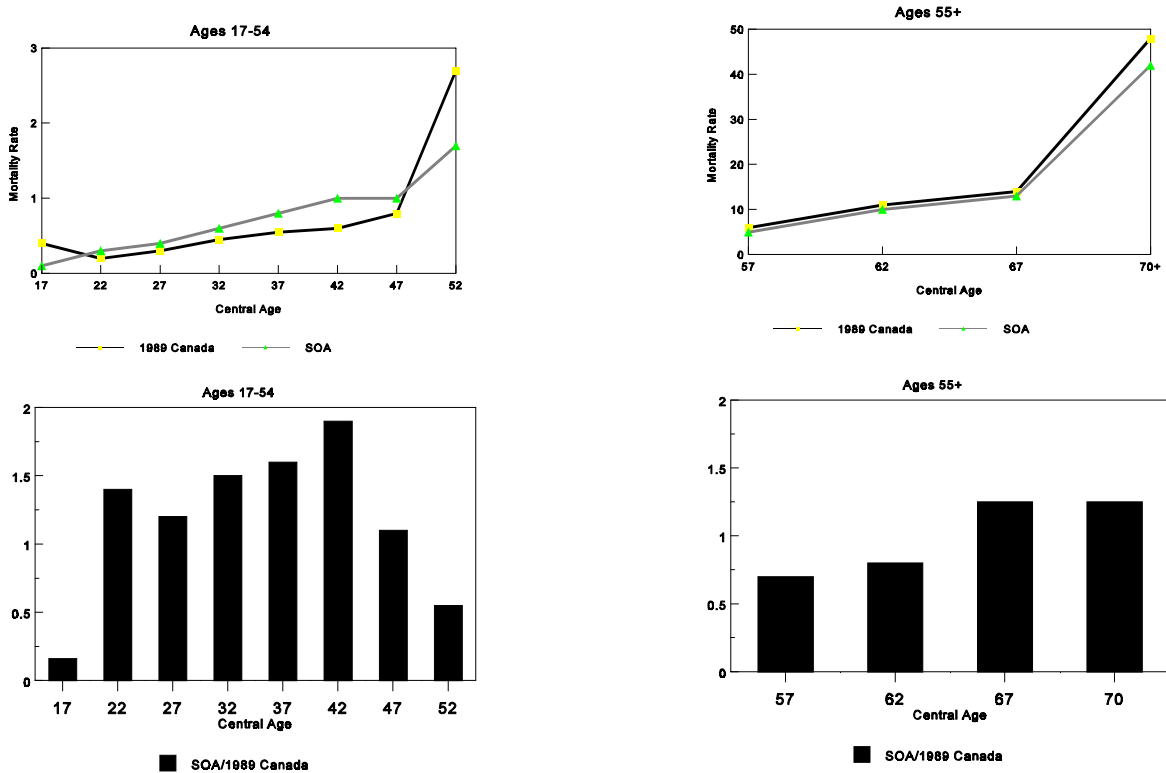


In Chart 17, the fit by amount for females doesn't get much better than it was by lives. Certain ages are closer, while others are farther apart. However, for ages above 40 we again see the same general pattern as in other EDB comparisons. The slope of the SOA table is not as steep for ages 40–65, but thereafter it rises more steeply.

Let's turn back to the federal employee comparisons. Now we'll start looking at how those rates compare to the premium waiver and the premium pay plans. Chart 18 compares the mortality for the federal employees, actives, and all retirees to a composite I created, adding the SOA premium pay and premium waiver plans. The comparison of the federal employee rates to the SOA EDB rates show how these rates start out above the federal employee rates at age 27. From ages 32 to 52 the

rates are almost identical. At age 57 the SOA rates are 33% above the federal employee rates. At ages 62 to 67 the SOA rates are less than 10% below the federal employee rates. From ages 72 onward the SOA composite rises with a steeper slope, surpassing the federal employee rates at age 72.

CHART 17
 COMPARISON OF 1989 CANADIAN MORTALITY
 TO THE SOA (EDB/NONE) DATA
 BASED ON AMOUNT OF INSURANCE FOR FEMALES (DEATH RATES/1000)



By combining the premium waiver and the premium pay plan, I actually received a better fit, as shown in Chart 18, than if I would have put the two tables separately against the federal employee rates.

CHART 18
 FEDERAL EMPLOYEE (ACTIVES + ALL RETIRED)
 VERSUS SOA DATA (PPC + PREMIUM WAIVER) SOA RATES
 BASED ON LIVES FOR MALES (DEATH RATES/1000)

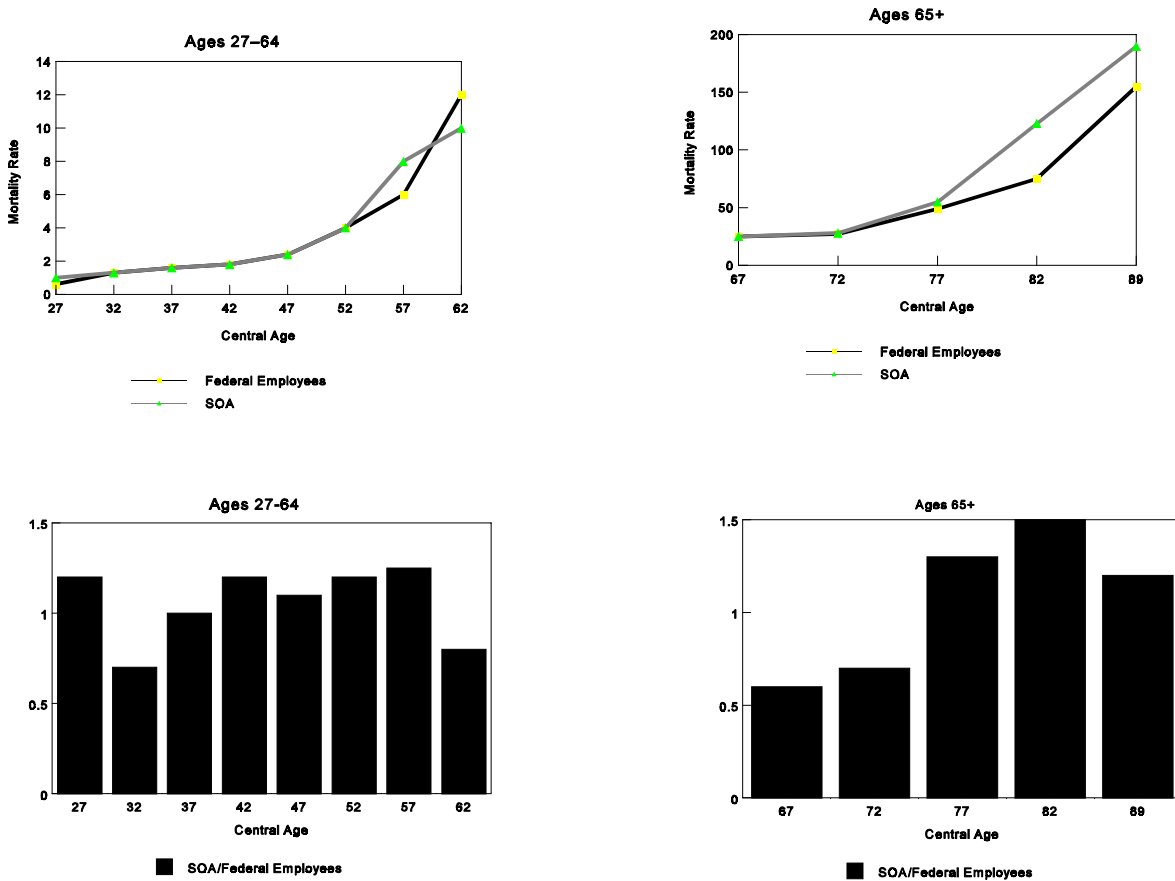
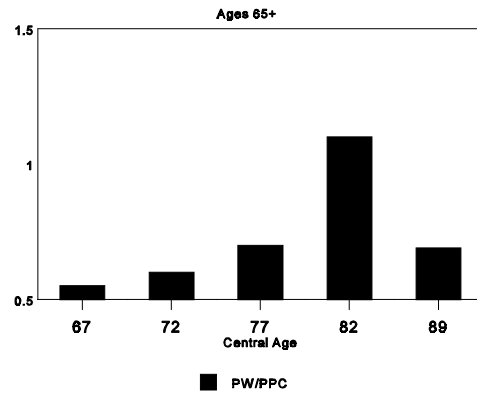
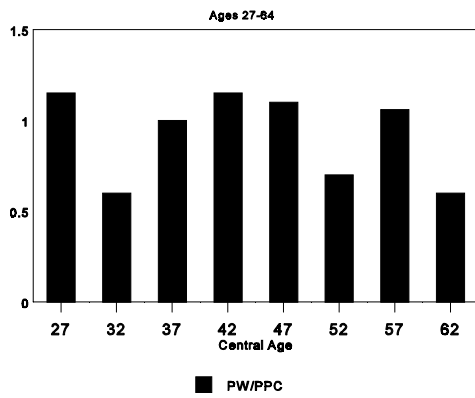
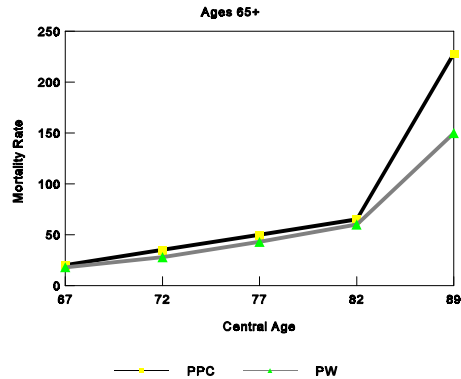
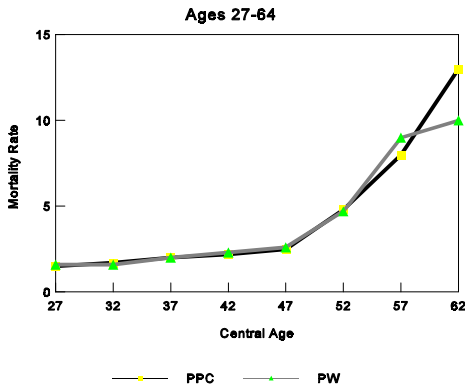


Chart 19 shows the two tables from the SOA that I combined, the premium pay and the premium waiver. For the males there is not a bad fit under age 62. At ages 62 and above, the premium waiver rates are less than the premium pay, with the exception at age 82. I, in part, attribute the age 60–65 limiting ages for premium waiver as the cause for this depression of the premium waiver rates relative to the premium pay rates.

CHART 19
 SOA DATA PPC VERSUS SOA DATA PREMIUM WAIVER
 BASED ON LIVES FOR MALES (DEATH RATES/1000)



Looking at the female death rates in Chart 20, we see that the fit here is not as good as it was for the males. And if I were to just put the premium pay against the federal employee rate, the fit would have been better for the premium pay than trying to combine the two rates together.

CHART 20
 FED EMPLOYEE (ACTIVES + ALL RETIRED) VERSUS SOA DATA
 (PPC + PRM WAIVER SOA RATES)
 BASED ON LIVES FOR FEMALES (DEATH RATES/1000)

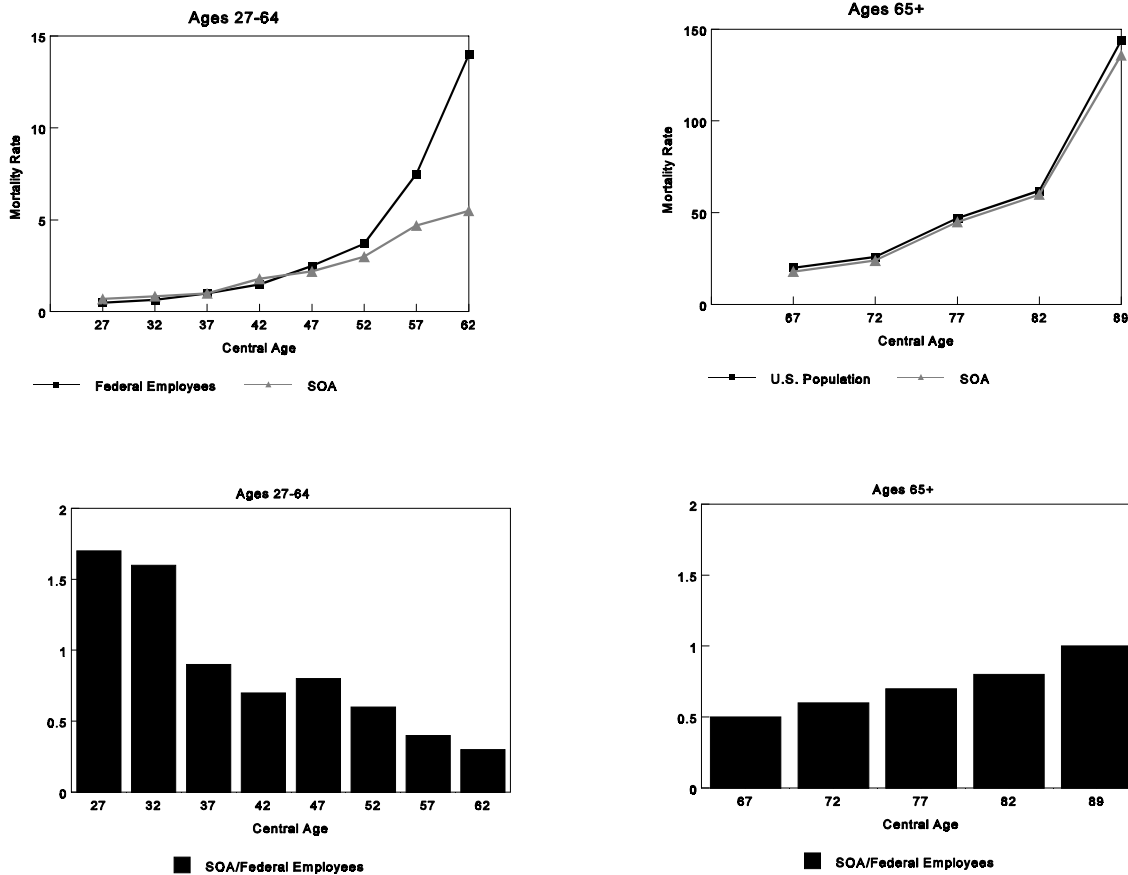
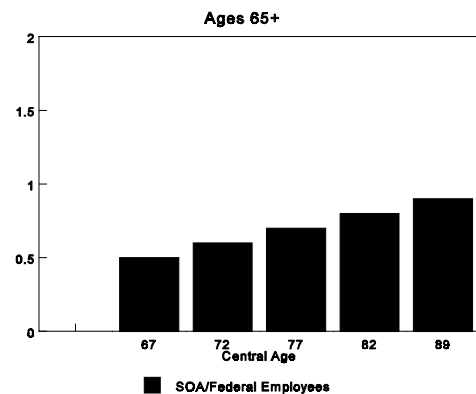
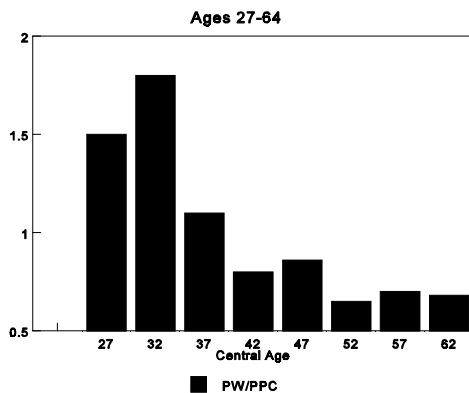
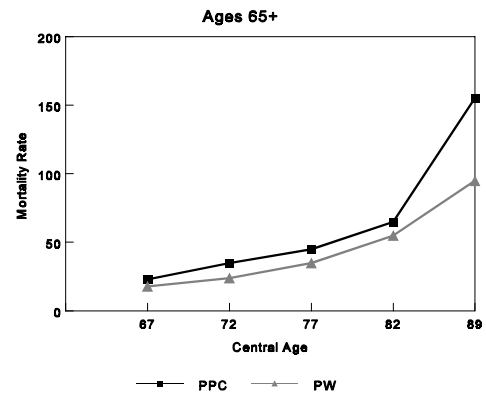
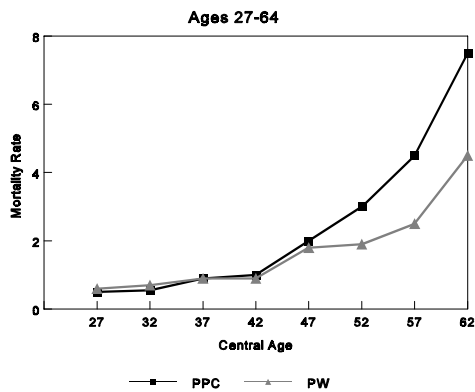


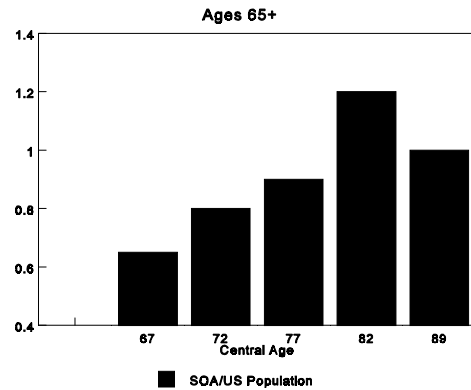
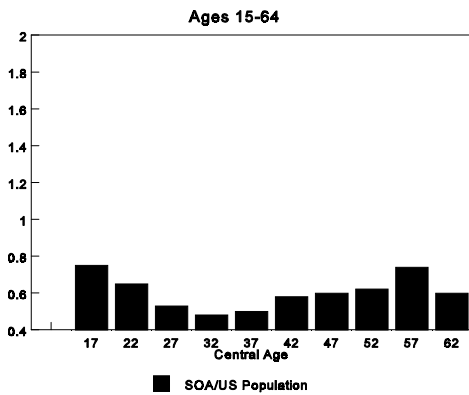
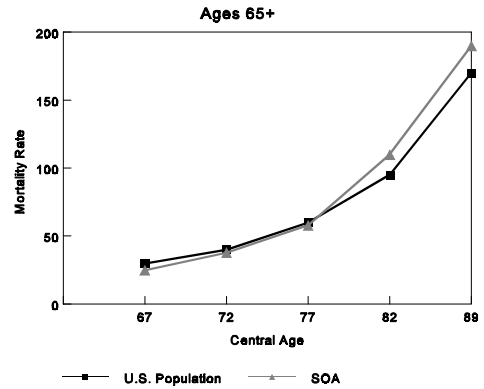
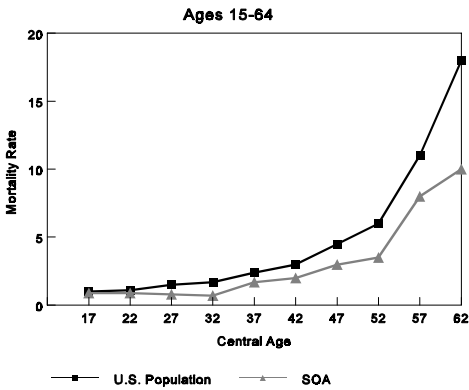
Chart 21 is a comparison of how the premium pay and the premium waiver rates compare to one another. As you can see, there is a big spread as we start getting above age 50.

CHART 21
 SOA DATA PPC VERSUS SOA DATA PREMIUM WAIVER
 BASED ON LIVES FOR FEMALES (DEATH RATES/1000)



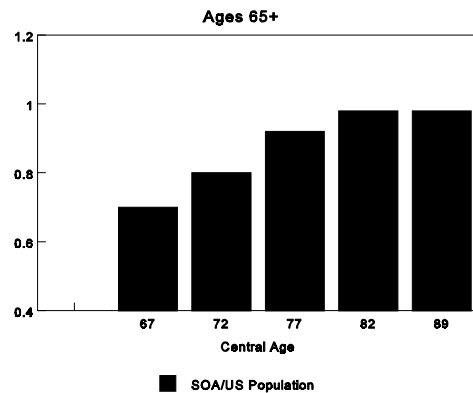
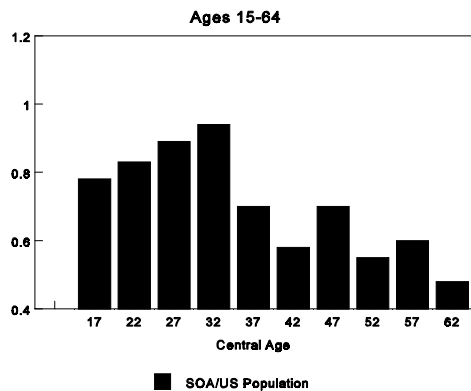
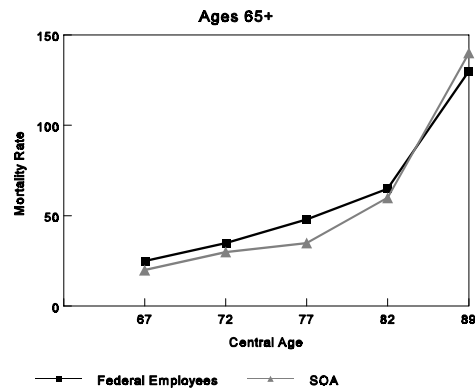
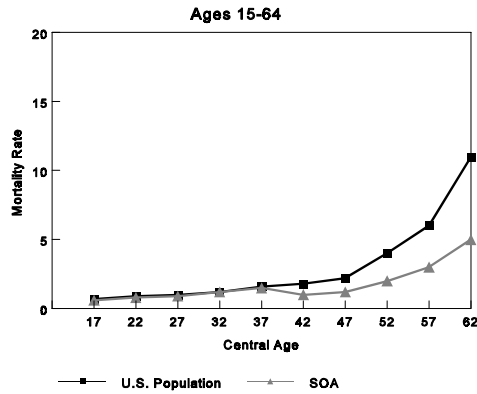
Next, let's look at comparisons to the U.S. population, starting with Chart 22. The U.S. population comparisons are also being made to the premium waiver and premium pay plans of the SOA. Let's not judge the absolute differences because we're dealing with a different demographic group; rather, I will focus on the overall slope comparisons. The mortality rates start out closer at age 20, and then the gap widens until age 32. Above age 35 the slope stays about the same through age 62, except for the blip of the SOA rates at age 57. Above age 65 the slope of the SOA rates is much steeper. I expected them to get closer above age 65 because in the SOA data we're no longer looking at a group of people who are actively employed. I did not expect them to exceed the U.S. population rates as they do in this chart.

CHART 22
 1990 U.S. POPULATION VERSUS SOA DATA (PPC PLUS PREMIUM WAIVER)
 SOA RATES BASED ON NUMBER OF LIVES
 FOR MALES (DEATH RATES/1000)



As seen in Chart 23, the mortality comparison for females starts out much closer at ages below 35. The spread increases up through age 62. Thereafter, the difference becomes closer, until the U.S. population data match the SOA data.

CHART 23
 1990 U.S. POPULATION VERSUS SOA DATA (PPC PLUS PREMIUM WAIVER)
 SOA RATES BASED ON NUMBER OF LIVES
 FOR FEMALES (DEATH RATES/1000)



To summarize, let me indicate some of the noteworthy things that I found looking at the data. First, the SOA extended death benefit tables appear to understate the middle ages. Second, the SOA female extended death benefit rates seem relatively high at ages 30-40. Third, the Canadian and the federal employees extended death benefit-type rates are a good fit for each other. Fourth, the Canadian rates show lower mortality by amount of insurance than by lives, and this is consistent with the findings in the SOA data. Fifth, for males, the Canadian and the SOA extended death benefit comparison by amount is a very good fit. Sixth, the SOA rates in general have a steeper slope after age 65 than the other tables. Seventh, from federal employee data we see a greater impact by adding disabled lives for females than for males. Eighth, combined male SOA premium waiver and premium pay are a better fit to the federal employees than either one separately, and for females we

would have gotten a closer fit by just comparing the premium pay. Overall, these comparisons lend themselves to a good evaluation of the SOA data. To echo what Charlie said, the data that are available in the SOA study are very detailed, and it's going to be an exciting time for actuaries to dig in and begin interpreting the data for themselves. I hope these comparisons to other tables helps in your analysis of the SOA table.

Mr. Keenan: Well, just to sum up, I think that both our presenters here did a wonderful job outlining the study and then comparing it against some other standards. I hope that it helps you do your own analysis. As we said earlier, there are some strange things showing up in the data. We, the committee, made every effort to go back to the contributing companies to check the reliability of the data, to check the accuracy.

As a final check of the data, we compiled the information that we got from each contributing company in the format that we were going to use in the study. We sent it back to the person who we determined was the chief group actuary for each one of the contributing companies and said, "This is your data. We see some strange things here. What do you think? Please help us make corrections if they're needed." We did get some corrections. In the end we still saw some things that we were concerned about. But we decided that the best approach was to publish what we had and let you, the folks who are going to use it, make your own decision as to what it means, how to interpret it, and how to build it into your own rating methodologies. Charlie's comments and observations on how the data look in general, and John's observations relative to some other data should help you in making your own evaluation.