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Session 29 PD
Mortality and Expense Experience Studies

Track:	Product Development
Moderator:	Mary Ann Broesch
Panelists:	Sharon S. Brody
	Sam Gutterman
	Chris Ian Noyes

Summary: Are you looking for the most up-to-date SOA mortality and expense experience results? As products become ever more competitive, it is important to have as much information as possible for benchmarking and other purposes. Up-to-date experience studies may be helpful, especially if you understand how to apply them to your business needs. After a brief overview of how these recent studies were developed, key observations, interpretations and emerging trends are presented for the 1995- 2000 individual life mortality experience and 2002 individual life and annuity expense studies. The session concludes with points about what to consider when using the results.

MS. MARY ANN BROESCH: We will be going over three topics. Sharon Brody is a fellow of the SOA and works at Prudential Financial. She has been there for the past 15 years. In her current role, she's working in an area devoted to developing and monitoring experience assumptions for individual life insurance. Her primary focus has been on mortality and lapse-related assumptions and other special actuarial studies. Sharon is also a member of the SOA Individual Life Experience Committee and chaired the development of the recently released 1995 to 2000 mortality report. This report will be the focus of her presentation. She's also a member of the Mortality Studies Working Group, and this group recently published a report that's intended to set longer-term strategic directions for inter-company mortality studies.

Our second speaker, for many of you, needs no introduction. Sam Gutterman was

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Note: The chart(s) referred to in the text can be found at the end of the manuscript.

introduced at the General Session and is one of the past presidents of the SOA. Currently Sam is a director and consulting actuary at PricewaterhouseCoopers in Chicago and the co-chair of the SOA's Committee on Life Insurance Company Expenses. He has also submitted a book manuscript on life insurance expenses to the SOA and is formerly the chair of the Committee on Experience.

Our third panelist, Chris Noyes, will be covering some considerations to use when you have an experience study. Chris has been with ING Re for almost seven years. He started in product development as a pricing actuary and eventually managed the areas of corporate-owned life insurance (COLI) and business-owned life insurance (BOLI), critical illness and life product development. Last December, Chris moved over to the sales side and now handles account management functions as the regional vice president for the company's northeast region. He has spent a great deal of time developing pricing assumptions and building life products through a variety of clients.

MS. SHARON S. BRODY: I'm here representing the Individual Life Experience Committee. I'm going to speak about the report we just released. It came out on the Web about two weeks ago, so it's hot off the press. The report is about 25 pages long. It's divided into several sections, and I would encourage you to read it if you want to get more information beyond what I'm telling you.

It's divided into several sections, including an introduction, an overview of the results and data concerning the individual years within the study between 1995 and 2000. We have a section that looks at the five-year aggregate data and makes some comparison with previous time periods. There's a separate section that goes into some additional details, such as smoker and nonsmoker experience, and it ends with a section on ultimate experience. I'll wrap up the presentation by talking about some next steps for our committee.

Within the study, 12 companies contributed data during this time period. Only eight companies contributed data to each of the years within the time period. This level is consistent with the study we released about a year ago that looked at 1995 and 1996, but it is down considerably from some of the previous reports that this committee had published. The SOA has made a big effort over the past year or so to encourage more companies to contribute their data. If you haven't been contributing your data and are interested, I'd be happy to speak with you afterward. Everybody would be most interested in receiving additional data. We're hopeful that our next report, which should be coming out by the end of this year and will look at 2000 and 2001, will have approximately 20 companies. We feel there's already been a major step for improvement from what we have in this report.

I tell you about the number of companies to give you a backdrop. When we look at these results, we have to keep in mind that they're based on a relatively small percentage of companies and small percentage of exposure compared to the

industry in total, and therefore we have to review the results with a level of caution. Some of the overall levels and some of the trends we see can be influenced by the mix of companies we had in the study.

We looked at expected claims over this five-year period and used both the '75 to '80 basic table and the 2001 valuation basic table (VBT) as the expected basis. I'm going to focus my talk primarily around the 2001 VBT. We tried to do this throughout the report, as well. One thing I want to emphasize is that we're trying to get everyone more focused on this table as the most recent current industry table. As I go through this, you'll see some reasons why we feel the '75 to '80 table has become out-of-date.

We define select period experience to be durations of 25 or later with ultimate experience being durations 26 and later. This is consistent with the structure of the 2001 VBT. The VBT has smoker-distinct tables. This is a major enhancement from the '75 to '80 tables, which looked at everything on a composite basis. This is one of the main reasons why if you're still looking at the '75 to '80 tables, you can get some distortions or differences in your results when you have different mixes (smokers and nonsmokers) in the different categories that you're looking at.

This table shows what our high-level overall results are for the select period.

1995-00 Select Period Experience					
A/E Ratios by Face Amounts Based on 2001 VBT					
Combined Males, Females, Nonsmoker, Smoker and Unknown Smoker					
1995-96	1996-97	1997-98	1998-99	1999-00	1995-00
90.4%	92.2%	87.4%	84.3%	83.5%	87.2%
A/E Ratios by Face Amounts Based on 1975-80 Basic Tables					
Combined Males, Females, Nonsmoker, Smoker and Unknown Smoker					
1995-96	1996-97	1997-98	1998-99	1999-00	1995-00
66.5%	66.7%	62.7%	60.6%	59.3%	62.6%

When you take a look at those results, what do you say to yourself? What we first noticed was that the overall level surprised us. When we looked at the VBT, we had 1995 to 1996 at 90.4 percent, and this trended down to about 83.5 percent in the last year of the study. The 2001 VBT was a table that was projected to 2001. I guess we were expecting to see results closer to 100 percent. We also noticed that there seems to be a trend of improvement or significant decreases in the ratios.

I'm going to talk about a couple of other items later and try to illustrate that the male improvement was greater than female improvement during this time period and that the improvement was concentrated more in younger issue ages. Finally, we didn't see evidence that smoker mortality was improving. The lower ratios overall were driven by improvement in the nonsmoker ratios.

During the period, we looked at the study on a face amount basis. We didn't look at

policy counts. One thing we noticed was there was a significant shift in our exposure base from the beginning of the study period to the end of the study period toward higher face amount policies. We feel this also influences the level of the results somewhat.

This table gives an overview of ultimate period experience.

1995-00 Ultimate Period Experience						
A/E Ratios by Face Amount Based on 2001 VBT						
Combined Nonsmoker, Smoker and Unknown Smoker						
	1995-96	1996-97	1997-98	1998-99	1999-00	1995-00
Male	112.9%	103.8%	100.4%	99.6%	96.5%	102.2%
Female	120.9%	106.2%	114.1%	111.8%	112.3%	112.8%
1995-00 Ultimate Period Experience						
A/E Ratios by Face Amount Based on 1975-80 Basic Tables						
Combined Nonsmoker, Smoker and Unknown Smoker						
	1995-96	1996-97	1997-98	1998-99	1999-00	1995-00
Male	83.4%	77.9%	75.5%	75.1%	72.8%	76.7%
Female	94.8%	84.7%	90.6%	88.9%	89.1%	89.4%

Here we have experience divided up for males and females, and you'll probably notice that the overall levels are significantly higher than what we saw in the select period. We also see trends of improvements for both males and females, but here again, it looks like the male actual-to-expected (A/E) ratios are coming down faster than the female ones.

When we looked at this, one of the first things we pondered was perhaps the reason you saw female experience over 100 percent could be that when they developed the VBT, there was a lack of credible data for a lot of the older attained ages for females. In addition, when that table was developed, there was a large emphasis on smoothness over fit, so it's not unexpected that there might be some disconnect between the ratios we saw in the select period and what we see in the ultimate period.

One Year Study Periods for 1995-00 Select Period Experience					
Combined Males, Females, Nonsmoker, Smoker and Unknown Smoker					
A/E Ratios by Face Amounts Based on 2001 VBT					
	1995-96	1996-97	1997-98	1998-99	1999-00
Total	90.4%	92.2%	87.4%	84.3%	83.5%

The table above shows the same numbers you saw before, reemphasizing that mortality was decreasing and was below the levels anticipated by the VBT. Mortality improvement or the rate of decline is approximately 1.5 percent to 2 percent per year, looking at these numbers.

One Year Study Periods for 1995-00 Select Period Experience by Smoking Habit					
Combined Males and Females					
15 Year Select Period; A/E Ratios by Face Amounts Based on 2001 VBT					
Smoking Status	1995-96	1996-97	1997-98	1998-99	1999-00
Nonsmoker	87.4%	91.5%	86.1%	83.5%	80.6%
Smoker	93.1%	106.0%	99.2%	99.7%	98.0%

This table breaks down experience by nonsmokers and smokers. I'm illustrating what I mentioned before: the rate of change or the improvement seems to be concentrated in nonsmokers. If you look at the smoker rates, they jump around and don't seem to give any clear trend of decrease.

Combined Males, Females, Nonsmoker, Smoker and Unknown Smoker					
A/E Ratios by Face Amounts Based on 2001 VBT					
Medical Basis	1995-96	1996-97	1997-98	1998-99	1999-00
Medical	85.8%	81.7%	82.3%	77.2%	75.9%
Paramedical	89.7%	97.5%	87.8%	86.3%	84.0%
Nonmedical	100.8%	103.4%	96.4%	93.7%	95.3%
Total	90.4%	92.2%	84.4%	84.3%	83.5%

Looking at the table by medical basis, there are two points I want to make. If you look within each year of the study period, you'll notice that the A/E ratios are lowest for medical, followed by paramedical, and highest for nonmedical. This meets the expectation that increased underwriting produces lower mortality rates. In addition, notice that the ratios are decreasing in each category, so this improvement doesn't seem to be concentrated just in medical issues, where increased underwriting is taking place.

I used some bar graphs to illustrate where the rate of change is coming from. Chart 1 is by issue age. The bar on the left is 1995 to 1996, and the bar on the right is 1999 to 2000. You'll notice that all age groups improved except for age 60+, which remains relatively flat, but notice that the rate of improvement or decline does seem to be biggest in the younger issue age categories: 20 through 29, 30 through 39 and 40 through 49, which is the biggest drop.

Chart 2 does the same thing but is by policy year. Here again, the decrease seems to be pretty much across the board in each category, except for six through 10, which jumps up a little bit. I want you to notice how the drop does seem to be biggest in the earliest policy durations, which are one and two and three through five, where you see a significant drop.

Chart 3 is by amount band. I want to point out a couple of things from this table. You'll notice that the A/E ratios decrease by amount band, also implying that as you

get to the higher face amount policies, you expect more underwriting and therefore lower mortality ratios. That seems to hold true in both of the study years I'm looking at here. But also notice that comparing 1995 to 1996 to 1999 to 2000, you see a drop across the board, except for $50,000 to $99,000, and this is supporting that this decline is coming from all areas. It's not coming just from the highest face amount policies with medical underwriting, so regarding the 1.5 percent to 2 percent improvement, maybe that number isn't exact if you took out the differential because of higher face amounts being weighted more. However, we do see that improvement as happening even at the lowest face amounts.

There has been a noticeable shift towards higher face amount polices; policies with face amounts $250,000 and over comprised 37 percent of the exposure in 1995 and 1996, but it was up to 48 percent of the exposure in 1999 to 2000.

This table looks at results by gender.

One Year Study Periods for 1995-00 Select Period Experience by Sex					
Combined Nonsmoker, Smoker and Unknown Smoker					
A/E Ratios by Face Amounts Based on 2001 VBT					
Sex	1995-96	1996-97	1997-98	1998-99	1999-00
Male	91.1%	93.5%	87.5%	83.4%	83.3%
Female	87.8%	87.9%	86.8%	87.3%	83.9%
Total	90.4%	92.2%	87.4%	84.3%	83.5%

Here we see that the male rate of improvement is slightly higher than the female rate, but the female ratios are also decreasing.

The next section of the report we call the five-year study. It's everything I showed you. We looked at a lot of things by the individual years and trends across 1995 to 2000. This section of the report aggregates all the data for the five years, and we do some comparisons with the previous five-year period, which is 1991 to 1996. The results were consistent with what we saw in the individual years, with a significant improvement from the 1995 to 2000 data relative to 1991 to 1996.

The results reflected a 15 percent decrease overall, with the male improvement slightly higher than the female improvement. It was again the lower issue age groups, 20 to 49, that experienced the most improvement for both males and females. Again, I include the caveat that you should review these results with caution because the study included a small number of companies and the mix of these companies changed from year to year.

Chart 4 comes from the five-year study. I'm using this chart to illustrate the differences that you can find when using the '75 to '80 table versus the 2001 VBT. The '75 to '80 table is the one on the left. The VBT is the one on the right. One obvious thing is the ratios are closer to 100 percent for the VBT, which you would expect because it's based on more current experience projected to 2001.

Also notice the differences within each category. There's a much more significant difference in durations one through two and three through five and then some of the later durations. This is reflecting that the slopes of the table are different. The VBT has a much steeper slope built into it. In addition you have the influence of what I said before, which is that the VBT has smoker-distinct tables, whereas the '75 to '80 table doesn't. Again, that's influencing these differences.

Chart 4 shows that looking at the results by amount bands showsthe same thing for the aggregate five-year data comparing the '75 to '80 table and 2001 VBT, you notice the A/E ratios decreasing with increasing amounts under both tables, but again, there are differences in magnitude in the '75 to '80 table and the 2001 VBT. This occurs for the same reasons that I just discussed.

I'm going to move on and talk a little bit more about smoker and nonsmoker experience. There's a separate section in the report that gives a lot of statistics on smokers and nonsmokers, so if that's something you're interested in, I would encourage you to look at that section of the report. Nonsmokers experienced significant improvement over the five years. The highest rates of improvement occurred for issue ages less than 50 in the same early policy durations of 1-5 for males, and in the face amount range of $500,000 to $999,999. The smoker mortality didn't indicate any clear improving trends, and the methodology we used in this section was to consider only the first 15 policy durations. The reason we did this is because we didn't feel we had reliable smoker or nonsmoker data beyond duration 15.

This table illustrates the smoker-to-nonsmoker mortality ratio.

Study Period	1975-80 Ratio	2001 VBT Ratio **
1994-95	2.27	N/A
1995-96	2.23	2.17
1996-97	2.41	2.34
1997-98	2.39	2.31
1998-99	2.48	2.38
1999-00	2.55	2.41
1991-96	2.22	N/A
1995-00	2.42	2.33
**To obtain a similar measure as the 1975-80 Ratio, the Ratio of smoker to nonsmoker mortality for the 2001 VBT was calculated by using the nonsmoker table as the expected basis for both smokers and nonsmokers and taking A/E Smoker / A/E Nonsmokers.		

We use this statistic in several places in this section of the report. It's meant to be an aggregate measure of the overall rate of smoker mortality relative to nonsmoker mortality. By looking at the study periods starting with 1994-95 up to the 199900 period, you see this ratio increasing. That's not good news for anybody who is a smoker, but this is consistent with the finding that the nonsmoker mortality was improving, but the smoker mortality wasn't. Therefore, the relationship between the

two was diverging.

This table breaks that ratio down a little bit further, looking at males and females and at the pattern by issue age categories.

Issue Age	1975-80 Male Ratio	1975-80 Female Ratio
20-29	1.95	1.71
30-39	2.53	2.16
40-49	2.70	2.57
50-59	2.63	2.87
60+	1.93	1.97
Total	2.43	2.36

We included this because it illustrates that some of those ratios are not uniform across the board. If you're looking to come up with smoker and nonsmoker tables, you have to dig a little deeper than putting in overall ratios. What you see is that both males and females follow a pattern and that this relationship starts out a little lower, increases and peaks in the middle issue ages and then starts to decrease in the older issue ages. It peaks a little bit earlier at 40 to 49 for males but then continues to increase to 50 to 59 for females, where it's up to 2.87.

This table looks at the same ratio, but looks at it by policy year.

1995-00 Select Period Experience	
Policy Year	1975-80 Ratio
1-2	2.49
3-5	2.42
6-10	2.46
11-15	2.23

In the first 10 years, the relationship is pretty steady around 250 percent, but then in policy duration 11 through 15, it dips down a little bit, which seems to make sense. As you get further away from underwriting, the relationship of those mortality rates is converging somewhat.

The last section of the report looks at ultimate experience, or experience in policy years 26 and over. I have a lot of numbers in this table, but if you look at the male ratios and the female ratios, you'll notice they both spike in the 30 to 39 category.

Between 1995-2000 Anniversaries, Smoker, Nonsmoker and Unknown Combined				
Attained Age	A/E 2001 VBT Male	A/E 2001 VBT Female	Avg. Policy Duration Male	Avg. Policy Duration Female

Under 30	80.8%	65.2%	27.3	27.3
30-39	128.7%	114.7%	31.0	31.0
40-49	106.8%	104.2%	34.2	34.8
50-59	87.4%	81.2%	35.8	36.9
60-69	90.6%	95.6%	37.7	38.8
70-79	105.6%	114.8%	40.9	41.9
80-89	107.1%	123.6%	45.7	46.0
90+	107.4%	117.8%	53.5	50.9
Total	**102.2%**	**112.8%**	**39.9**	**40.2**

The male ratio is at 128.7 percent and the female at 114.7 percent. They then start to decrease and then come up again at the higher attained ages.

The two columns on the right list what the average policy durations are, and we included this to illustrate how old these policies are. The policies of attained ages 70 and later have been on the books for 40 to 50 years. You have to keep that in mind when you're trying to draw any conclusions from this data.

We pondered why we had that spike in the 30 to 49 category in the ratios, and we determined that we thought that some of it was related to the impact of AIDS, even though in the development of the 2001 VBT, the impact was removed in the select period. We think there was still some impact left in the ultimate period. In addition, we thought there was some selective lapsation going on. You're talking about a policy where people are now in their 30s or 40s, and it was issued to them when they were children. By now a lot of people have replaced their policies. You probably have selective lapsation going on.

In addition, the point I want to make is that we didn't think that it should be a significant concern that there were some ratios over 100 percent. The 2001 VBT was the basis for the 2001 CSO, but you have to consider that the 2001 CSO is going to be used for policies issued under current underwriting standards.

This table illustrates the relationship between premium-paying policies and paid-up policies in the ultimate period.

1995-2000 Ultimate Experience (Policy 26 Years and Over) By Premium-paying Status					
1975-80 Basic Table			2001 VBT		
Premium-paying	Paid-Up	Ratio	Premium-paying	Paid-Up	Ratio
56.2%	70.2%	1.25	74.5%	92.2%	1.24

We put this statistic in because we've seen in previous studies that paid-up policies seem to have higher A/E ratios than premium-paying policies. The exposure base is not the same here as was built into some of the previous numbers I showed you. These are just policies that were identified as being either premium-paying or fully paid up. It doesn't include extended-term and reduced paid-up. We recognize that

the overall level is different from what I showed you before, and this is something we're going to explore further in our next report to better understand those relationships.

To wrap up, I want to talk about what the next steps are going to be for the Individual Life Experience Committee. It was mentioned that I was part of the Mortality Studies Working Group. That group came out with a paper and recommendations recently that are currently in the formative stages of being implemented, and some new task forces are being formed. We're going to make sure that the Individual Life Experience Committee works in coordination with the Working Group to meet both the short- and long-term goals of how we want mortality studies to look going forward.

One key thing that was identified is that we want to get our studies back to being published on some regular and predictable cycle on an annual cycle. You may have noticed that the data were 1995 to 2000, which is a bit out of date for now, but we did a couple years combined because we wanted to get ourselves moving forward as quickly as possible. It's our hope that by the end of 2005 or so, we're going to be caught up and on a cycle of having the data submitted early in the year and then having the report out by the end of that year that would cover the previous calendar year. We're hopeful that we're going to be able to meet those goals, given the efforts that have been going on.

In addition, we're going to be delivering the data in a dramatically different format. In the past, we've delivered the data using lots of tables that maybe weren't that usable. In this last report we didn't even publish the tables because we thought we didn't have a large enough number of companies contributing, so we chose to write a report and have charts included within that report. Starting with the report that is going to be released later this year, we're going to be including pivot tables and all the underlying details, so people can use the data to their hearts' content.

It will be done in such a way that individual company data will, of course, be secured. You won't be able to identify any individual company, but in aggregate, you'll be able to do lots of slices and dices on your own. Longer term, the Mortality Studies Working Group will determine the best long-term solution for how the data should be delivered. In the short term, it's going to be using these pivot tables.

In addition, there's been a lot of talk about preferred mortality and the need to start studying preferred mortality. There are going to be two separate task force formed to look at both the short- and long-term solutions for that, and the Individual Life Experience Committee will support those efforts.

Finally, we have on the agenda this year to do a separate study of older age/ultimate mortality.

MR. SAM GUTTERMAN: We now move from the science to the art, from mortality

statistics, where we have lots of data, clearly defined data elements and exposure segmentation, to an area of expenses, where we might be lucky to get any allocation at all, let alone being accurate. This is the first SOA study of expenses. I will discuss five aspects of the study: a background, followed by the methodology that we followed in 2001, the results of the 2001 study (I will be putting up some numbers, but I will not concentrate on the numbers themselves), the current status of our 2002 study and what the future will hold for the studies.

Significant SOA efforts on the study of life insurance expenses began in 2000 with the formation of the Committee on Life Insurance Company Expenses. Whether the SOA should study expenses on an inter-company basis has been debated for more than twenty years. In part, we have not done so because several industry-sponsored organizations have provided in-depth expense analysis. However, these, as well as some consultants' studies, have generally not been publicly available to nonmembers. In part, this effort has been undertaken to put such expense information into the public domain.

The first SOA expense study, which preceded 2000, was conducted by the Project Oversight Group (POG) on the Generally Recognized Expense Table (GRET). This expense study was conducted at the request of the NAIC and GRET was developed for use in sales illustrations in the United States. Various problems arose in that study when the first GRET was developed in 1997, because it relied primarily on publicly available annual statement information. These primarily resulted from the fact that Annual Statement information was used, that is, actual allocations were used by line of business and information was only available at a high level of aggregation. Reporting for certain products such as universal life and reinsurance clearly result in the data being somewhat unreliable. Information for several companies had to be eliminated completely due to uncertainty as to their applicability. In part this was due to the lack of publicly available information at a level that could be applied on an industry-level basis. It certainly was not applicable to all companies. This led to the realization that pricing actuaries needed more information. This in turn was a significant reason why the SOA Committee was formed.

In addition to the intercompany study that I will describe in a moment, the committee has continued to conduct periodic updates of the GRET, continuing education sessions such as this one, sponsorship of a particular paper on expenses conducted by a PhD candidate and a prize for the top papers on expense analysis. As a plug for the latter,
the Pedoe prize, named after a famous Canadian actuary who conducted a series of studies of life insurance industry expenses, is being sponsored for the best expense-related papers in relevant periodicals or research journals. We hope that its existence encourages you to write a paper on this topic.

In the course of development of the 2001 inter-company study, we conducted a survey of the expense information needs of SOA members. We determined that

there was a significant need for such information – including a need for publicly available information that could be used for benchmarking purposes. The respondents particularly emphasized the need for expense information for pricing purposes. The first priority then given in terms of coverages was in the area of individual life/annuity products. This was closely followed by the need for expense analysis information for group coverages. I'll discuss that a little more later.

For the 2001 study — that is expense information for the calendar year 2001 — we emphasized individual life and annuity products. The study was restricted to those companies that issue such policies in the United States. We have had discussions with the CIA, who has thought about doing a similar study for Canadian companies. This possible extension is still in the discussion stage.

We split individual life and annuities into several categories or product groupings. We believe that they have distinctly dissimilar expense characteristics in terms of either size of policies for example or generally experience expense relativities relative to exposure bases or available expense drivers.

- We split the life insurance into five product categories: non-variable permanent products, term products, variable life, bank-owned life insurance (BOLI) and corporate-owned life insurance (COLI). We did not have enough contributions to publish BOLI and COLI products, so the information gathered was not published. We have additional contributions in 2002 and have yet to determine whether or not we will be able to publish information for these two types of products, as we are always concerned about issues surrounding the confidentiality of our company contributors' information due to the small number of contributors in a particular category.

- We split annuities into four categories: fixed deferred, variable deferred, fixed immediate and variable immediate. For variable immediate annuities we did not have sufficient information to publish this information, although I believe we will have sufficient information in 2002.

We also determined wherever possible (that is, for acquisition expenses and wherever there was sufficient number of contributors), if we would request and publish information and expenses by distribution channel.

There were several distribution channels for which information was requested: brokerage, career, direct response, multi-line, PPGA, stockbrokers, financial institutions and an other/unallocated category. We only received information for stockbrokers and financial institutions for annuities, so you'll just see those data splits only on annuities.

It is important to note that this information has some limitations because some companies, particularly in this inaugural 2001 study, were not able to allocate their expenses by distribution channel, although in most cases we did receive all of the

important acquisition expenses allocated. Already in the 2002 study a greater percent of the data received was submitted on a complete basis. We expect that in the future even a more complete set of allocated expenses would be included. As a result, the credibility of the study not only would be greater due to more contributors, but also due to more complete information.

The 2001 study, which was published last fall, had 27 contributors. The aggregate volume was expenses associated with 31 million lives of covered experience and 4.5 million annuities.

As usual in expense studies, overhead was a particular important area. Overall, we requested information by function, including underwriting, policy issue, product development, marketing overhead, commissions and other acquisition expenses. We also had an expense category referred to as general overhead. This function is the bane of anyone who is studies expenses. In fact, in many companies it is the largest expense function. In some cases, this is certainly a catchall function. Overhead has been and I suppose will continue to be addressed by a number of papers and will continue to be discussed many times in the future.

In the 2001 study, 29 percent of the total expenses submitted for life insurance was classified as being general overhead, while 13 percent of total expenses were allocated to general overhead for annuities. How to address this item was a major area of discussion by the Committee. The conclusion reached was that general overhead would be included as a maintenance expense; the unit it was allocated to was all inforce polices.
The GRET, initially developed in 1997, at the request of the NAIC, have been updated periodically since then. The proposed 2005 GRET was reviewed by the Committee last month and discussed at the NAIC meeting a couple of days ago. I have not heard whether it was approved by the LHATF of the NAIC then.

One difference between what we did in our intercompany study and the methodology used to develop the GRET is the source of information. The GRET utilizes Annual Statement information from the 200 largest life insurance companies with relevant expense information. The 2001 inter-company study used privately provided data by at least 20 companies on a volunteer basis.

The 2001 study derived unit expenses by a functional expense allocation process, asking the companies to provide expenses with a predesignated set of functions. The GRET has utilized a multiple of a given set (a seed) that was developed by the Life Office Management Association (LOMA) expense study conducted in the 1980s. The seed is given per 1,000 of face amount, per policy and percentage of premium for acquisition expense and per policy for maintenance expense. Because of a desire for continuity, the GRET has still utilized that relatively old unit expense seed. In contrast, for the 2001 study we attempted to develop a functional allocation rule based on units assigned to each expense function submitted.

In the SOA study, acquisition expenses and corresponding units were segmented by distribution channel, while in the GRET, an entire company's experience has been allocated to a single distribution channel. For example, if a company primarily distributes its products through branch offices, it allocated all of its expenses to the branch office category. The distribution segments are also organized differently. The inter-company study uses career, brokerage, PPGA, multi-line, direct response, stockbrokers and financial institutions. As a result, there are some fundamental differences. Which is more relevant and accurate? I think that the SOA is, but there are some limitations on the information and accuracy because we depended upon the functional allocations provided to us by the individual companies and may not be consistent across companies.

The 2001 study consisted of both life insurance and annuities, while the GRET was just for life insurance. We included commissions and premium tax separately. The GRET excluded them as being company-specific and incremental in nature, there is no need for industry-wide data for that purpose. The 2001 study had universal life dump ins and extra premiums separately provided, while the GRET combined all such premiums.

The following is a brief description of a few of the allocation rules we used in both the 2001 and 2002 studies. We may publish the results of using an alternative set of allocation rules in either the 2002 or a subsequent studyWe allocated:

- Per $1,000 of face amount for life insurance - marginal underwriting (e.g., costs of inspections, medicals and other outside external costs), one-third of product development and other acquisition expenses.

- Per new policy - other underwriting costs, policy issue and one-third of the product development and other acquisition expense.

- A percentage of premium - all of the sales and marketing-oriented expenses and one-third of the product development and other acquisitions expense.

- Per policy inforce -
maintenance expense, including policyholder administration, policyholder services and general overhead. One could argue that certain overhead expenses could have been allocated to acquisition expenses, but we did not do that. Note that we did not have to include any pricing constraints (i.e., we assumed that all such expenses were recoverable, as we did not have sufficient information to indicate whether any such expense could not be recovered.

As indicated, we split the product development/other acquisition expenses into these three sets of driver units.

The following table includes a summary of the results for permanent life insurance category, as contributed by 26 companies – the number contributing in any

category of this business is indicated by the numbers in the parentheses.

2001 Inter-Company Study -- Permanent Life Insurance						
Distribution type (# of contributors)	Per policy issued	Per $1,000 issued	Percent of 1st year premium	Commission 1st renewal		Per policy inforce
Career (8)	$165.40	$0.66	9.4%	65.7%	3.6%	
Brokerage (5)	148.93	0.87	11.3	79.1	3.8	
PPGA (4)	118.68	2.53	24.3	98.5	3.9	
Multi-line (5)	110.42	1.70	23.5	53.9	3.8	
Other (10)	105.95	1.99	33.4	38.3	3.2	
Total (26)	120.64	1.27	17.1	53.5	3.6	$52.87

This indicates some of the relativities by distribution category. For example, the career distribution system appears to have greater expenses related to per policy issued, but overall lower expenses in other categories. The total overall expenses were $52 or $53 per in-force policy expenses, including overhead. Note that these would be allocated to policies in all policy years, not just to those in renewal years.

2001 Inter-Company Study -- Term Life Insurance						
Distribution type (# of contributors)	Per policy issued	Per $1,000 issued	Percent of 1st year premium	Commission 1st renewal		Per policy inforce
Career (7)	$283.14	$0.53	52.8%	48.6%	4.3%	
Brokerage (6)	146.43	0.65	21.8	89.1	6.8	
PPGA (3)	231.17	0.57	49.0	82.3	2.3	
Multi-line (4)	89.35	0.73	37.8	46.1	5.5	
Other (9)	293.80	0.49	54.6	57.2	3.3	
Total (23)	137.26	0.65	39.7	56.1	4.3	$71.72

For term insurance, there are a couple of items to note when comparing against the prior table. The expense per policy issued for permanent insurance was $120, while term was $137. I presume the reason for this differential is due to the larger average policy size on term insurance. Because of the size of the products, the per policy in-force expenses were $71 compared to that for permanent of $53. Based on our allocation of the companies' contributions, a term policy per policy was more expensive to maintain.

This table compares expenses for life insurance not only for the 2001 study, but also the preliminary 2002 study results and the results of the recent GRET study.

2001, 2002 (preliminary) Inter-Company Studies and 2005 GRET (tentative) for Life Insurance						
Distribution type (# of contributors) *2001*	Per policy issued	Per $1,000 issued	Percent of 1st year premium	Commission 1st renewal		Per policy inforce
Term (23)	$137.26	$0.65	39.7%	56.1%	4.3%	$71.72

Permanent (26)	120.64	1.27	17.1	53.5	3.6	52.87
Variable (10)	480.38	0.54	27.4	44.3	3.4	204.04
Total (27)	155.93	0.74	24.8	50.0	3.7	68.02
2002 preliminary						
Term (35)	$151.70	$0.44	37.3%	66.1%	3.6%	$64.08
Permanent (35)	123.67	0.74	30.6	50.8	3.6	55.74
Variable (18)	464.22	0.59	23.0	38.1	4.4	163.48
Total (37)	156.70	0.52	27.7	50.0	3.7	63.97
2005 GRET-Branch	$66.00	$1.15	73.0%	--	--	$33.00

I have a few observations about the above table. First, the 2005 GRET is based on 2003 calendar year results for the branch office category for the largest 54 companies included in this distribution category. It has not yet been adopted by the NAIC. In the preliminary version of the 2002 study, the numbers in this table are somewhat different than those currently indicated on the SOA Web site. Note that they are preliminary numbers, although I believe that they are fairly close to the final results, as we have one more committee to review before finalization of the 2002 results, which we hopefully will have finished by the end of this coming week.

Based on this table, a few observations can be made. First, there has been an increase in the number of companies that contributed to the 2002 study, to 37. Based on the results we can tell that variable-life products have a much higher unit expense level than do either term or permanent products. Note there were only 10 contributors in 2001, but 18 in 2002 for variable life; as a result there should be a greater degree of credibility in the more recent study, but you can see a much higher unit expense across the board, with a high per-policy maintenance expense for variable life.

As I mentioned, based on the art and science of expense allocations and expense analysis, you have to recognize the potential biases included in this unit expense information. First, these variable policies are a lot more expensive to maintain. This makes sense, although it is uncertain to what extent this may be due to a difference in allocation. This is a question that every pricing actuary has to examine in her or his own situation. Due to the nature of an incomplete inter-company study, it is difficult to conclude that this represents a true industry-wide level of expenses due to the limited number of contributors. Indeed, a user of this information has to be cautious when utilizing the results of any intercompany study, but particularly one that is in the early developmental stage. Unlike the ordinary life mortality study, which has been around for decades, this study is the first one and you have to remember it is still in the development stage.

Remember that there is a difference between that of the inter-company study and the GRET allocation, which is based on a LOMA seed, which in turn was based on a LOMA inter-company study in the 1980s. These are definitely based on different relativities, as can clearly be seen in the 73 percent of first-year premium in the GRET, which is quite different from the result of our inter-company studies. In part, that difference is due to the drivers and the allocation rules applied.

The following are results of the fixed deferred annuities, for which, due to consideration of time, I won't go into any detail.

2001 Inter-Company Study -- Deferred Annuities					
Distribution type (# of contributors)	Per policy issued	Percent of 1st year/ren premium	Commission 1st renewal		Per policy inforce
Career (9)	$161.93	2.2%	3.0%	2.4%	
Brokerage (3)	94.03	0.8	4.7	1.8	
PPGA (3)	469.64	2.6	4.3	8.7	
Stockbroker (2)	204.64	1.3	5.8	3.9	
Financial Inst (4)	109.58	0.7	5.5	5.5	
Total Fixed (21)	105.50	1.0	5.2	3.6	$93.32
Total Variable (11)	133.00	1.3	6.0	5.1	173.72

You can see that there are some fairly large differences in unit expenses among distribution categories. We'll see in the upcoming 2002 study how much this is due to the small number of contributors in some of the categories.

For annuities, we are in the process of looking at variable annuities compared to the fixed type – it's clear that when you compare the per-policy issue expense of $197 on a variable deferred versus the $80 on a fixed deferred annuity product, similar to variable life, variable annuities have higher expenses than do fixed.

You'll notice there are some significant differences between the two years, 2001 and 2002, such as a lower expense per policy in force. That's something that we will be further investigating in the next couple of weeks. We'll probably compare company-to-company results for those who contributed to both studies. Whenever you have this small of a number of companies, you should expect some large variations. Hopefully in the future when we have a larger number of contributors, these shifts will be more manageable.

For the immediate annuities, there were fewer contributors; as a result, we had fewer categories to report on.

2001 Inter-Company Study –- Fixed Immediate Annuities				
Distribution type (# of contributors)	Per policy issued	Percent of 1st year premium	Commission 1st year	Per policy inforce
Career (5)	$336.58	0.8%	2.8%	
Total (12)	194.86	1.3	3.3	$109.56

I have a few additional comments on our initial study. One thing that we did notice is a significant variation by company. When we looked at these variations, we also looked at the minimum and maximum results. Therefore, application of the results

as an expected level for a particular situation should be done with caution. Although the results might be used as a preliminary benchmark, but as the mix of company contributions vary in the future, the results of trends may not be easily explained. You always have to be cautious when utilizing industry averages.

In 2002, there were relatively modest changes in our study specifications from 2001 based on our initial study. We expect to publish results soon. More companies were able to allocate expenses between distribution channel, so as you will see when results are finalized, the information on per-distribution channel will be more credible, and therefore you can rely on those unit expenses more than those from 2001. In total we have had 44 contributors and hope to have more in the future.

In terms of the future, we anticipate some further refinements, particular for policy termination expenses. We realize that we didn't quite define our request clearly enough in the first two studies, so we'll be modifying our request for them in the future. In addition, we may be doing further studies on overhead and unit expenses by size of company to be able to better understand our results.

The nontraditional marketing section has indicated that it will request more direct response contributions, as we only had three contributions in 2002. Hopefully with some additional contributors in the next study, we'll have more credible direct response unit expenses, which we'll be able to publish. In addition, we also hope to recruit additional contributors.

In the future we will be looking at the possibility of expanding this study to other coverages, in particular to group. If you believe there is a need for expansion, please let us know the type of information you believe is needed.

Please note that this is still a young study. We're looking for further ideas and input. We have received a good response so far and are looking forward to expanded studies in the future.

MR. CHRIS IAN NOYES: I'm going to talk about what to consider when using the results of an intercompany experience study. A lot of my comments will apply to you even if you're just looking at an experience study for one company, not necessarily across a bunch of companies. Here's a quick outline. First I am going to talk about general items to consider when looking at these things, and then I'm going to focus on the details of mortality studies. I'll go through a particular example that I created that has no bearing to real life whatsoever, so there are no antitrust problems. I'll talk about things to think about, which is what I call calibrating, or things to think about when taking a backward-looking mortality study and relating that to a forward-looking pricing assumption. I'll end with details to think about on expense studies.

In general, you have the who, what, when, where, why and how questions to ask. Who's in the study? In other words are you talking about large stock companies,

small mutuals or life subsidiaries of property and casualty (P&C) companies? I think a lot of these are more important for expense studies than for morality studies when you're asking about who is in the study. It can relate to mortality if you know that certain companies sell in a particular target market versus others.

What's in the study? For expense studies, are you talking about life business, annuity business or fixed versus variable costs? On the mortality side, is it substandard or preferred? I think the "what" is important when you're looking at mortality and expense studies. It is one of the questions to ask.

When was the study done? Again, for mortality studies, was it done in 2001 on experience from 1995 through 2000? You need to know what business is in the experience and when the study was completed.

Where's the experience in the study from? For mortality you can look for expenses by whether they're U.S. or Canadian, but more important is where the experience is from. In other words, where are you getting the data from? For expense studies, Sam had mentioned the statutory annual statements; for mortality is it an SOA study or in house study? What are you looking at? Where is the experience coming from?

Why was the study performed? For example, if you have a mortality study, are you refining it to look at older ages or if you have an expense study, are you refining it to look just at fixed cost or just at variable costs? What you're looking at should be a consideration.

Finally, how was the study done? Given assumptions used in data massaging, it's not always the case that you have five million records, and two million of them are incomplete, so you throw those out and have three million records left over. It gets a little bit more detailed than that. For example, if you try to build a mortality study from just an in-force file because that's all you have, you have to make some assumption on lapses and whether you have the exposure in there or not, and that type of thing. Who performed the study and how exactly they did it are good things to know.

I'm going to get into details on mortality studies. I'm not going to read through the entire list. Hopefully I've developed a fairly comprehensive list of things to think about when using a mortality study. I'd be all for hearing any suggestions at the Q&A section at the end if there's anything that could be added. Of particular importance are the things that usually come through in either the title of the study or below the executive summary. You're going to see questions such as what are the exposure periods and issues used in the study? What is the age basis — is it age nearest or age last, and what's the expected basis? Is it the '75 to '80 table or is it the VBT table?

That type of detail usually comes through, but some of the more important items that sometimes are included are what type of businesses are included in this study?

Are we talking about term, whole life or UL? For mortality, are we talking about simplified issue term or sold through banks? Is it VUL that's single premium that's not sold for the cheap death benefit? What type of underwriting was done and did underwriting changes take place? If you have business that was underwritten in the 1970s prior to blood testing, you certainly want to factor that in if you're trying to create a mortality assumption for today, where you're collecting blood, urine and everything else and make an adjustment for that. Those are the three things that I point out to you, but each is important to focus on.

What about the how? Sharon talked at length about the different results that were displayed, including results obtained by medical basis, issue age, policy year, amount bands and by gender. What's going to be nice is when we start seeing results at a seriatim level so you can do a pivot table on it if, for example, you want to look at the results for females above age 50 that were medically underwritten. Many times, credibility becomes an issue, but how the results are displayed is a key issue when looking at mortality studies.

How the exposures are calculated is important. Were they grouped ages or actual ages? Was there consistency between pulling policies out of the study for whatever reason and removing the exposure they contributed? Regarding policy changes when you have conversions or exchanges, did they come in point-in-scale? Did you treat them as new business? How were those things handled? If you have substandard policies in your mortality study, it's one thing to note that they're in there; it's another thing to be able to split them out. Did you reflect the table rating or the flat extra that went along with them? Those are all fairly crucial things, and you should have a pretty good laundry list of things to ask when you get a mortality study even if it's within your own company so you know exactly how it was done and what exactly is in there.

Let's look at the mortality study example. Again, I created this, so it doesn't have any bearing on real life other than highlighting a point that I want to make fairly clearly. I make some assumptions because we're talking about inter-company, so I have two companies. Conveniently one is called SI Term Life, and the other one is High Net Worth Life. SI Term Life sells only simplified issue term policies, and High Net Worth Life sells only VUL policies. Each company sells 1,000 policies a year, and all the policies are sold on January 1. Nobody lapses, so this is an easy exposure calculation for me to do.

SI Term started selling policies in 1995, while High Net Worth started selling policies in 1997. Each of SI Term's policies is $50,000, and the High Net Worth Life policies are $1,000,000 each. I'm painting a picture. You can reasonably assume that SI Term's mortality would be a little bit higher than High Net Worth's mortality. I created an expected mortality table, where everybody dies by duration 10, which was easy for illustration purposes, but hopefully that's not the case in real life.

Expected Mortality

Duration	SI Term	HNW VUL
1	0.10	0.02
2	0.20	0.05
3	0.30	0.10
4	0.40	0.20
5	0.50	0.50
6	0.60	0.60
7	0.70	0.70
8	0.80	0.80
9	0.90	0.90
10	1.00	1.00

SI Term grades up from 0.1 to 1 literally, and then I built in a little select period for High Net Worth, where it grades in by duration five at the same level of mortality. The exposure period for this particular mortality study is 1995 to 2003, so it covers all the issue years for which these two companies have been selling policies.

If we take a look at the results, the study has a little more than 7,000 claims in it across nine durations, and there are 58,000 exposure years in the study. When you look at it, the A/E on this business is exactly 100 percent by amount using the E that was in the table. I should say that I'll typically look at results by amount instead of looking by count because of the financial impact. We pay death claims based on amount, not by count. I'll refer throughout the rest of the presentation usually to "by amount" results.

You get this study and say it's 100 percent by amount, so it seems that because the A/E is 100 percent, we should use that as our pricing mortality assumption, which might make sense at a high level, but when we get into it, it's not going to be exactly right.

In Chart 5, the 100 percent A/E that I'm talking about is the far lower-right-hand number, which is by amount. By count, it's coming out at 76 percent, so the first thing you see is for issue years and exposure years '95 to 2003, by count is a lot less, which would indicate that you're seeing results being skewed by the higher face amount policies and High Net Worth VUL company.

If you're paying attention to the assumptions that went into this, durations eight and nine have to only be made up of SI Term Life's business because it started selling in '95, two years before High Net Worth started selling. Durations eight and nine are strictly SI Term business.

That's what the overall study looks like. Getting into a little bit more detail, we'll look at each company separately (see Chart 6). For each company, this is for all the issue years that business was written. One of the first things that pops out is that

the by count and by amount numbers are now identical for each company within the company, and that should make sense because I made all the policies the same size within each company.

This should indicate to you how I created the actual deaths. If you look at the slope of the A/E, whether you look at by count or by amount, you start to see a discernible pattern. I'll point that out again in the next example, when we take a look at just one issue year for each company. This is the first issue year for SI Term and the first issue year for High Net Worth VUL (see Chart 7). Again, you see the same pattern for each company. One thing to note is for SI Term, for issue year 1995, the A/E is 72 percent, but if you look back at the Chart 6, when you roll up all the issue years together, it's 62 percent. It's a little bit less when you look at all issue years. If I go back and look at High Net Worth just for one issue year in 1997, the A/E is 99 percent, but when you roll up all the issue years that High Net Worth sold business, you're up at 104 percent.

The key is how did I make up the actual deaths? Because this is a made-up study, I had to come up with some actual deaths to compare to. For SI Term, for every single issue year, I made the actual deaths half of the expected deaths for the first five durations, and then I made the actual deaths twice what the expected was for the next five durations.

Because of the way I did that, for 1995, the 72 percent would make sense, but as you layer on more issue years that only contribute in the early durations, which is coming in at a 50 percent rate, you're going to move closer from 72 percent to 62 percent. If I started including more at the early durations, you get to 50 percent. That's why you see the overall A/E ratio for all issue years at 62 percent but for one year of issues, at 72 percent.

The same is true when you look at how I created the actual deaths for High Net Worth VUL. For every issue year, once again, the actuals are equal to 1.1 of the expected for the first five durations, and then for the second five durations, they're equal to three-fourths of the expectation. You see an opposite effect because I've changed the slope a little bit based on the actuals.

We started out at 100 percent A/E, and I've broken it out by company. We're at 62 percent A/E for SI Term and at 104 percent A/E for High Net Worth VUL. You might ask why the results are so skewed toward High Net Worth since the results are in aggregate coming out at 100 percent.

There are two reasons. The first reason is that the size of the policies that High Net Worth writes is overwhelming the study. It's overwhelming SI Term's experience. You're seeing results skewed toward High Net Worth. The second reason is that if you look at the actual experience, and I'm going to go back to the expectation, SI Term's actuals were 50 percent in the first five durations, and High Net Worth's were 110 percent in the first five durations.

If you do the math in your head, the crossover point is going to be roughly at about duration four, where all of a sudden High Net Worth starts to have higher actual mortality than SI Term. If you're looking at the mortality study, what you're getting is High Net Worth's business, because there are no lapses, there are more lives left later in the study, so it's going to contribute more exposure later in the study. More of the results will skew toward High Net Worth.

That's the reason why in this particular study you're seeing what you're seeing. This is obviously a rudimentary study. I just made it up for illustration purposes. I show two different companies, which were obviously made-up companies, but you can certainly have the same type of effect if you're looking at risk class, face amount bands, ages, genders or whatever it is that you're looking at, whether you're looking at a multicompany study or your own company study if you don't have the data broken out for you (you might have a page of just nonsmoker/smoker splits, or you might get "by duration" or "by male/female.") What's nice is to be able to cross-reference all those things and take a look at, for example, what males who are preferred at the core ages of 25 to 45 look like. If you don't, these are some of the things that can happen. You might mispeg what's going on.

Next I'll focus on what I call calibration. This is trying to true up what you have in your hand — this experience study or mortality experience — and convert that to a pricing assumption. There are four main things to think about when you try to get apples-to-apples comparisons.

The first one is secular mortality improvement. You have a study, and I'm going to pick on my SI Term mortality study. For that one, you have a study that's issued and exposed 1995 to 2003. Generally speaking, you'd say there are nine years in the study, so when you go 4.5 years forward and 4.5 years back, that's the midpoint of the study. That makes sense. June 30, 1999, is great. If I'm going to issue SI Term business now for 2005, I'm going to price it now, and I'm going to assume uniform sales distribution, I might say I'm going to trend forward with mortality improvement or unimprovement, whatever I think mortality is going to do going forward. I may trend that forward from June 30, 1999, to June 30, 2005.

The more accurate way to look at the mortality study is to exposure weight the business. What I just talked about assumes each calendar year has the same weighting to it, and that's not the case with most mortality studies. With the SI Term business, it's easy to think about for calendar year 2003 how many issue years contributed to the exposure. It would be nine issue years contributing exposure — in 1995 contributing duration nine exposure in 2003. If you think about it, you have nine durations of exposure to eight to seven to six, all the way back. What you're getting is a lot more exposure skewed toward the present day, skewed toward the later calendar years.

If you weight your exposure in this particular mortality study, you end up in January

2000, which in this particular example is only a six-month difference. It may not make a lot of difference, depending on how much you think mortality is going to improve, but depending on the mortality study, it can have quite an impact. That's mortality improvement; obviously the rate of improvement or unimprovement is up to the actuary.

The next piece is comparisons only over the study period. I'll talk about what that is in a general sense now. If you have a mortality study on a particular book of business, and let's say that the business has been sold for only five years, let's say the number is 32 percent of the '75 to '80 table. You move 32 percent around and get preferred and standard and all that, you make that assumption for the pricing horizon. If you're out there pricing 20 or 30-year term, you need mortality rates going out for 20 to 30 years.

The problem is the mortality study had only five durations in it, so the only thing you can say that study shows for sure is that your average mortality came in at 32 percent of the slope of the '75 to '80 on average for five durations. You can't make any statements about what's going to happen going forward. What this is trying to do is say that when you're looking at a mortality study, if there are eight durations in it, look at only eight durations of your pricing assumption and see how they compare because that's the only thing you can do to true up apples to apples.

Another consideration is whether there is consistency in risk selection, i.e., underwriting requirements and preferred guidelines. If you're looking at policies sold in the 1970s, it's likely blood wasn't collected. This is pre-AIDS, so you're going to price business now and you're collecting blood. You need to make an adjustment to the mortality study because clearly you have apples and oranges.

Preferred guidelines are big nowadays. It seems that companies are changing their guidelines every six to eight months, so it's hard to get a consistent set of preferred guidelines for the business in the mortality study. What is the persistency underlying the business being exposed? Target markets are an example, and you can think of a lot of things when you're thinking about what's in the study versus what you are pricing.

Finally, you do all this great work, have something that you can calibrate to and then have to ask yourself how credible it is. A variety of different methods can be used. The classical method is to use the normal curve and some number of claims divided by 1,082 as the benchmark. The only pitfall of that is it assumes a uniform claim amount, so it assumes all your claims at the same size, which usually isn't the case. Some of the other methods, such as Monte Carlo or simulations, can be used.

I'll talk about details on expense studies, and I don't have as many questions here. That might relate to Sam's point about it being more of an art than a science. One of the important things to think about is distribution channel: whether you have multiple line exclusive agents versus PPGAs versus career agents, who's paying the

home office expenses or it is sent out to the field? These are the types of questions you need to ask. What's in there? You need to know that to be able to make use of the expense study you have. Some other things are what types of expenses are covered — acquisition, maintenance, per unit or per policy? What expenses are excluded, for example, premium tax or commissions? For inter-company studies, commissions can be somewhat of a proprietary issue, so they may not be included.

An important one for setting a pricing assumption is how is the expense experience going to be used? You might have a different set of factors for pricing than if you're doing illustration testing. A lot of that comes down to allocation. This list may not be all-inclusive. There might be things to add, but that's what I came up with based on the work I've done.

Finally, when you have an expense study and are thinking about how much expense you're going to cover — maybe you're going to try to cover $1,000,000 — you first need to consider what I call your anchors. You have per policy, percent of premium per unit, percent of assets, etc. You may come up with a set of factors, and they may seem like they're going to work. The next thing you do is compare them to the metrics and think, "If I'm trying to cover $1,000,000 and apply my per-unit expense to the number of units I have in force and the number of units I expect to sell, exactly how much expense am I going to cover?"

Does it make sense? Have you covered the expenses you intended to cover, and do the expense factors have the appropriate effect on pricing? Here's an anecdotal experience I had with one particular company. It had calculated its expense factors at a high level across all life business, and then when we went to look at pricing out permanent and term, for neither one did it make sense to use the particular expense factors that were developed. We had to come up with expense factors that were specific to the line of business being priced, making sure that as we allocated and aggregated things up, it still made sense in aggregate.

Understand what you're covering. The philosophy on planned expense gaps is if you're at a company that expects a high level of increase in sales volume, you may not be able to cover your expenses. Let's say you're talking about a five-year planning horizon and have a sales volume where you're going to sell a lot more each year but may not be able to cover your expenses the first two and a half years with the particular expense factors, but in the second two and a half years, you may more than cover them. In the span of five years, you'll cover the total. The timing, though, isn't going to be exactly right. That gets into allocation conversations.

Finally, you need to monitor it. Does it make sense if you have expense factors becoming obsolete? For example, if you're assuming in your planning process that you're going to sell half UL and half term, assume a percent of assets as an expense factor and look back three years, you'll look it and say, "Wait a second. I sold 90 percent of my business as term, not as UL." The expense factors you came up with may not make sense anymore. You need to monitor the business.

MR. MARTIN G. KLINE: I have a question on the first presentation. You talked about still wanting to study this further, but the fact was that paid-up life policies have worse mortality experience than policies still paying premium. Aside from the obvious <u>antiselective</u> behavior of people who may be converting to an extended term insurance or reduced paid-up insurance, are there any speculations as to why this might be the case?

MS. BRODY: I'm not sure if we had an answer for that. It's a pattern we've seen.

UNIDENTIFIED SPEAKER: I have a question on mortality. Regarding the ratio on slide 5 starting with 90 percent in 1995, is there any speculation about why that's so low? Is it because the VBT table includes companies other than just the SOA-contributed data? Why do we start so low versus closer to 100 percent?

MS. BRODY: That's when I started the talk. I said that level did surprise us, and we think it could be a couple of things. There is a different mix of companies than what we're looking at now. The VBT was based on 1990 to 1995 experience and had a slightly different mix of companies than what we're looking at here. There was improvement built into the VBT to project it to 2001, and it's possible that there wasn't a high level of improvement.

UNIDENTIFIED SPEAKER: I'm sure many actuaries would appreciate any inquiries on it.

MR. THOMAS E. RHODES: I'd like to comment on that. I think you're correct in your observation. It surprised me it was that low. I would put it down to a couple of factors. First of all, when the projection was done on the VBT over the five-year period, extremely low percentage improvements were used over that projected seven-year period of time. As in the prior session I went to, in actuality instead of using much less than 1 percent improvement factors, the improvement in males was distinctly over 1 percent, so that's one source of the difference.

One source of the difference, which we speculated on in the ILEC committee, was that there was a larger percentage of preferred risks at higher amounts with different types of underwriting than we had expected. The 2000 to 2001 study, which is going to be released by the fall annual meeting, will have preferred and standard broken down, and then we'll be able to get a much better fix on that, looking at preferred, nonsmoker in higher amount bands through using pivot tables. Here, it's still a bit of speculation.

MS. BRODY: I had commented we saw the shift I think from 37 percent to 48 percent just over 1995 to 2000 for higher face amount policies, so as Tom said there's probably a different mix of higher versus lower face amounts.

MR. RHODES: There's also the distinct pattern if you look at earlier studies, which

this was taken from. There was a great switch from nonmedical to paramedical exams that occurred, which may also be playing into it.
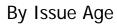
MS. BROESCH: I'm going to go back to the first question, which was about the premium-paying and the paid-up policies and why the experience is worse on the paid-up. It's hard to say without being able to see the details behind it, but I'm wondering if it could have something to do with the type of policy that's included. The type of policy that would have that provision that becomes paid up versus the ones that are still in premium-paying status or if the paid-up are older.
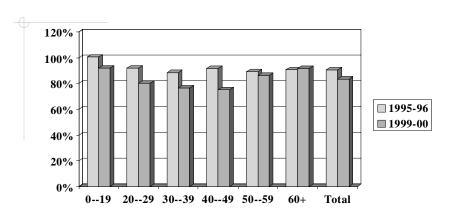
MS. BRODY: The distribution was different. If you looked at the chart by attained age, you saw that the ratios were higher in the older attained ages. It could be a distribution issue. Again, I think it's another thing that we can dig into a little further once we have the pivot tables.

UNIDENTIFIED SPEAKER: Historically the difference was attributed to the high percentage of extended term, where many extended term policies were or benefits were sold on anticipation of death. In other words, why bother continuing paying if you have a terminal illness if you could continue your policies at the same face amount? I think that the most recent mortality study or the tables said that was not as significant as before.

MS. LUCILLE D. ROINESTAD: Another possibility on the paid-up versus premium–paying is in the early 1980s, a lot of people with paid-up policies rolled them into UL and other things, so if they were insurable, they were gone. The paid-up policies may be people in poor health.

Chart 1

By Issue Age

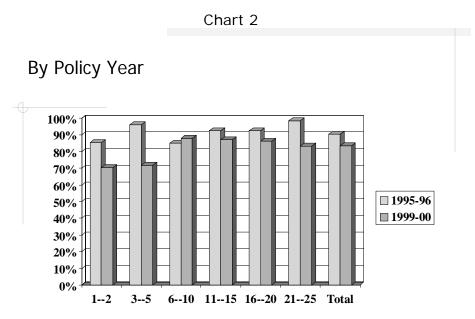◆ **A/E ratios decrease in every issue age group except for 60+**

◆ **Improvement is greatest at issue ages 20-49**
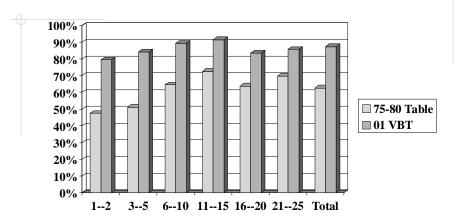
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Chart 2

By Policy Year

◆ **Improvement in the A/E ratios for all policy year groupings except 6-10.**

◆ **The largest percentage improvements occurred in both policy years 1-2 and 3-5.**   13

Chart 3

By Amount Bands

14

Chart 4

By Policy Year

◈ **Mortality experience by duration has a much steeper slope in the ratios using the 1975-80 Basic Table (increasing from 47.4% in durations 1-2 to 72.6% in durations 11-15) compared to the 2001 VBT due to the steeper slope built into the 2001 VBT.**

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Chart 5

14

Mortality Study Example

- Let's take a look…

For both companies and all issue years

Duration	Exposure Count	Exposure Amount	Death Count	Death Amount	Expected Count	Expected Amount	A/E by count	A/E by amount
1	16,000	7,450,000,000	604	176,500,000	1,040	185,000,000	58%	95%
2	13,468	6,248,000,000	1,044	360,000,000	1,734	366,000,000	60%	98%
3	10,640	4,921,000,000	1,266	547,800,000	1,978	541,100,000	64%	101%
4	7,800	3,513,600,000	1,336	766,000,000	1,880	730,800,000	71%	105%
5	5,174	2,077,000,000	1,482	1,125,750,000	1,761	1,043,280,000	84%	108%
6	2,846	653,400,000	1,026	338,200,000	765	420,336,000	134%	80%
7	1,306	177,400,000	322	82,600,000	221	100,195,200	146%	82%
8	624	31,200,000	58	2,900,000	29	1,451,520	200%	200%
9	283	14,150,000	6	300,000	3	163,296	184%	184%
Grand Total	**58,141**	**25,085,750,000**	**7,144**	**3,400,050,000**	**9,411**	**3,388,326,016**	**76%**	**100%**

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Chart 6

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Mortality Study Example

But for each company separately…

SI Term

Duration	Exposure Count	Exposure Amount	Death Count	Death Amount	Expected Count	Expected Amount	A/E by count	A/E by amount
1	9,000	450,000,000	450	22,500,000	900	45,000,000	50%	50%
2	7,600	380,000,000	720	36,000,000	1,440	72,000,000	50%	50%
3	6,020	301,000,000	756	37,800,000	1,512	75,600,000	50%	50%
4	4,512	225,600,000	600	30,000,000	1,210	60,480,000	50%	50%
5	3,260	163,000,000	375	18,750,000	756	37,800,000	50%	50%
6	2,308	115,400,000	724	36,200,000	363	18,144,000	200%	200%
7	1,188	59,400,000	252	12,600,000	127	6,350,400	198%	198%
8	624	31,200,000	58	2,900,000	29	1,451,520	200%	200%
9	283	14,150,000	6	300,000	3	163,296	184%	184%
Grand Total	34,795	1,739,750,000	3,941	197,050,000	6,340	316,989,216	62%	62%

HNW VUL

Duration	Exposure Count	Exposure Amount	Death Count	Death Amount	Expected Count	Expected Amount	A/E by count	A/E by amount
1	7,000	7,000,000,000	154	154,000,000	140	140,000,000	110%	110%
2	5,868	5,868,000,000	324	324,000,000	294	294,000,000	110%	110%
3	4,620	4,620,000,000	510	510,000,000	466	465,500,000	110%	110%
4	3,288	3,288,000,000	736	736,000,000	670	670,320,000	110%	110%
5	1,914	1,914,000,000	1,107	1,107,000,000	1,005	1,005,480,000	110%	110%
6	538	538,000,000	302	302,000,000	402	402,192,000	75%	75%
7	118	118,000,000	70	70,000,000	94	93,844,800	75%	75%
Grand Total	23,346	23,346,000,000	3,203	3,203,000,000	3,071	3,071,336,800	104%	104%

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Chart 7

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Mortality Study Example

And for each company by issue year…

SI Term – issue year 1995

Duration	Exposure Count	Exposure Amount	Death Count	Death Amount	Expected Count	Expected Amount	A/E by count	A/E by amount
1	1,000	50,000,000	50	2,500,000	100	5,000,000	50%	50%
2	950	47,500,000	90	4,500,000	180	9,000,000	50%	50%
3	860	43,000,000	108	5,400,000	216	10,800,000	50%	50%
4	752	37,600,000	100	5,000,000	202	10,080,000	50%	50%
5	652	32,600,000	75	3,750,000	151	7,560,000	50%	50%
6	577	28,850,000	181	9,050,000	91	4,536,000	200%	200%
7	396	19,800,000	84	4,200,000	42	2,116,800	198%	198%
8	312	15,600,000	29	1,450,000	15	725,760	200%	200%
9	283	14,150,000	6	300,000	3	163,296	184%	184%
Grand Total	5,782	289,100,000	723	36,150,000	1,000	49,981,856	72%	72%

HNW VUL – issue year 1997

Duration	Exposure Count	Exposure Amount	Death Count	Death Amount	Expected Count	Expected Amount	A/E by count	A/E by amount
1	1,000	1,000,000,000	22	22,000,000	20	20,000,000	110%	110%
2	978	978,000,000	54	54,000,000	49	49,000,000	110%	110%
3	924	924,000,000	102	102,000,000	93	93,100,000	110%	110%
4	822	822,000,000	184	184,000,000	168	167,580,000	110%	110%
5	638	638,000,000	369	369,000,000	335	335,160,000	110%	110%
6	269	269,000,000	151	151,000,000	201	201,096,000	75%	75%
7	118	118,000,000	70	70,000,000	94	93,844,800	75%	75%
Grand Total	4,749	4,749,000,000	952	952,000,000	960	959,780,800	99%	99%

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