

**1998 VALUATION ACTUARY
SYMPOSIUM PROCEEDINGS**

SESSION 5IF

GROSS PREMIUM VALUATIONS

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MR. ROBERT B. CUMMING: Our topic is gross premium valuations for health business. We have three presenters today. Our first presenter will be Peggy Hauser. She is with the Long Term Care Group, which is a long-term-care managed care company. It provides administrative services and reinsurance services for blocks of long-term-care business. Peggy's role at the Long Term Care Group is to provide product design, pricing, and financial analysis. She is going to be talking about a case study on long-term-care gross premium valuations.

Our second presenter will be Ross Bagshaw. Ross is with the Provident Companies. Ross is going to talk about gross premium valuations from an individual disability income (IDI) perspective. Ross is in charge of individual DI valuation at Provident, which is one of the biggest carriers in the individual DI business. It has over \$7 billion of reserves for individual DI business. I'm going to wrap up the talk by going through a case study from a client project we did for a medical gross premium valuation.

MS. PEGGY L. HAUSER: The health insurance reserves model regulation gives a definition of what a gross premium valuation is. It is the ultimate test of reserve adequacy, and it needs to take into account all expected benefits that are unpaid, and all expected, unearned or expected premiums.

When is it important to do a gross premium valuation? Again, that same model regulation says it's important to do a gross premium valuation whenever a significant doubt exists as to reserve adequacy. The keynote speaker at the general session said that the NAIC is also contemplating requiring a gross premium valuation whenever you're doing a Section 7 opinion. A Section 7 opinion now includes language that says: The reserves and related actuarial items are computed according to standard actuarial practice and are at least as great as the actuarial present value of the difference between future cash-flow disbursements and future cash-flow receipts calculated using best-estimate assumptions.

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I take this to mean that the NAIC is contemplating that Section 7 opinions could now be subject to having a best-estimate gross premium valuation included as part of your opinion. If, in doing a gross premium valuation, you find that the reserves should be higher than the minimum required reserves, they must immediately be recognized, and reserves have to be restored to that adequate level. However, if you find that your gross premium valuation produces reserves that are less than the minimum reserve standard, the minimum reserve standard still applies.

I'd like to present a long-term-care gross premium valuation case study, and I want to give you a few caveats before we get started. I was formerly a consulting actuary. This case study is not based on any block of business that the Long Term Care Group is administering or anything I actually saw in consulting practice. My case study is based on parts of things that I saw in practice, parts of what I've seen in actuarial memorandums, and then I also used a little creativity. I tried to come up with a situation in which I thought I wasn't making too many grossly bad decisions on the outset. I wanted to see how quickly my minimum reserve standards would become inadequate. I was very surprised at how quickly that happened.

Let's go over some background on the case study. It involves a block of individual long-term-care experience. The block began to be issued in 1994, and at that time, the company wasn't really making a huge commitment to the long-term-care line. It obtained some morbidity assumptions from a consulting firm and decided that it would do the pricing internally. There was not a strong commitment to the line and the company ended up selling about 12,000 policies since 1994. Now it's the end of 1997, and we must do the year-end valuation.

First, I'd like to give a little bit of background on what the initial pricing assumptions were. The actuary, at the time, said that 7% seemed like a pretty reasonable interest rate, so we used it for the investment earnings assumption. The actuary received some input on lapse rates. Some of their other products had experienced some high lapses, so he decided to go a little bit high in the first year, starting out at 20% and then grading down to a 6% ultimate lapse rate by year six. He felt that rate was consistent with what they were seeing other companies doing. The actuary used a 1980 CSO mortality, which was consistent with what was required for holding the company's reserves.

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Because the actuary did not have a good handle on how much expenses were going to be to run a block of long-term-care business, he decided to use a loss ratio method of pricing. Because most of the states require a 60% minimum loss ratio, he merely took the present value incurred claims, divided by the present value of earned premiums, and solved for what the premium had to be to get to a 60% loss ratio.

As the block evolved, the company began setting statutory reserves and used a statutory interest rate of 5.5%, which I think might have been okay in 1994. It has been changed since 1994. When that changed, the company didn't make any changes in its reserve bases. The company used the morbidity assumptions for their pricing that were obtained from a consulting firm. Terminations were consistent with the minimum health insurance reserve model regulation that allowed 1980 CSO mortality plus lapses with some limits. As is consistent with the regulation, the company used one-year full preliminary term.

At year-end 1997, the company used these statutory reserve factors to come up with a seriatim reserve of \$6.8 million for this block of business. The company was concerned that the reserve wasn't adequate. The concern was that the persistency had actually turned out to be better than anticipated. There was only three-and-a-half years of experience at this point, but the 20% lapse rate that the actuary had anticipated did not materialize. The lapse rates were about half of what was expected. As you're all aware, it's not so easy to get a 7% investment return; the company was a little bit concerned about that. The actuary now had a better handle on its expenses and felt that it could more accurately reflect what was going on in the company. He realized that, at the time of pricing, the company was selling policies that included inflation protection. When a person makes a claim, the benefit continues to inflate. The company had recognized that from the time of issue until the claim incurral, the benefit was inflated, but it forgot to continue inflation on-claim, which was another cause of concern. Finally, the actuary noted that the model regulation had strengthened the reserve requirements for long-term-care insurance, and he thought he should take a look at that. As a result, the actuary decided to perform a gross premium valuation.

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I want to talk a little bit about the differences in the model reserve regulation. First, as I mentioned before, this company had assumed an interest rate of 5.5% in its statutory reserves, and my understanding is the 1997 year-end interest rate should be 4.5%. As far as mortality, the model regulation now requires carriers to use the 1983 Group Annuity Mortality (GAM) Table rather than the 1980 CSO. As you can imagine, that's a significant change. Further, the 1980 CSO has everyone terminating at age 100, whereas group annuitant mortality extends to age 110. So, when the company was doing its pricing, it assumed everyone died at age 100, but now the company is thinking that it should have used a table that went to age 110.

For other health products, you are allowed to use termination rates when calculating your statutory reserves. You can use lapses only if the total termination rate is greater than 1980 CSO Mortality. The total termination rate is limited to 80% of the pricing total termination rate or, at most, 8%.

The model regulation has now changed for long-term-care insurance in that the limits are no longer placed on the total termination rate. They are placed on just the lapse rate. You can now add the mortality which is now the 1983 GAM Table to the lapse rate. However, the lapse rate isn't subject to the 8% and 80% as it was for other products. Rather, in durations five and later, you can use 100% of your lapse rate but not more than 4%. So there is a little bit of a difference between the standards for other health products and for long-term-care.

The company constructed its model office variables for the business that they had in-force. There is a list of items that need to be contemplated when you're putting together your model office. One is you need to accurately reflect your mix of business by benefit period and elimination period. If you take a look at daily benefits, you need to make sure that you're recognizing what daily benefits were offered and what your distribution of business was by daily benefit. You take into account any inflation protection that is in-force. Maybe you issued a \$100 daily benefit in 1995, but if the policy had inflation protection, that benefit has now increased.

Further, many of these policies, although my particular case study doesn't include any, are issued with a guaranteed purchase option. Every three years, the insured has the opportunity to upgrade

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their daily benefit amount, so that needs to be reflected in your model office variables. Further, any nonforfeiture benefits should be included which, again, my case study doesn't include. Issue age, issue year, gender, and type of product are self-explanatory variables. As far as type of product goes, you might need to be setting up separate cells for a nursing-home-only product, a comprehensive product that includes both nursing home and home health, or a home-health-only product. There are a lot of different product variations in long-term-care, so setting up the model office can be a time-consuming chore.

The next step that is important is validating the model. You might have run all of your pricing cells, and you now want to see how well you are doing. First, you need to make sure that the cells that you've run are producing the correct year-end in-force business. As I mentioned, this company experienced lapse rates in the early durations that are about half of what they expected. In fact, they realized that they ended up having 20% more policies in-force than they had expected based on their pricing assumptions. Of course, it is important to match your year-end reserves. A very time-consuming aspect of validating the model is matching the actual claim experience and choosing what your expected assumptions should be in the future.

Let's talk a little bit about morbidity assumptions. First, I think it's important to produce a model that says what expected assumptions should have been. In a recent case that I was looking at, we found morbidity was about 50% of what was expected. It's important to determine why those deficiencies are occurring. Is it due to the frequency or the length of stay? Perhaps your reserves are understated, and you don't have a handle on length of stay yet. Or it could be the average charges. Those are the components that would go into your expected claim cost assumptions. I think that those variables need to be tested independently. We will project the expected number of claims given the volume of in-force business versus the actual claims that are in effect. You can get a handle on how far off your frequencies have been.

Once you know that your numbers are off, you need to figure out whether you are off at all durations and ages, or whether you have a slope problem. Is that difference going to continue, or do I just have a slope problem? If I determine that I have a slope problem, is it because I have missed my selection

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factors for underwriting or is it because my slope by attained age is off? Granted, this company that sold 3,000 policies in four different years is not going to have anything credible at year-end 1997 to really make a determination about whether its experience is credible yet. It can't really know whether the experience is going to continue into the future. For this particular case study, I assumed that we would go with the expected morbidity, even though the company was experiencing better-than-expected morbidity. I wasn't willing to give them that benefit of the doubt.

I'm going to quickly run through what happens when you do the gross premium valuation. The first thing I did is I ran the valuation with pricing assumptions for the future experience, except that since I now have a handle on expenses, I'm going to run the projections with real expenses. It turns out that their expenses and profit will be more than 40% of their premium. Given the current premiums, they probably aren't going to have much profit, because the technique that they used to price did not allow for enough expenses.

The first item in Table 1 is the present value of future benefits (PVFB), which is \$54.1 million. Then there is the present value of future expenses (PVFE) at \$19.3 million. I compare those two to the present value of future premiums (PVFP) at \$71.2 million, and the liability is that \$2.2 million difference. I have a seriatim reserve equal to \$6.8 million. If all of my future pricing assumptions are correct, I then need to recognize the actual expenses. Therefore, I have a surplus of about \$4.6 million which is about 6% of my future premiums.

TABLE 1
Results with Explicit Expenses

PVFB	\$54.1
PVFE	19.3
PVFP	71.2
Liabilities	\$2.2
Current Reserve	6.8
Actuarial Surplus/(Deficit)	\$4.6
Surplus/(Deficit) as a % of PVFP	6%

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We already know that there are a couple of other items that have to be examined. Let's correct that oversight we had of not recognizing the people with inflation protection whose benefit continues to inflate after they are on claim. In this particular example, the company sold a lot of inflation protection. Two-thirds of their business included inflation protection, and 80% of this block included lifetime benefits. As you can imagine, this had a pretty significant impact on future benefits. My present value of future benefits has increased by 11%, so my expenses have also increased due to claims administration expenses. By just recognizing this inflation on claim, I now have an actuarial deficit of \$2 million which, as a percentage of future premium, is about 3%. It's not actually calculating what your required rate increase would be because it does not reflect any shock lapse or any adverse selection. It's merely what the calculation says. There was no change in the present value of future premiums for this scenario because nothing changed.

TABLE 2
Cumulative Results with Inflation on Claim

PVFB	\$60.2
PVFE	19.8
PVFP	71.2
Liabilities	\$8.8
Current Reserve	6.8
Actuarial Surplus/(Deficit)	(\$2.0)
Surplus/(Deficit) as a % of PVFP	(3%)

I ran the next scenario (Table 3), to see what would happen in the future if we could not generate the 7% investment earnings rate that we had assumed in pricing. That also has a dramatic impact, and it has a bigger impact on the benefits than it has on the premiums. Therefore, the actuarial deficit increases, and my deficit is 9% of future premiums. I think that the impact of changing that discount rate by 1% increased the future benefits by 12% but only increased the premiums by about 5% or 6%. That had a pretty dramatic impact because the benefits on this policy are loaded so much from the back end.

TABLE 3
Cumulative Results with 6% Discount

PVFB	\$67.4
PVFE	21.0
PVFP	74.5
Liabilities	\$13.9
Current Reserve	6.8
Actuarial Surplus/(Deficit)	(\$7.1)
Surplus/(Deficit) as a % of PVFP	(9%)

All of these tables show cumulative results. I'm continuing to make the changes that I had assumed in all previous tables, and I'm adding one more change on. I reduced our lapse rates and I decided that maybe the company missed the lapse rates for the first couple of durations; however, I wasn't willing to go too much further for the ultimate duration.

Table 4 reflects changing that ultimate lapse rate from 6% to 5%. I'm trying to be a little bit more conservative on that. I think long-term-care insurers might say, "Conservative!?" In all likelihood, the 5% assumption I picked is not a conservative assumption, but you can see the impact that this has. The present value of future benefits has increased by 20%, and my claims have only increased by 11%. I now have an actuarial deficit of 19% of my future premium.

TABLE 4
Cumulative Results with Reduced Lapse Rates

PVFB	\$80.6
PVFE	24.0
PVFP	82.5
Liabilities	\$22.1
Current Reserve	6.8
Actuarial Surplus/(Deficit)	(\$15.3)
Surplus/(Deficit) as a % of PVFP	(19%)

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One more test that I ran determined the effect of changing the mortality bases from 1980 CSO to 1983 GAM (Table 5). This also had a dramatic impact. It increased my present value of future benefits by 27% and the present value of future premiums by 11%. If we combine all of these changes, we have a deficit of 34% of the future premium.

TABLE 5
Cumulative Results with 1983 GAM

PVFB	\$102.5
PVFE	27.6
PVFP	91.8
Liabilities	\$38.3
Current Reserve	6.8
Actuarial Surplus/(Deficit)	(\$31.5)
Surplus/(Deficit) as a % of PVFP	(34%)

That's the end of the sensitivity test that I performed. However, if I were the valuation actuary at this particular company, I certainly would go further in my analysis. I think it's clear that this company needs to revise their reserves and set up additional reserves beyond what their initial statutory reserve assumptions produced.

There are a couple of other issues on this policy. First, I did not assume that the morbidity was better than expected. However, I think it would be dangerous to assume that positive morbidity experience will continue, but that is a thought.

Second, I have not yet incorporated any rate increases which, if the situation was as we've depicted, rate increases may be in order for this block. When incorporating rate increases into the gross premium valuation, you need to take into account shock lapses and also the waiver-of-premium provision which can create a vicious circle. As you assume shock lapses, you are stuck with worse risks, and those worse risks are more likely to go into claims status where they have their premiums waived so you're not collecting that higher premium. When I was a consultant, we had done a gross

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premium valuation for a carrier that had some very bad losses on its long-term-care block of business. Trying to create enough future premium from rate increases was a losing proposition. It was impossible to get back to ground zero because of the adverse selection that can occur.

Another issue that you need to be thinking about now when incorporating rate increases in the gross premium valuation are the rate stabilization issues that are also in the long-term-care model regulation. I understand that those rate stabilization values are changing, but we might be having a contingent nonforfeiture benefit. Your gross premium valuation needs to reflect realistic rate increases, and you must be cognizant of what can actually be accepted or approved by state insurance departments.

The testing that I did, in my opinion, helped us to reach a new best-estimate, but I don't think it incorporated much of a margin for adverse deviation, which you may want to also consider when setting your gross premium valuation.

MR. ROSS J. BAGSHAW: Hi. I'm Ross, and I'm a valuation actuary. I wasn't always a valuation actuary or at least I didn't know it. I was a product pricer for all my career, until about a year-and-a-half ago when a kind man pulled me out of that darkness and into the present light. I work for Provident, and IDI is its main driver, although long-term disability (LTD) is getting larger. I'm also responsible for the LTD valuation business that is growing rapidly right now. If people are more interested in LTD, we can move over to that instead of IDI. I know there aren't many IDI players left.

I think that we've already gone over the main nature and purpose of gross premium valuations, at least from a statutory point of view, as the ultimate test of reserve adequacy. We actually don't use gross premium valuations for statutory purposes because we just view it as a simplification of the cash-flow testing that I think most companies are doing right now. When we do a gross premium valuation, we assume a level of interest rate. We're assuming our current estimate assumptions.

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While we do sensitivity analyses, we believe you don't necessarily have to do them. It's a best-estimate calculation. You work hard to get your best-estimate assumptions, and then you let them go. You find out what they look like.

IDI has a very long tail, very much like long-term care in that regard. It has excellent persistency, which can be a real problem, and we'll touch on that later. It's very sensitive to external factors like the economy. Right now the economy is going well and disability insurance is doing well. Those of you who kept track know that it wasn't going well about five years ago. That's one reason we have young people like myself in key valuation roles within the IDI industry. Bad things happen. It's very hard to predict what's going to happen in the future. People are working and they seem to be happier. However, experience for doctors is still poor. Doctors just hated managed care and were a dominant piece of IDI sales. These policies were built on the assumption that doctors would never become disabled. Doctors would kill themselves trying to get to work. Now we are finding many more claims from doctors.

The industry tables, like the 1985 Commissioners Individual Disability Table A (CIDA), which so many companies built as their foundation for assumptions, have absolutely no relation to actual DI results. It was largely based on group data. It was largely based on old data. It's blown in essentially every single dimension. The termination rates are blown and the incidence rates are blown. The good news is that while the termination rates are too aggressive (especially in the early years), and the incidence rates are not aggressive enough, the slope of the claim costs was blown enough that it's still producing very high active life reserves. That has saved us. Our experience is much worse than 1985 CIDA incidence at the early attained ages, and later on it's about 100%. You might say, "You're always way higher than 100%." Some of you may not have any active life reserve concerns at all, but the slope, in addition to the level of your claim cost curve, determine your overall level of actual reserves.

Our products are noncancelable level premium products. We do have some guaranteed renewable business, but essentially it doesn't sell. It doesn't sell because people can buy noncancelable products. Any agent can point and say, "They've raised rates 100% in the last ten years. Wouldn't

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you rather pay 10% more for a product that can't go up in premium?" So, they're noncancelable. All of that has done bad things to the IDI business but it has recently turned around. It looks quite good. I'm responsible for valuing both Provident and Paul Revere, which were the top two IDI companies in the United States. We're clearly number one combined. Both companies had to take major steps toward reserve strengthening since 1994. Now things are getting better. We'll talk about that later.

Let's discuss choosing assumptions. What subdivisions are appropriate when you're doing gross premium valuation work? Clearly, if you're doing it for statutory purposes, you must subdivide by statutory entity. That's just the rule. For GAAP we separate by line of business, which would mean that I'd combine all IDI. I look at it separately for the two major companies, but if we had reserve adequacy trouble, we've already predeclared that we're going to combine the experience from both companies. God bless purchase GAAP, although we're not close to danger. We recognized loss recognition at Provident in 1994, and because you put up best-estimate assumptions with no margins from that point forward, you're not really supposed to put margins in your work once you recognize losses. We would be very thin on that side of the house. The good news is it has turned around some, so we are growing out of it. In addition, our new business is doing much better.

What about policy versus claim reserves? Would you have to divide your gross premium valuation work for that purpose? I don't think so. We studied the claim reserves in much detail. We have good data on them, and they're very sensitive. We viewed them for GAAP purposes, and our auditors agree that claim reserves are not subject to lock-in. As a result, we manipulate our claim reserves either up or down (usually up), based on recent data. Policy reserves are by and large the source of our major margins for the reasons that I laid out, which was that the slope of the claim cost curve assumed in setting active life reserves was steeper than it has actually been. Active life reserves tend to have large margins, and claim reserves tend to have very small margins. That's especially true for statutory. An IDI company's Schedule H loss ratio test usually doesn't look very good. The good news is it's a broken test because it doesn't recognize tabular interest within the reserve mechanism. Interest on long-term liabilities is a large percentage of their growth.

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The relationship of past experience and the future is an ongoing debate. Basically, our data are changing like crazy. Our data are improving in both incidence and terminations. There have been a lot of changes at Provident where we've brought claims from paying them in the field to bringing them in-house. We've made a serious investment in our return-to-work programs, and that seems to be paying great dividends. We've improved underwriting. And the economy is going very well. It's very hard to separate internal and external factors.

When we're choosing assumptions, the size of the models is our biggest limitation. We have six machines fully dedicated to model generation. These machines were considered super computers two years ago. Now they're war horses ready for retirement. They have 200 megahertz and are good machines, but it still takes us a week to run one model for one of the companies. If you find something you don't like, it takes another week. A sensitivity test would take another week. The size of the models is our overriding problem right now. We know that we're not splitting our data the way that we want to to get a really good picture of our future. We're constrained by the models. I actually don't have responsibility for the modeling function. That is the critical function for IDI, and I suspect for most health lines of business. In some companies, it tends to be undervalued because of low visibility, but that's where we get all our information.

When choosing assumptions you must consider general morbidity, investment yields, persistency, and expenses. We'll touch on all of those. For investment yields, we basically assume our best-estimate yield, which is actually 8% right now for Provident, and it's less than that for Paul Revere. We're very well-hedged on Provident. Our investment people are convinced that the 8% is good for a long time, despite the recent down ticks. We're not nearly as well-hedged at Paul Revere, and we're not very well-hedged on the LTD. That's where interest rate drops are going to hit us for sure. Persistency is pretty stable. We do a five-year rolling average on that. We have expenses pretty well pegged. Regarding expenses, we believe that you would not have to include overhead for gross premium valuations. We do anyway, but the accountants say you don't have to do it. If you are in anything like loss recognition danger, pull them out. It's easier to include them than it is to figure out what's overhead and what's not overhead. We think it's close to 3%.

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Morbidity is our driver. We separate morbidity by incidence, terminations, and payments. I wish that we didn't separate terminations and payments, but we do. It doesn't end up very well with the 1985 CIDA or traditional actuarial work. As far as incidence, we use five-year rolling average data. I'm not going to tell you that there's not any judgment in there. Five years ago was the worst, and last year is the best. Somebody is going to notice that. We look at issue age, attained age, and duration because there is some selection effect. We look at class. We look at doctors separately. Doctors are a very large piece of our business and are by far the worst.

We also take into consideration elimination period, benefit period, and issue state (Florida). The reason issue era is important is because we sold lower benefit policies to people that didn't really understand how to make money off them in the 1970s and very early 1980s. Then we went into this as an industry loading up benefits. The mid-to-late 1980 issues are the worst of the business. Now it's better again. We have to stratify those data because, unfortunately, the best morbidity on the older policies has a very real impact on this year's incidence rates, but it has a lesser effect on the present value of all future benefits. The oldest stuff is going to wear off the soonest. You really want to make sure that you take that into account.

There are a variety of multi-life discount programs and multi-life discounts work. For incidence there are select association discounts out there, otherwise known as air breather discounts. Those seem to have little or no beneficial impact on morbidity. You have to look really hard, and the marketers appreciate it when you do look really hard to find some. We don't vary our incidence by sex or cost-of-living adjustment (COLA) benefits. With doctors and lifetime benefits being separate classes under themselves, the COLA really doesn't seem to have an impact. If we were to not select doctors or not select lifetime benefits to divide off of, and were to do COLA first, I think both the incidence and termination rates would be remarkably different from what we see. We actually ran it, and it didn't make much difference because it was all captured in the other parameters. I forgot to mention size. What we really wish we had was a total replacement ratio. That's very hard to get. We use monthly indemnity as sort of a proxy for that. There's a clear difference between high-face-amount policies and low-face-amount policies. The real difference is what percentage of your after-tax income you can have.

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Women have a much higher likelihood of incurring a claim. They do terminate from claim much better than men do, but in total, the cost is much higher for women than men. That was one of the things that really burned the IDI industry. They used to sell 95% male cases, and then they decided to go unisex and charge the male rate. Guess what? Now females make up something like 30% of the sale of the IDI population. Sex is a factor of which we need to divide our morbidity results. I'm convinced that we will in 1999 when we get the more powerful computers. We are currently carrying 60,000 cells and that doesn't include any split by sex. It takes 16 gigabytes of hard drive space to just contain the cells. Dividing it by sex would double things.

Terminations are based on much the same parameters. There are a few less considerations. For example, we don't look at the discount programs when we look at terminations, but most everything else is a driver, especially as you go out farther. If you have a lifetime benefit, and he has been on claim for five years, you might as well just set him up as a life annuity. It's not going to go away. If you have a five-year benefit period, then our claims people might very well be able to encourage you to go back to work early and help you get there. However, terminations are very volatile and hard to pin down. Our assumptions do change all the time, and we're getting better and better at it as a company.

Morbidity is also separated by payments. All the termination studies that the Society does and that everybody else does are based on sort of an incurral basis. All of our work is based on more of a cash basis. Let's say our claims department goes to somebody who has six months left in his benefit period. He's to-age-65, has six months to go until he's age 65, and they give him the six-month benefit. They give him a six month benefit in cash so they don't have to pull up the file anymore. We register a termination, and then we have to register six times the payments. These things are closely linked. I would prefer to code a financial termination date six months later, but we don't. I'd like to get that graph in front of the claims department because I think it shouldn't count as a termination, and they certainly view it as one. In our models, terminations and payments are connected together, and there appears to be nothing I can do about it.

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Validating the models. I've gone over the size of the models, and how much time it takes us to run them. They're very painful exercises. As a result, our modeling department has relied very heavily on static validations. In static validations, one determines the model of, for example, active life reserves and the model of disabled life reserves. If the answer isn't as good as you think it should be, you tweak it.

In dynamic validation you should be doing things like saying I know what happened in 1997. You might put in the 1997 assumptions, roll them forward, and see how well the model is doing. We're working toward dynamic validation. It might not be going as well as it could. It's mostly an issue that pertains to size of the model issue. The consultants that set up our assumptions for Paul Revere gave up. That became obvious to us late this year, but the consultants clearly couldn't do it and gave up, so there's just blaster factors in the middle of termination tables, which excited me to no end when I was trying to put them on the valuation system.

Dynamic validation is the critical and appropriate validation, and it's not something that my company is doing very well currently. I expect us to do a lot better. I strongly encourage you to not just assume that you can take your claim reserve, multiply it by 1.1 or whatever, and get the right result. It's even more important on incidence rates. In pieces, the model doesn't look very good, but when you aggregate things it turns out well. We like that, but we need to do better in terms of actually validating the models, and that's where the real guts of the job is. I suspect it is for long-term-care and anything else.

Analyzing results. Goal one is to be positive. Present value of premiums higher than present value of reserves and expenses implies adequacy. For GAAP purposes, you'd better get deferred acquisition costs (DAC) in there. I would say that being positive is fine because you don't have to recognize any losses. Unless you're very positive, you won't have any future profits either. When we did last year's gross premium valuation, we had one block that had a small sufficiency and one block that had a large sufficiency. The problem is in the definition of *large*. Pretend the sufficiency is \$500 million. That sounds like a lot of money, but you're doing a closed block test. You don't have any new business coming on within a gross premium valuation and the premiums are

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noncancelable. Reserve sufficiency is the source of all your profitability on that closed block business for the company.

So \$500 million might translate into a 10% return on equity (ROE). At the same time, management is telling everybody we need 15%. When management hears \$500 million, they might believe you've locked up our profits forever. The reserves are redundant and huge. If you have \$500 million of sufficiency, you get a 10% ROE. If you have any less than \$500 million, you get less ROE; it's just that simple. You have to make sure that you understand and can explain what kind of profit generation your reserves are going to produce.

That \$500 million was a pretty sizable percentage of our overall reserves, but it is clear that in the less-than-\$100 million block, the ROE returns aren't nearly that good. If my results are bad (less than \$100 million of sufficiency on my business), then I would try to be pumping up reserves a little bit. If they're negative, then that's a tragedy. If they're negative, then you must undertake loss recognition. You have to write down your DAC and pump up your reserves.

I think it's important to look at your trends and your sources of adequacy. Clearly, if your adequacy has gone from \$5 million, to \$30 million, to \$100 million in the last three years, you're going to feel a lot better about it than if it's going the other way—from \$100 million, to \$30 million, to \$5 million. You don't need to be a rocket scientist to know that drawing that trend line in Excel is scary.

MR. CUMMING: My talk is based on a client project we did. It involved calculating a gross premium reserve for a company. I'm going to cover a little background on the situation. I'll go through our methodology and some of the assumptions and talk about some of the issues that came up in this project and in many other gross premium valuations. I'll then show you the results and some sensitivity testing.

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I have a little background on the organization we are working with. It is a not-for-profit organization. It has what I consider to be a fairly large block of individual major medical business. It had about \$100 million of annual premium.

What is a little different, and what makes this a somewhat atypical example is that the management was not averse to increasing its reserves. Because the company had pretty good surplus levels, the management was not averse to putting aside some money to fund some future expenditures. The rating and how the rates relate to claims in these gross premium valuations is probably the key issue that tends to drive the result.

This company combined all of its individual major medical business into one pool for rating purposes. It was giving all of its coverages the same rate increase. They wanted to pool the business. They didn't want the older, closed blocks of business getting stuck with high rate increases and paying very different rates, given the benefits from the current issues. They wanted to pool all the business and charge the same rate increase across all blocks of business. In doing so they were targeting the equivalent of a lifetime loss ratio of about 72%. As long as enough new business came in to offset the lapses, you'd have basically a steady-state scenario. Given that steady-state scenario where the new business is replacing the old business, the company could put through rate increases that are in line with underlying cost trends leveraged for a deductible. As long as the new business is coming in, rate increases would be in line with the cost trends. It would maintain a 70–72% loss ratio for everything going forward.

The projection model we built was much simpler than what Ross described. I'm certainly glad for that. It's an annual projection model on a calendar-year basis. It goes out about 30 years. We did it in a worksheet-based approach. The key part of it is to split the business by duration, and we do group the business by issue year so that we can reflect durational cost increases.

We went back about eight or nine issue years, and then prior to that, we just grouped all the business together. That is basically the only split in terms of the projection—just grouping the premium and the claims by the calendar year of issue.

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Key assumptions that tend to drive our results are the interaction between future rate increases, claim trends, and the duration-related cost increases and what they do to our loss ratios. We have rate increases that are in line with the underlying cost trends, and that keeps their overall loss ratio stable as long as you include the new business that's coming in. If we're doing a gross premium valuation and following the business that's currently in-force on a closed block basis, and if we isolate them, we will find that the company's loss ratio is going to climb or creep up over time because of duration-related cost increases. The retention versus the actual expenses certainly impacts the end result as well.

Table 5 shows the assumptions that we developed that depend on the durational component. The duration in Table 5 is measured in terms of years. We go out seven years, and then we assume an ultimate level. The claim level in the first year is about half of a lifetime average, which is about the same as what it is in the third year. It starts out at about 56%, and then it climbs fairly quickly over the first three years; it then climbs at a slower rate.

TABLE 5
Durational Assumptions

Duration	Claim Level	Lapse Rate
1	56%	32%
2	86	23
3	100	21
4	105	19
5	108	17
6	110	15
7+	+1% per year	15

Both of these assumptions are based on our analysis of the companies historical data split out durationally. The historical data did show a fairly level pattern for the claim level in the future years. It went up fairly quickly at first, and then it seemed to stabilize or flatten out quite a bit. We left in a 1% increase per year on the claim level. The lapse rate started out at about 30% in the first year

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and then, over time, dropped down to about 15%. That's a fairly low ultimate lapse rate, but it is consistent with what we saw in terms of the durational claim factors. The ultimate increase in the claim levels, because of duration, was fairly low, and I think that's probably a result of the low lapse rates.

The expenses vary by duration as well. Basically, the first and second year expenses are a little bit higher because of commissions. The company does pay a higher commission in the first year on the business or the first 12 months since issue. Since our model is really grouping things by calendar year of issue, things issued in a given calendar year will have higher expenses than year-end in the following year because there will be some premium in the first 12 months. That's why it's higher in the first and second year.

Our trend assumptions were composed of four different pieces. We had an underlying cost trend assumption included. Deductible leveraging came out to about 6% per year. We are basically assuming that their rate schedules are going up about 6% each year. There's also going to be a trend component for the block that is getting older on an attained-age basis. We estimated that that added a little over 1% per year. The premium slope by age was fairly reasonable. We matched up the premium and the claim cost increase for the attained aging of the population. Again, this is consistent with the rating approach whereby the premium increases on this block are maintained at a level that's consistent with just underlying cost increases. In other words, the company doesn't want to charge people extra because of the durational aging effect.

Everything assumes a net investment income rate of 6%. In our model, we're earning investment income on the claim reserves, and we put in one-half year interest on any gain or loss that comes in during the year, assuming that is centered in the middle of the year.

In my view, there doesn't seem to be much guidance on these gross premium valuations. When talking with different people, I heard of a lot of different approaches or philosophies to these types of calculations. I'm on a committee for the Academy that just recently has offered to assist the NAIC with the development of a guidance manual on health insurance contract reserves and gross premium

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reserves. This might start to address some of these issues and provide a little more guidance to regulators and defacto guidance to valuation actuaries in terms of some of these assumptions.

One of the things that has been discussed differently is whether federal income tax should be reflected. All of our analyses shown here are done on a pre-federal income tax basis. But there might be some scenarios where, if the company's not allowed to deduct the gross premium reserve for tax purposes or changes in these reserves for tax purposes, it might be appropriate to look at things on an after-tax basis.

Another issue is whether you use marginal expenses or fully allocated expenses. Ross talked about that a little bit in terms of the GAAP situation. In this case, we've used fully allocated expenses, which includes overhead as well as everything else. Another issue is when do you combine blocks of business and allow positive results on some blocks of business to offset negative results on others? In this case, we've combined all the major medical business. That's rated as one pool by this organization, so that seems appropriate. We have not tried to offset it or adjust it for other individual medical business.

Another question deals with guaranteed renewable business. Although this business was referred to as guaranteed renewable by this company, I believe that if it so chooses, it could cancel the entire block in that state. I don't think the company would ever do that, and we certainly didn't reflect that in our calculation. We assumed that this block would stay in-force and continue to run out. That reflected the company's and management's intent, but you can get in situations where a company might have that out. It could cancel an entire block. Maybe it would be locked out of that state for some period of time. Should that be a reason for not setting up a gross premium reserve? What if you think the company is still going to stay in the state, even if it has losses? Are you required to set up a gross premium reserve?

Time is also a key issue in a lot of this. Our model ran out 30 years and was basically consistent with how long we thought the block would be in-force. There can be gaming issues, though, if you allow things to run out really long and you start projecting gains again which offset losses in some of the

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early years. I've seen a number of people discuss that maybe it's most appropriate that if you have some short-term losses, on medical type business your projection should only go out until the losses stop. That is, you shouldn't allow long-term gains to offset short-term losses due to the uncertainty regarding whether these long-term gains will materialize. That might be the appropriate reserve to set up.

Margins. Should we do a best-estimate assumption or put in a margin for adverse deviation? Our philosophy and approach, at least for statutory gross premium valuations, is to do things on a best-estimate basis. I think Peggy mentioned some of the wording that's in that draft actuarial opinion and memorandum. Section 7 talks about doing a cash-flow type projection and using best-estimate assumptions. We generally use best-estimate assumptions. I haven't seen anything that says you should or shouldn't use them when doing gross premium reserves.

Table 6 shows that the middle scenario that we chose is a 72% loss ratio. Our model assumes that they're targeting this loss ratio, and they're achieving it on the open block of business. If we're just following the people currently in-force, then over time the loss ratio climbs in our gross premium valuation model.

TABLE 6
Sensitivity Testing: Target Lifetime Loss Ratio

Target Lifetime Loss Ratio	Gross Premium Reserve
67%	\$23.5M
72%	\$52.6M
77%	\$77.8M

The model is also very sensitive to what's going on with durational cost increases. Our baseline scenario, which formed the basis of the gross premium reserves, assumes a 1% increase in claim costs every single year once you go past duration seven. That was based on some analysis of the experience, but I have to admit that when you get out to those later durations, the experience is

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somewhat thin. We thought that was a reasonable assumption. It's a little bit lower than we might normally use, but it reflects that they do have lower lapse rates than we would normally see. If you change that assumption just by 1% up or down, you swing the gross premium reserve up or down about \$15 million.

Claim and premium trend is shown in Table 7. Again, we assumed total trends of about 7% in our model. That gave us the \$53 million reserve number. If we increase that or lower that by 2%, we change the reserve about \$10 million up or down. When we change this, we do change claim and premium trend together so that we always have those consistently going up, and that reflects management's chosen rating strategy at that point.

TABLE 7
Sensitivity Testing: Claim and Premium Trend

Claim and Premium Trend	Gross Premium Reserve
5%	\$43.9M
7%	\$52.6M
9%	\$63.8M

One issue in the chosen rating strategy was to use rate increases on the existing business and existing policy forms so that we're just keeping pace with the underlying cost increases. Other approaches commonly used would be to close off the policy forms and rate them by themselves. For sensitivity purposes, we looked at what would happen to the gross premium reserve if the company closed those blocks as of the valuation date and then managed those blocks to either an 80% or an 85% target loss ratio in the future (Table 8). This did drop the gross premium reserve significantly. If it closed a block, and put through rate increases initially and kept pace with trend and allowed the loss ratio to go up to 80%, the company would manage it to that 80% loss ratio going forward. These actions would drop the gross premium reserve by about one-third.

TABLE 8
Sensitivity Testing: Open versus Closed Block

Rate Increases	Gross Premium Reserve
Open—target 72%	\$52.6M
Closed—target 80%	\$35.8M
Closed—target 85%	\$46.6M

MR. A. DUFF WINKENWERDER: My question is on tax reserves and the use of the 1983 GAM versus the 1980 CSO. It seems much more appropriate. If you're thinking of designing a long-term-care product that has an up-front premium as opposed to a level premium from the continuing care retirement community (CCRC) environment, can you use the unitary type method or a net level type method instead of preliminary term? It would seem that you would have to.

MS. HAUSER: At the previous session, we talked about requirements for tax reserves. The speaker at that session said that 26 states need to adopt the regulation before you can follow the regulation for tax purposes. Therefore, for tax purposes, you should be using the 1980 CSO.

MR. JAMES A. GEYER: I was especially interested in the comments on whether to use full expenses or just marginal expenses. I guess I'd appreciate a little more discussion from each of the panelists in terms of your experiences in doing a gross premium valuation for purposes of recognizing a potential loss or making a determination that reserves held are truly adequate. Is it your experience that you would just use marginal expenses? If so, what type of expenses get excluded or included? What regulatory advice or requirements are there on that point?

MR. BAGSHAW: As far as regulatory advice, is your question to be statutory based? I'm going to pass on this question because, on a statutory basis, we've never, in IDI, come very close to having a reserve adequacy problem. We put up very large cash-flow testing margins and we do use fully

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allocated expenses for our cash-flow testing. Regarding GAAP, when Provident went through their loss recognition, they used a marginal assumption for expenses, but that's not the nature of your question.

MR. CUMMING: I would say, "Ditto." In our experience, we've used fully allocated expenses in doing the statutory gross premium valuation. Again, I haven't seen anything definitive in terms of guidance on doing that or not doing that. As Ross mentioned, there is some guidance put out by the accountants regarding recoverability testing for GAAP purposes. They do allow marginal expense assumptions.

MR. WILLIAM F. BLUHM: I have a question for Ross. Has there been any further discussion or movement on the issue of whether redundancies in particular assumptions used for IDI reserves are being used to offset deficiencies and other assumptions? Do you know what I'm talking about? There was an issue a few years ago about that with a particular regulator.

MR. BAGSHAW: Yes, we ultimately did win that, but that was before my time with Provident. I talked about how 1985 CIDA was deficient for valuing claims, and it was very deficient in the first years. You're able to use your own experience in setting up statutory reserves for DI and LTD in the first two years. We have been earning 8% interest rates. We're required for statutory purposes to use a 4.5% interest rate. When you're valuing a claim that's going to last 40 years, it makes a big difference. So the gist of the problem was that we were calculating our claim reserves in the first couple years saying that we ought to hold 1985 CIDA times some small but constant number that's greater than one putting up cash-flow testing surpluses in the hundreds of millions of dollars. There's a statutory requirement that says we must hold at least 1985 CIDA at 4.5%. We cash-flow test our reserves and produce a positive answer. To me that's enough. I mean what could be simpler than that? We had this huge sufficiency. One state found a more conservative DI actuary, and he said "The morbidity is insufficient, and we don't care about sufficiencies anywhere else." He said we

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had to change the morbidity basis. We should value that at 4.5% and disregard any other contributions in cash-flow testing. We don't assume any lapses on our noncancelable DI business. For a guaranteed renewable, you're allowed to use the lesser of 8% or 80% of your total termination rate, but for noncancelable, you just have death rates. We're looking at the present value of our active life reserves. Based on 4.5% interest, there is absolutely no consideration of any lapse rates of any kind. We were producing high cash-flow testing margins. He wanted us to crank up our statutory claim reserves by a couple hundred million bucks, and we fought it, and, as I understand it, we won.

At the M&R symposium last year there was actually discussion between Dave Libby who was the valuation actuary at the time and the consultant that was working for the state department. They debated. There was a show of hands, and at the end of the day the show of hands went 90% for Libby and 10% for the other actuary. That's about the way it shook out. My view is you have a statutory minimum as prescribed by law. I realize that with unified valuation changes, that may not become the case, but right now they'd say, "Here's your minimum standard; cash-flow test it." We'd put it under tons of sensitivity analysis, varied interest rate scenarios, and if it keeps coming out squeaky clean, I think that you'd have every right to resist somebody trying to punch up one piece of the whole pie. That's how it came out.