

HEALTH INSURANCE CASH-FLOW TESTING

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MR. ALBERT A. RIGGIERI, JR.: I will be reviewing the basic elements of cash-flow testing as they relate to individual disability income insurance. My comments will be drawn from our experience at Paul Revere in developing cash-flow testing for 1992 year-end. This was the first year we completed cash-flow testing for our disability income business. One important message I can give you related to our work was that we learned much from other actuaries, particularly those who have been involved with this type of work for some time in dealing with New York Regulation 126 requirements. We therefore did not have to reinvent the process but rather we could build off of others' experiences and concentrate our attention on specific issues related to disability income business.

Now, let me turn to our cash-flow testing process. The following is a list of the four basic elements of our process:

1. Model office construction
2. Liability Modeling: active life model and claim runoff model
3. Asset modeling
4. Analysis of results

These elements are common to cash-flow testing as it applies to any insurance business, but within each element there are items of specific interest related to disability insurance. I will highlight those items in my discussion. We have a two-part liability model. One part projects premiums, commission payments, administration expenses, along with cash-benefit payments and reserves for claims incurred after the initial date of the projection. The second part is a claim runoff model. It projects cash-benefit payments and reserve balances for all claims incurred prior to the initial date of our projection including both reported and unreported claims and administration expenses associated with these claims. This two-part liability model allows for much more control in setting our assumptions, performing sensitivity tests, and validating results than if a single model is used for all elements.

MODEL OFFICE CONSTRUCTION

Now I'd like to turn attention to the activity of constructing a model office. Our model office is used to group active lives into cells for producing liability projections under the first part of our model. The second part of our projection works on a claim-by-claim basis, eliminating the need for any groupings. This is possible due to the relatively small number of claims open at any time.

The challenge in setting a model office for disability insurance is to represent the key parameters that are important to our business while limiting variations in order to maintain computing efficiency. The task is complicated by the large number of possible parameters that can impact our business. In trying to select the most important parameters you should take into account the following considerations:

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1. Volume of business
2. Product characteristics
3. Integration with other assumptions
4. Premium variations
5. Efficiency considerations

Of particular importance is the need to coordinate your model office with possible parameters by which morbidity experience will vary as well as variations in rate structure and product characteristics.

Keep in mind that cash-flow-testing work will deal with your entire in-force book of business, and the nature of these considerations can vary for the different generations of the policies on your books. Also, make sure that your priorities are set up-front, and you make the tough calls needed to limit the variations. Remember, you're going to be most interested in aggregate forecast for the business, and you can use some macro-level adjustments to fine-tune your results which can help you eliminate some of the variations built into your model office.

I'll give you a quick rundown of the model office that we used at the end of 1992. Table 1 shows the major parameters used in our model office.

TABLE 1
Model Office Construction Summary of Results

Parameter	Variations
Basic Plans	10
Ratebooks	2
Issue Ages	3
Policy Sizes	3
Elimination Periods	2
Benefit Periods	2
Gender	2
Occupation Class	3
Sales Channel	3
Rider Plans	2

- Not all combinations are used
- 2,100 cells
- Premiums maintained by policy duration

We used ten basic parameters. The basic plan grouping is a breakdown into categories by policy types, such as those with total disability versus residual coverages, and business versus personal policies. This grouping also allows for some generational breakdown of our business. Inside of this breakdown we allow for the other parameters shown here. You will note that we do not have any different geographical areas represented in our model. This is not because we consider it unimportant but rather that our distributions of sales and our morbidity differentials by area have remained quite constant over time. This allows use of a simple geographical morbidity loading, and we eliminated this parameter from our model. This is an example of how we limited the variations in our model.

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Another example of how we limited our model office variations involved our rider plans. We did include cost-of-living benefits and lifetime riders in our model because these coverages have significantly different benefit structures than regular base policy benefits. Other riders have cash flows that can be modeled as additional layers of base policy coverage. Cash flows for these two riders, cost of living and lifetime, have much longer deferral periods until payout. And we thought it was important to recognize this in our model.

If you cross multiply each one of the elements shown here, you'd come up with some 26,000 cells. That would be quite a bit to handle in a model office for a cash-flow testing. With some careful selections, we limited the number of cells to 2,100. For each of these cells, we tabulated our premiums by duration, in order to properly reflect the mix of business by policy duration in our model.

LIABILITY MODELING

I'd like now to give you some background related to our liability modeling. Our active life model projects premiums, commissions, expenses, cash-benefit payments, claim reserves (statutory, tax), and policy reserves (statutory, tax). Each of the key assumptions driving the projection is tied to the latest available experience we had for our business. Up-to-date morbidity and persistency assumptions were developed by reviewing experience from the late 1980s and early 1990s. Maintenance expenses, including the cost-of-claim administration, were projected using unit rates from a 1992 expense study. Commission rates reflect the different generations of contracts available to our agents and brokers. We therefore developed a base of up-to-date assumptions and built those into our modeling. The assumptions that get the most attention in our modeling are related to morbidity experience. Most of the variations built into our model office are designed to allow us to produce an accurate projection of future claim experience.

There are three other items of note concerning the active life modeling. First, there is no direct linkage between our liability modeling and our economic scenarios. This approach may at first seem inappropriate, but let's look at our reasoning behind this delinking of asset and liability modeling. First, we have no historical evidence of direct linkage between the economy and morbidity or persistency experience. We do test variations in both, that allows us to view the combined impact of low interest rates and increased morbidity costs that could occur under an economic slowdown, but we make no assumption as to a direct linkage. We also modeled CPI-linked cost-of-living benefits at the maximum payout rates. We have certain caps in these riders, and we project payments using these caps, which results in a slight degree of conservatism in our benefit projections. Last, we consider expense inflation to be a minor element, vis-à-vis risk and financial impact.

The second item of note is that our statutory and tax reserve interest rates are fixed. Variations in claim reserve interest rates can alter the timing of profits and tax payments, but we find that profits emerge in a slightly different pattern that does not impact our overall view of reserve adequacy.

The last item of note is that we ran two liability scenarios. One is called the baseline and reflects our most up-to-date expectations. And the other builds in a 10% deterioration in morbidity costs. We considered this an adequate range of results to

test related to morbidity costs. Other elements of our liability projection were held constant.

Our claim runoff model projects cash benefits and reserve balances for each of the some 6,000 reported claims as well as claims incurred but not reported. The projection is based upon up-to-date assumptions as to claim persistency, and it is run independent of economic scenario. We ran two scenarios for this element of our liability model. These scenarios were for a baseline scenario, and one which has claim terminations reduced by 10% during the first two years of disability.

ASSET MODELING

We began our asset modeling by categorizing our investments into these segments: noncallable bonds, callable bonds, stocks and real estate, CMOs, and mortgages.

Approximately 50% of our investments are in noncallable bonds, which are quite simple to model. They require only a quality rating, maturity date, coupon rate, and book value to project the cash flows and investment income. This helped to keep our work load down and allowed for some grouping in this category of our investments.

We have another 45% in callable bonds, collateralized mortgage obligations (CMOs), mortgages, and mortgage-backed securities. Most of the latter are agency-issued Government National Mortgage Association bonds (GNMAs). These categories require parameters that model prepayments under interest-rate fluctuations. CMOs are the most complex type of asset in this category, and we required extra help from some of our experts to provide us with insights on how to project cash flows under CMOs. The remaining 5% of our assets are equity-based, such as real estate and stock. We modeled these with a small cash return and a bit of capital appreciation.

We used outside vendors to generate input data to our asset models, and we used vendor software as much as possible here. This is where you can truly capitalize on existing expertise to help out. We also consulted heavily with our financial product actuaries and our investment staff. This became very important in dealing with complex CMOs. Through this we learned that we could apply standard practices related to items such as mortgage prepayments and bond call provisions.

For investment scenarios we ran each of the New York seven scenarios against each of our two liability scenarios. This helped us understand how interest fluctuations would impact our results. New investments were made in 25- and 30-year bonds and mortgages, and our disinvestment strategy called for selling off assets with closest maturity dates first.

VALIDATION ACTIVITIES

Before I return to reviewing some of our 1992 results, let me briefly describe a few validation steps that we attempted to ensure that our models were producing credible results. First, we cross-checked the results of our liability model, our forecasting process, and our cash-flow-testing process to converge so that we will lose a bit of this cross-checking.

In verifying the overall projected morbidity costs, we calculated interest-adjusted loss ratios, which are cash-benefit payments plus all reserve changes, minus the tabular

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interest earned on reserves divided by premiums. We compared these indexes to recent historical results and also viewed the pattern of interest-adjusted loss ratios over the life of our projection. We have certain expectations related to this pattern, and when results vary from them, we study the results in more detail to find out what is driving them.

We also checked our runoff of open claims by reviewing projected gains and losses produced by our claim runoff model versus our actual recent experience. As I noted, there are multiple validation steps which you can build into your process if you split your model down into pieces.

For certain cells in our model, we backed our projection up to the date of issue and compared cash flows to recent pricing studies for new issues. This allows another cross-check to independently produced results.

The results of our asset modeling are reviewed by comparing projected investment returns to our current portfolio yields and reviewing projected yields across a series of investment scenarios. And finally, we review our model default losses against recent historical asset breakdowns.

RESULTS OF 1992 CASH-FLOW TESTING

I will now give you a quick review of our results from 1992 cash-flow testing. The information I'll show you is based upon our U.S. segment of the business. It has approximately \$380 million of annualized premiums and over a billion dollars of reserves associated with it.

Table 2 shows the cash flows generated by our active life model. We can see the premiums dropping off over time, and commissions, expenses, and benefits remaining fairly constant over time. This leads to the characteristic pattern of positive cash flows during the early projection years, and negative cash flows in later years of our projection. This clearly shows the long-term nature of the disability product liabilities.

TABLE 2
Liability Modeling
Active Cash Flows \$ Millions

Year	Premiums	Commissions, Expenses, Benefits	Net Cash Flow
1	357	162	195
2	322	160	162
3	291	163	128
4	265	172	93
5	218	175	43
10	142	185	(43)
15	76	179	(103)
20	34	138	(104)
25	11	76	(65)

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Table 3 shows the results of our runoff model for current open claims. You can see here the declining cash flows associated with a closed block of claims. These cash flows are layered in on top of the active life model to obtain the total policy-related cash flows for our business.

TABLE 3
Liability Modeling
Claim Reserve Runoff \$ Millions

Year	Claim Reserve	Cash Flow
1	669	(124)
2	595	(96)
3	542	(78)
4	497	(70)
5	456	(63)
10	311	(45)
15	174	(29)
20	84	(17)
25	35	(6)

Initial Reserves: \$763M

Cash Flow = Benefits Plus Claim Administration Expenses

Table 4 shows the combined cash flows from all sources for our business. You'll note that a positive cash flow in early years of the projection indicate the reinvestment risks associated with disability income products. The capital transfer column shows our ability to generate dividends, after allowing for buildup of surplus of 10% of liabilities. We initialize our model with no surplus, and retain up to 10% of liabilities in a surplus account before releasing profits. It takes two to three years before we can generate positive dividends. Looking at the overall cash flows in the last column, you see the high level of early-year cash flows followed by negative cash flows at later durations. These are the results of our baseline morbidity scenarios under level interest rates, which is one particular scenario.

TABLE 4
Analysis of Results
Cash-Flow Summary \$ Millions

Year	Policy	Investment	Capital Transfers	Net Cash Flow
1	70	162	0	232
2	61	142	0	203
3	41	158	(18)	181
4	19	161	(40)	140
5	(2)	166	(57)	107
10	(91)	154	(59)	4
15	(133)	155	(45)	(23)
20	(118)	69	(35)	(84)
25	(70)	56	(20)	(34)

Investment Rates: Level NY1

Morbidity: Baseline

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Table 5 is a less favorable scenario. This scenario has a 10% unfavorable deviation in morbidity results and a 300 basis point drop in interest rates. The characteristic you'll see here are the policy cash flows become less favorable and the investment cash flows move up in the early years, as bond calls and prepayments are exercised. The resulting cash flows have a pattern of a steeper drop-off versus our baseline scenario reflecting additional reinvestment in early years and increased payouts in later years.

TABLE 5
Analysis of Results
Cash-Flow Summary \$ Millions

Year	Policy	Investment	Capital Transfer	Net Cash Flow
1	62	256	0	318
2	49	203	0	252
3	27	169	0	196
4	3	156	0	159
5	(18)	161	0	143
10	(111)	170	(23)	36
15	(152)	151	(22)	(23)
20	(133)	59	(24)	(98)
25	(78)	48	(17)	(47)

Investment Rates: 300 BP Drop NY7

Morbidity: 10% Deterioration

Table 6 shows a projection of after-tax earnings and capital gains for our baseline morbidity projections with level interest rates. This scenario generates a fairly good level of earnings. Early-year capital losses are generated due to defaults, and capital transfers begin in year three after building up a surplus balance. Earnings and capital gains for each of our 14 scenarios were reviewed, and comments were given in our report to the appointed actuary.

TABLE 6
Analysis of Results
Profits/Losses \$ Millions After Tax

Year	Earnings	Capital Gains	Total	Capital Transfer
1	42	(2)	40	0
2	53	(2)	51	0
3	59	(2)	57	19
4	50	(2)	48	40
5	64	(2)	62	57
10	57	(2)	55	59
15	37	0	37	45
20	25	1	26	35
25	13	1	14	20

Investment Rates: Level NY 1

Morbidity: Baseline

Table 7 shows the present value of capital transfers for each one of our 14 scenarios. The present values are calculated using after-tax portfolio yield rates. This type of an

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exhibit allows us to develop a precise summary of our results. As you can see, our asset adequacy measures show that, under the scenarios tested, we have between a 16-56% margin in our initial assets. Furthermore, in looking at this information, we could extrapolate and consider results for alternative fluctuations in interest rates and morbidity results. Basing our conclusions on these results, we were able to conclude that we could withstand significant deviations in experience while our assets remain adequate to fund all policy obligations. This allowed us to express an opinion of asset adequacy for year-end 1992.

TABLE 7
 Analysis of Results
 Present Value of Capital Transfers
 Percent of Initial Assets

Interest Rate Scenario	Morbidity Scenario Baseline	Morbidity Scenario Downside
Level	47%	34%
+ 50 BP/Year	47	36
Increase/Decrease	56	44
+ 300 BP Increase	55	42
- 50BP/Year	39	25
Decrease/Increase	32	20
- 300 BP Decrease	31	16

MR. JAMES T. O'CONNOR: I'm going to talk about some of the practical considerations related to what I call short tail business. Al talked about disability income, and he could have applied the same points to long-term-care insurance. We're going to focus now on some of the short-tailed products: group health insurance, small-group health insurance, and individual medical. So, particularly, our focus is going to be on medical insurance. A lot of you who deal with medical insurance probably had to wrestle with this question at year-end. What do I do for my medical business? Is it really necessary to go through all this cash-flow testing for medical, since it's such a short-tail product? Can't I just use my traditional approaches of using developmental methods and runoff methods for this business, for its claim liabilities and leave it at that?

I intend to explore that question and some other questions. I don't know that I'm going to give you any answers. But I think what it's going to come down to is that, when dealing with short-tailed business, it's going to call for good actuarial judgment on the part of each of the valuation actuaries as to how you should treat medical business.

NAIC STANDARD VALUATION LAW

I think the first thing we should look at is what the model standard valuation law actually says about the types of opinions that we need to give. Of course, the valuation law doesn't specify between life insurance, annuities, or health insurance. The law states that "every life insurance company" shall include an opinion of the same qualified actuary, as to whether reserves [held], when considered in the light of assets, "make adequate provision for the company's obligations."

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So, whatever this means to you, one of the things that certainly stands out in that sentence is "when considered in the light of the assets." I think what that says to us is, whether you're dealing with life, annuities, long-tailed health insurance, or short-tailed health insurance, we still need to consider the assets. Whether that means cash-flow testing or not is another question. But I think it does call for us to look at the assets in various ways.

CASH-FLOW TESTING IS NOT ALWAYS NECESSARY

The Actuarial Standard of Practice (ASP) No. 14, gives us some guidance as to whether or not we really do have to cash-flow test in every situation. It basically says that cash-flow testing is not always necessary. And it gives three particular situations where cash-flow testing may not be necessary and might be handled in some other ways.

The first is that the risks inherent in short-term products may be more appropriately analyzed through other means. These risks usually involve a small number of large individual claims, over a short-term period, and might be better addressed using risk-theory techniques.

A second area would be that, if the actuary can demonstrate that a block of business is relatively insensitive to influences such as changes in economic conditions, then the actuary may determine that cash-flow testing is not needed in order to support the opinion. Note though, that this does not say insensitive to investment income, but insensitive to economic conditions.

Now, I know that certain changes in economic conditions can impact more than just the investment income for health insurance. Certainly, economic downturns could result in something like increased antiselective lapsation. So, I think, based on this statement, we just can't conclude that we don't need to do cash-flow testing, simply because short-term medical business is not sensitive to fluctuations in investment income.

Finally, the third condition is that variation in benefit and expense experience for disability and medical may arise from certain nonsecular trends and experience. These may be better handled using some kind of statistical technique to supply the historical data.

So, I think the ASP has shown us that, at least in certain situations, cash-flow testing would not be necessary for short-tail business, and in particular, for medical. Some of the alternatives to cash-flow testing, that we certainly use and traditionally have used, are claim-liability developmental methods, risk-theory techniques, other statistical methods, and runoff methods that we use for analyzing claim liability. I guess the question is, "Are these enough though? Do they answer the question of whether the assets along with our expected premium income will in fact produce the cash that is needed and when it is needed?" That's the bottom-line question of whether we need to do either cash-flow testing or gross-premium valuation.

CONSIDERATIONS ABOUT WHEN TO CASH-FLOW TEST

What I want to offer are some thoughts on when cash-flow testing is appropriate to use, and when it's not.

The first consideration is: Are you doing cash-flow testing for other business? If the answer to this is yes, the additional work that's involved for including your health insurance block may make cash-flow testing for that block a viable option, even whether or not you might consider that it's really a necessary thing to do. It certainly would give you a better outlook on the entire business of the company, when you do combine it with your other lines, like life insurance.

Another consideration is: How large is the block of health business that you're looking at? If it's minimal, then cash-flow testing is probably not a worthwhile venture that you need to spend your time on since it wouldn't make too much difference for the overall viability of the company.

If it is sizeable, and one of several lines of business, it certainly may be worthwhile, particularly, as I said, if you're doing cash-flow testing on the other lines of business anyhow.

And third, if medical or short-tail business is your only line of business, then I think the actuary really needs to consider the need for cash-flow testing or some other type of projection techniques to assure himself that the reserves are, in fact, adequate.

Now, as I said before, the valuation law does require us to consider the liabilities in the light of the assets held. I don't think that this necessarily means cash-flow testing, but I think it does mean, looking at how good the assets are, how appropriate they are for the business that you're examining. What's the duration or the maturity distribution of the assets? Does it match up fairly well with the short-tail nature of the health insurance block that you're looking at? What's the quality of those assets? Are they high-quality, investment-grade assets? What's the yield of those assets? These are some of the considerations I know I went through when I was looking at a number of blocks of business. Depending on the answer to those three questions, the approach you take for determining your asset adequacy or the adequacy of your liabilities makes a difference. If all three of these things are very good: you have high-quality bonds backing your assets; they're for the most part, basically short term, matching the expected duration of your medical liabilities; and they have a decent yield, then you may conclude generally that cash-flow testing may not be necessary, particularly if it is a type of business like group medical business, where the business is not really sensitive to investment changes.

If one or more of these asset characteristics are questionable, particularly if the duration question or the quality is not good, then testing probably should be done in some fashion. I haven't seen that to be the case. In most of the companies that I have seen, and a number of companies that I've talked to, generally, the assets that have been allocated to the medical business have been relatively good quality, very high quality, with short duration. However, other companies may be treating the health line as a dumping area for poorer assets if they are cash-flow testing their life and annuity lines and not their health business.

Another consideration about when to do cash-flow testing is: How large are the claim reserve contingency margins? Now large margins, (and what a large margin is, is somewhat up to the judgment of the particular actuary) certainly would give the

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actuary generally sufficient comfort unless certainly some other components such as expenses of the company or of the business line are out of whack.

But slim margins may call for some sensitivity testing in some manner, either through cash-flow testing, gross-premium valuations, or some other kind of means or sensitivity testing the business to get a comfort level that, in fact, the reserves and liabilities that have been established are adequate.

Another consideration that you may want to take into account when considering whether you want to do cash-flow testing is: What's the company's surplus position? Generally, in terms of doing liability work, we don't become too concerned with the surplus questions that are involved, and rightly so, but the fact that a company has a very strong surplus position could lend support to a decision not to cash-flow test.

Conversely, if the surplus position is rather weak, as a valuation actuary, you may want to consider going through some extra tests, just to assure yourself that the liabilities that have been established, will, in fact, do the job under most situations.

GROSS-PREMIUM VALUATION

So, you may conclude that at least cash-flow testing, as it involves looking at your assets and their duration and modeling those assets, may not be necessary for your short-term medical business. But, the question would still remain: "Is a gross-premium valuation needed for this type of business?" When I say gross-premium valuation, I want to consider basically some type of projection of your experience going forward, and evaluating the business on that aspect, as well as perhaps the traditional means that you have used, like developmental methods, for looking at the business.

I think there are a few reasons why you may want to consider doing gross-premium valuations or projections of the business and not simply relying on claim runoff or developmental methods for looking at your medical business. One of the things I think we have to consider, particularly when we're doing this for medical business, is that we're not to include new business going forward. What regulators are interested in is whether the company is viable with the business that it has at this point. So, when we're making these projections, we're not to include any new business in the projections.

Now, this could be significant to a number of different types of blocks of medical business. This is particularly so with small group with heavily underwritten business and individual underwritten medical business, where the claim slope is significantly steep. Some companies rely upon their new business for their profit margins. For a lot of this medical business, the profits come in the early years, particularly in the first year. This is so especially for small-group business. Those early profits are often used to offset losses of later durations.

Other companies don't face that problem quite as much with their rating techniques. They rate to try their best to keep each block of business, in terms of each tier or each duration at a profitable level, so that it's not highly dependent upon the profits generated in the first duration of the business.

One of the things that we need to consider when we're projecting our medical business is to do an appropriate allocation of expenses between our first-year or new business and our renewal business. Simply using percentage estimates to allocate for expenses may not do, especially considering the high expenses in the first year, due to the underwriting and the marketing acquisition of the business.

An important point when you're doing these projections is to really look at what the true underlying assumptions are that need to be looked at, particularly for the allocation of expenses.

We've often said, "We don't have to do these types of projections for the short-tail business. We can rely just on our runoff methods and developmental methods for this since the claim liability makes up the vast amount of our liabilities. Because if we run into a problem, we can always terminate the business, or we can always raise the rates." And that has been kind of an out for a lot of the medical insurers, in terms of looking at these types of things.

However, in today's climate, regulators are not comforted by those arguments. In particular, we're seeing more states make it difficult for a carrier to terminate business. It's not an easy thing, and it's not, oftentimes, even easy to get the types of rate increases that you're talking about. So you're not always assured that you can get the relief that you might need into the future. So those types of arguments, while they still hold some water, I think, tend to get less and less credible as a reason for not doing various projection tests that we're talking about here.

What are some of the gross-premium valuation considerations that we need to make? Certainly the rating structure is one. What types of rating structure we're using, what types of rating structures are evolving, and what regulators are forcing us into are certainly questions that you're going to have to cope with in this next couple of years.

Lapsation and mortality assumptions in the projection are key. Certainly, in terms of some of the sensitivity testing that you may want to do for this type of business, lapsation is very important to consider.

The recognition of claims cycles is important. This is something that might need to be recognized, and I think there are various opinions as to how you recognize them and whether you should recognize them. Certainly, your testing should be concerned with more than just a single present value. You should look at certain points in time to see whether or not the business is viable.

Adequacy in runoff of the current claim liability is essential. This is something that while you've tested it using your traditional methods, if you are making a projection, you want to make sure that you model it appropriately.

In your projection, you should deal with the treatment of claim trend and rate increases. Particularly, the aging and underwriting selection assumption is key for medical business as well as the antiselective shock lapsation that occurs when rate increases are put in on this business. It's key, I think, to be very realistic when you're doing your valuation actuary work about the types of rate increases that (or if you're

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talking about individual business, the type of approvals) you'll be able to secure from state insurance departments. If you're talking about group business, what are truly realistic rate increases that you can put in place, given the fact that states are limiting your rate increases in respect to what you're doing on your new business, and are in some cases, even requiring approval of your rate increases. I think as time moves on we're going to see more of these requirements on the group business.

I have already spoken about expense recognition, coming up with realistic expense assumptions in your projection. Policy reserves should be modeled in an appropriate fashion to include in your projections. Whatever discount rates that you're thinking of using for your projections should be realistic.

I would like to talk a little bit about rating structures. I think they are going to become a more important issue for valuation actuaries to understand. Oftentimes, the valuation actuary is not involved in the pricing of the products and needs to talk to the product actuary to get a good grasp of what's going into those rates, how they're structured, and to get some ideas of how the rate structure can impact the requirement for reserves. We have all sorts of different rating structures, each having different risk implications. There are individual attained age rates and banded attained age rates, where we have a certain amount of annual increases in claim costs without corresponding increases in your rates in that case. Many of the small group insurers continue to use select and ultimate rates, either in a pure or modified version. By modified, I mean that they're not taking in the early durations the full amount of selection that they're getting from the underwriting and preexisting condition provision. They're setting their rates a little higher than that, so that they don't have to come in with subsequently higher rate increases. So, to a certain extent, those rates may be funding for some future expected losses.

Consider entry age rates and issue age rates. Generally, it is required when you're using an issue age rate structure to set up some kind of active life policy reserve. Regarding modified and pure community rating, we know more states are tending toward some kind of community rating structure. So I think as states move to this, the valuation actuary needs to be concerned with which states those are, and how a switch to that type of rating structure could impact his or her requirement for some kind of additional reserves.

One of the types of reserves that's being discussed quite a bit these days, particularly for individual business, is durational reserves. The idea is that, because the impact of underwriting is so successful and claim costs are so much lower in the first couple of years than in later years, there should be some kind of consideration for durational reserves.

Now the NAIC has actively been considering this type of thing in its individual rate-making guidelines. Up to this point, no decisions have been made as to exactly what kind of durational reserve requirement, if any, the NAIC is going to have in that draft model act.

Actuarial Standards Board (ASB) also speak to durational reserves, as do some of the valuation laws. They state that if the actuary does, in fact, feel that there is some question as to whether or not the reserves are adequate for things like durational

reserves, then such additional reserves certainly should be established. The question is: How does the valuation actuary get comfortable with that type of determination? Are durational reserves needed?

Well, I think a gross-premium valuation may be the answer to that. Certainly, it will vary based on the type of business, the block of business that you're looking at, as to whether you really even need to go as far as a gross-premium valuation.

I spoke about the impact of rating laws and other types of new compliance requirements that are going to effect valuation actuaries. Such questions include Medicare supplement refunds. How does the valuation actuary determine whether or not he should be establishing some sort of reserve in the event that refunds are necessary for his or her company's Medicare supplement business.

Consider reinsurance pool assessments. The small-group rating laws and access laws that are being passed in many states are setting up reinsurance pools, that most carriers who are in this market are members of. These carriers are certainly going to be subject to certain reinsurance pool assessments, particularly if the members of these reinsurance pools are doing their best jobs in terms of deciding who goes into these pools or not. If the carriers are doing a good job, you're almost sure that the pool may be underfunded, and will require some kind of reserve -- some kind of assessment for that pool. So the question is, how large can these assessments be? When should the valuation actuary decide to put up some kind of reserve to reflect this? Is it good enough to just wait until the assessments actually have been made, or should he or she be looking and expecting some of these things as time goes on?

What's guaranteed issue going to do in terms of your reserve requirements? As more states go to requiring some form of guaranteed issue, how is that going to affect the reserves you have on hand? Can your pricing actuary predict accurately what the mix of business is going to be related to the guaranteed issue aspects of this?

And, as I mentioned before, community rating is certainly something that's coming down the pike in terms of rating laws for many states. There are implications to reserves there.

Related to your projection period, what should it be? How long should it be? I don't have any definite answer, but certainly, if it is short-tailed business, the length of the projection period should reflect that. For blocks of business that I've reviewed, I've used a five-year period as my projection period. Some may argue for more. Some may argue for less. I've seen some companies leave it at one year. Others have gone out on their short-term business as far as ten years.

SENSITIVITY/SCENARIO TESTING

We talked about sensitivity/scenario testing. Whether cash-flow testing is used or a gross-premium valuation or some other methodology, it's important to use sensitivity testing. The regulation for your actuarial opinion and memorandum calls for you to use the New York Seven. Does this make any sense for a short-tail medical block of business? I guess the answer to that is, to the extent that you believe your business is nonsensitive to investment fluctuations, it doesn't make a whole lot of sense in terms of the New York Seven test itself.

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So what scenarios are appropriate? I guess we can address that question by asking, what are the New York Seven scenarios? As we said before, the law states that it's not just investment income changes, but changes in economic conditions, and the question is, how do those changes in the economy impact the business other than just the investment income? What I might suggest is, particularly if you want to stay with the New York Seven as a guideline, that you might want to use the New York Seven to try to interpret what that scenario is saying about the economy, and what those changes in the economy then imply about your health business in respect to maybe lapsation and morbidity changes under a given economic scenario.

So, for example, you may want to look at the New York Seven interest scenario that's level with no deviation as being representative of the lapses, morbidity, and interest that you're using in your base projection scenario.

Consider another New York Seven scenario is the one that's uniformly increasing at 1% for five years and then starts to decrease back to the original level over the next five years. You may want to interpret that as something related to trend. It implies maybe that trend is going to be increasing and then start coming back down. And maybe that's how you want to model a sensitivity test. So it is somewhat consistent with what they're looking for in the New York Seven.

Another example would be an immediate increase of 3% and then level, which is an inflationary scenario, perhaps, and what does that imply for the health business? Well, maybe it implies that claim costs are going to increase immediately, too. Perhaps an additional 5%, maybe it's 10%, in 1993 and then falling back to the same trend that you might have used under your base scenario.

You may want to reflect in these scenarios the recognition of these types of movement, and how you respond or your company responds in terms of rate increases and implementing rate increases to respond to those changes in economic conditions. Very often there is a delay in the recognition of certain underlying economic movements.

One more example might be the New York Seven scenario where there is an immediate decrease of 3% and then level. Well, that may reflect a depressed economy and imply significant layoffs. If there are significant layoffs and you're in the group market, that might mean additional lapsation that should be assumed in your scenario, and perhaps with some permanent claims, antiselection that goes along with it.

So these are some of the things that you can do in scenario testing, and relating them to changes in economic conditions. This perhaps should be done because, as you know, medical business is a very sensitive business when it comes to fluctuations in morbidity and lapsation.

Some of the other scenarios or sensitivity tests that I like to look at are what a 1% increase in the loss ratio does to the gross-premium valuation results. When I'm saying 1%, generally I mean going from a 75% loss ratio, for example, to a 76% loss ratio. Then that same answer can be used since you're basically looking at 1% of premium. What's the impact of an increase or decrease of 1% of premium on the

present values that you have calculated under your gross-premium valuation? And that gives the reader a good feel for how sensitive the business is for certain things. Similarly, you may want to do something like that for lapse rates.

HEALTH VALUATION SURVEY

Now having said all that, and not really giving you any answers, but pointing out a lot of questions, we've conducted a survey, or are in the process of conducting a health valuation survey, where we've talked to a number of companies and hope to talk to more companies regarding some of the things that they have been doing. We asked how they've been approaching this whole question of cash-flow testing for health insurance. Since there are no clear answers at this point, we thought it would be a good idea to pull something together, especially in terms of being able to talk to companies and see what kind of questions they have regarding this. This is so they can better address these through some kind of practice notes.

These are preliminary survey results that we hope to update and present more fully at the valuation actuary symposium later this fall. Certainly we invite anyone who's interested in participating in this survey to give me a call because the more companies we have, the better feel we're going to get as to what the prevailing opinions are about some of these issues.

For these preliminary results, we had responses from 19 companies, some of which had a small amount of health insurance, the majority of which had sizeable blocks of health insurance. Of those 19, 15 did Section 8 opinions and four did Section 7 opinions. Now, of interest of the Section 7 opinions, I looked at what categories these companies would have fallen into, and all of them would have been A or B companies. So I'm not sure how they decided that they did a Section 7 opinion. What they may have meant is that their approach to health insurance was more on the lines of what a company that qualified for a Section 7 opinion may have done. I'm hoping that's the case and I assume that it is.

Seven of the companies actually did go through the exercise of doing cash-flow testing for their health blocks. I might say that these results are not limited to short-tailed business, but they also include long-term disability insurance and long-term-care business. The majority of those seven were certainly in the ranks of companies that did have at least some block of long-term disability business.

Twelve of the 19 companies did gross-premium valuations. It was interesting that so many companies, of the 19 that we looked at, actually did conduct that type of thing.

We asked the companies about sensitivity testing, and ten did it; seven used the New York Seven scenarios; and seven companies used some kind of durational analysis. Projection periods certainly varied: 30 years for companies that had long-term care and long-term disability blocks of business and one to ten years for short-tail business.

Sixteen of the 19 performed other tests, and I think what they mainly were referring to were some of the traditional tests. Twelve companies segregated assets. Eleven companies reviewed assets for quality and duration, which surprised me. Finally, nine

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companies have found the work longer than they expected, and six exactly what they expected.

Let me invite any of you who wish to either participate in the survey or, if you have particular questions or topics that you're interested in wanting guidance for, to let me know what questions there are. We are going to be developing practice notes for health insurance down the road, so the more input we get, certainly the better the practice notes will be.

MR. TIMOTHY F. HARRIS: I'm a member of the Life Committee of the Actuarial Standards Board, and some of the standards that we put together impact health actuaries as well as life actuaries. I'm going to go over some of the regulatory and professional requirements that impact cash-flow testing for health insurance.

The important regulatory requirement is the 1990 Standard Valuation Law. Even though it's just recently been adopted, its exact title is the 1990 Standard Valuation Law. The year 1990 is when it was first adopted by the NAIC as a model.

At the end of 1992, this law had been adopted by ten states, with a December 31, 1992 effective date. The required opinion, as Jim O'Connor stated, requires consideration of assets, and it also has a state of filing valuation requirement. This means that when you file an actuarial opinion, you should be aware of the requirements of the state in which you're filing that opinion. There were ten at the end of the year where, if you filed an opinion, you were required by the new valuation law to know what the state's valuation requirements were.

Milliman & Robertson and Tillinghast coordinated the assembly of the life and health valuation law manual for the Academy of Actuaries and the Society of Actuaries. If you haven't purchased a copy, I recommend that you get a copy of it because it will give you information on the valuation laws of the various states. You're going to note a lot of variation in the health insurance valuation laws. Some states have adopted the current NAIC model, some the previous NAIC model, and a few states have adopted different things in between and beyond the NAIC models. You really have to stay on top of what the different state valuation requirements are.

According to this new valuation law, the appointed actuary can be legally liable, primarily to the company or the insurance commissioner. There's protection in the law of most of the ten adopting states from liability to other individuals. The memorandum that's prepared is confidential by law, in most states. But it's not confidential if you give it to agents or use it for marketing.

The next most important regulatory requirement is the actuarial opinion and memorandum regulation. This is the regulation that accompanies and supplements the new valuation law itself. This regulation provides the details that you need to know to comply with valuation law. It has been adopted by five states with a December 31, 1992 effective date.

It is unclear what is required in those states that have adopted the new law, but not the model regulation.

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A few of these states have indicated they were going to act as if they had adopted the model regulation but, in the others, you don't know. There's a reiteration in this model regulation of the state of filing valuation requirements.

As was discussed previously, there are two different categories of opinions that are spelled out in Section 6 of this model regulation. These are Section 7 opinions and Section 8 opinions. The Section 7 opinions are typically for the smaller companies, and the Section 8 opinions are for the larger companies or riskier small companies. A Section 8 opinion requires an asset adequacy analysis, while a Section 7 opinion is actually a weaker opinion than was previously required.

The memorandum regulation lays out size categories for companies and risk tests for companies that might otherwise be exempt from a Section 8 opinion.

The memorandum, as I mentioned, is confidential. You should indicate in the memorandum whom it is for and whom it is not for. You are required to describe the liabilities in detail. You are required to describe the assets in detail. You are required to describe the analysis bases that were used, and you are required to discuss any aggregation of liabilities.

Later in 1993 you will see an exposure draft of a compliance guideline for Section 7 opinions. This is for actuaries who are going to be providing Section 7 opinions. This draft is going to the Actuarial Standards Board next week, for its review and probable release as a draft.

What is a Compliance Guideline? A Compliance Guideline has the force of an ASP, and it gives the actuary guidance in those situations where the actuary has to comply with a requirement, where a requirement doesn't track accepted actuarial practices. That's what's happening with Section 7 opinions. You're not required to render a cash-flow testing opinion under Section 7 of the memorandum regulation, where ASP No. 14 might have required you to render a cash-flow-testing opinion. That's why the Compliance Guideline becomes necessary.

This standard should be effective by the end of 1993. It's going before the Actuarial Standards Board soon and I'd be surprised if it didn't approve the standard for exposure. Then you'll have a chance to make comments during the comment period, and later it should be a standard unless the comments indicate the need for revisions.

We have had for some time the second exposure draft of the ASP for appointed actuaries. This applies to Section 8 opinions only. There was a lot of discussion about whether or not it applied to Section 7 as well. It was redrafted to apply to Section 8 only.

We have to comply with the ASP on when to do cash-flow testing. This standard of practice applies to more than just valuation work. You may be required to do cash-flow testing when you're doing pricing work, financial projections, or merger and acquisition work. Cash-flow testing does apply to more than just valuation work.

We also must consider the ASP on how to do cash-flow testing. If you remember, this is an updated standard. The original version of this standard looked like it was

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drafted for actuaries doing multiple interest scenario testing on a block of annuity business. That's basically the way it read.

The current version was updated by a combination of the life and the property and casualty subcommittees of the Actuarial Standards Board, and it's much more general. Since it's more general, it adapts a little better to health insurance than it did previously.

We also have the reinsurance ASP. This ASP also can impact any cash-flow testing work that you do. This Standard requires that you look at the cash flows associated with reinsurance agreements, and also states that you may wish to do some cash-flow testing of the net liabilities of reinsurance.

There is also the ASP on health claim liability. The only thing in this ASP that comes anywhere close to addressing cash-flow testing is the section that refers to the time value of money. That section of the standard addresses discounted rates, but if you wanted to, you could stretch it to cover cash-flow testing.

MR. JAMES A. KAISER: I have a question for Al Riggieri. You mentioned that you used assets that equal the liabilities. So you had no surplus at the start. I think, under the current standards, you are allowed to use a portion of the asset valuation reserve (AVR), at least up to the present value of defaults. Would you care to comment on that?

MR. RIGGIERI: I think that's true. In our case, we played it conservative and left the AVR out of our testing. We could have included the AVR up to the limits and allowed it to offset some of the default losses.

MS. LYNETTE L. TRYGSTAD: My question is how the 1990 valuation law applies to HMOs. The states that we contacted almost across the board said that it did not apply to HMOs. And so we essentially gave old Section 7 opinions. And second, were HMOs included in your survey?

MR. O'CONNOR: It's my understanding that the HMOs file a different blank with the states. To my knowledge, they have not been covered by the valuation law, and they have not been addressed in the ASPs. In terms of our survey, none of the 19 companies included HMO.

