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HEALTH VALUATION ACTUARY TOOLBOX

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The panel will discuss tools, techniques, and methods used by the health valuation actuary (HVA) in dealing with:

- Business projections and cash-flow analysis
- Valuation on nonguaranteed premium business
- Target surplus analysis
- Reinsurance (e.g., price versus deductible trade-offs)
- Claim reserves (e.g., change in processing)

MR. JAMES N. ROBERTS: We're not going to discuss risk-adjusted capital or surplus requirements extensively because there are other sessions on that topic for the health actuary. We'll be talking about cash-flow testing, an AIDS reserve methodology, group health actuarial issues and then general topics with a focus on individual health actuarial issues. I'd like to introduce our first speaker, Ed Goral. He's an associate actuary at the Blue Cross Blue Shield Plan of Florida. His own responsibilities are primarily for the over-age-65 and direct-pay products.

MR. EDGAR J. GORAL: My subject is cash-flow testing for health insurance. Our company, which sells only health insurance products, produces a fairly detailed model for cash-flow testing. I'll touch on the most important assumptions, methods, rationale and specific tools within the overall model. Actual cash-flow testing was accomplished using the following four steps:

1. Each major obligation was projected using appropriate assumptions.
2. Each major receivable was projected using appropriate assumptions.
3. Income from and maturities of invested assets held on the valuation date were projected.
4. Assets were liquidated at market value when obligations due exceeded the sum of receivables due, anticipated investment income and maturities.

Projections were done monthly for the first two years then annually thereafter for a total of 20 years. Monthly measurement periods were chosen because most of the obligations are short term as are much of our assets. Our investment department does spend a significant amount of time in managing the short-term cash requirements. The cash flow was never allowed to become negative in any measurement period, including one-month measurement periods. No borrowing was allowed. Excess funds were invested at the assumed reinvestment interest rate.

We tested three interest rate scenarios in detail: level; level at 3% above the current rate; level at 3% below the current rate. The obligations and receivables due and investment income are not sensitive to interest rate changes. We focused on providing the cash needs at each interval, insuring that invested funds at the end of

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20 years exceeded obligations. We did not perform successive valuations. We did not generate successive balance sheets measuring the surplus at each interval. Projections were done on a going-out-of-business basis. We concluded that the most appropriate way to isolate the C-3 risk was by not accepting additional insurance risk. For group health, canceling all business on the valuation date and examining the run out of claims was most appropriate for three reasons. First, in force is not clearly defined. The composition of a group changes as new members are added to existing groups. The new members represent additional insurance risk. Second, the benefit itself is subject to change unlike level benefit life insurance. As one moves in time beyond the current rating period, the uncertainty in the benefit increases. Third, the benefit to the group is cancelable at the option of the company upon appropriate notice. Inclusion of benefits beyond obligation periods existing on the valuation date was viewed as acceptance of additional insurance risks. Our individual medicare supplement is entry-age rated, level premium coverage. In this case in-force business is clearly defined and coverage is guaranteed renewable. Therefore, it was considered appropriate to decrement the in-force over time by expected lapsation.

For cash-flow testing, benefits were held constant at the level that existed on the valuation date. Future benefit increases were assumed to be provided for by future premiums, not current assets. Our remaining individual health was treated like group health on a canceled block basis. Although in-force is clearly defined, our individual major medical can be nonrenewed at the option of the company. Our decision to study the cash flows from only existing risks meant that most assets would be liquidated or not reinvested very shortly after the valuation date. This was felt to be a more appropriate assessment of liquidity than relying on future premiums.

What obligations did we study? A list of obligations and their size is shown in Table 1. Given the magnitude of our nonreserve obligations, we felt that they had to be included in the analysis. Although the format is similar to the statutory statement balance sheet, the amounts used for cash-flow testing were not always identical to the balance sheet.

TABLE 1

What Obligations	How Big (millions)
Aggregate reserve for A&H	\$80
Policy and contract claims reserve	190
Advance premiums (group/reinsurance)	10
Advance premiums (individuals)	40
Experience rating refunds	50
General expenses due/accrued	50
Taxes, licenses, fees due/accrued	10
Bank overdrafts	40
Advance deposits (reinsurance)	10
Other (clearing accounts, litigation)	40

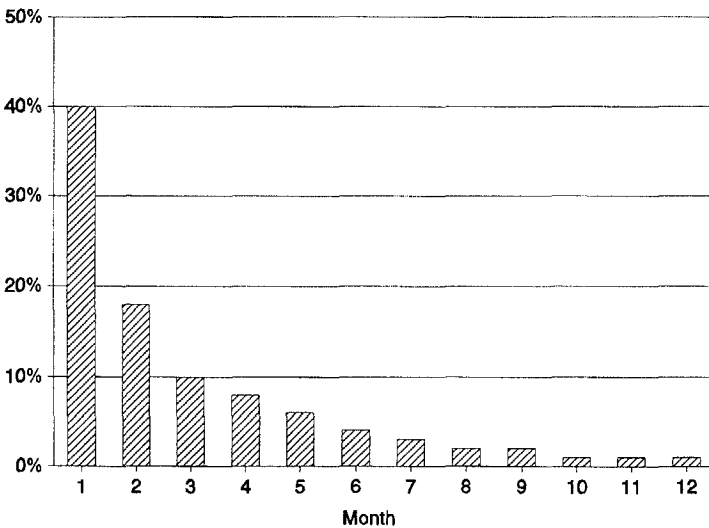
Tools. The aggregate reserves for A&H are broken into three components: A reported claims reserve of \$20 million, an extended liability of \$10 million, and a Medicare supplement active life additional reserves of \$50 million. The reported claims reserve of \$20 million and policy and contract claims reserve of \$190 million

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were examined together. The statutory reserves were reduced to obtain the corresponding cash-flow testing obligations. Our statutory reserves contain a margin to ensure sufficiency with a certain confidence. The margin was substantially reduced but not eliminated.

We felt that, since the obligation projection was based on the best estimate, reserves would be insufficient half of the time. An application of our results to investment strategy could cause illiquidity when we underestimated the liability. Chart 1 shows how cash required to pay the obligations represented by these reserves was projected using historical run out for the first 12 months only. Historical run-out was generated by incurred month and paid month for six major lines of business. The paid amount by elapsed month over the total paid was applied to the adjusted reserve. After one year, only 2.5% or \$5 million of the original liability remained. After only two years, 0.15% or \$300,000 of the original liability remained. The projections were done by actuarial staff using spreadsheet software.

CHART 1
Cash Requirement per Month
as a Percent of IBNR and Claim Reserves



Historical run out was extracted from the mainframe using statistical analysis system (SAS). For Medicare supplement, active life additional reserves were produced annually by performing valuations on projected enrollment. Enrollment was projected each year from the existing in-force using pricing lapses that depend on attained age and duration. Valuation date claim costs were used to generate reserve factors for each projection date. If active life additional reserves increased, there must have been excess premiums and cash must have flowed into the company. If the active life additional reserves decreased, there must have been a deficiency of premiums to claims and a cash requirement must have been generated.

We did not examine premiums, claims, or expenses; we examined only the difference in active life additional reserves. This shows the magnitude of the cash in-flows or requirements from the active life additional reserves. On a smaller magnitude, in comparison with the other liabilities, there is an in-flow in the early years that offsets the cash requirements from other obligations. The valuation projections were performed by actuarial staff using automatic premium loan programs. The initial enrollment by product issue age and duration was extracted from mainframe data files using SAS. Advance premiums were either returned immediately or applied as earned for Medicare supplement.

Expense related obligations were applied by month based upon the nature of the obligation and historical pattern of payment. Our company does not keep detailed records on obligation lag times, so some judgment was involved. Tax and assessment items are not always paid regularly and litigation liabilities may or may not materialize. The expense of paying future claims was included as a future cash requirement. The claim administrative expense was calculated as a percent of paid claims. Projected claims were then used to determine the expense of payment. No inflation was assumed in the expenses. The nonledger payables for the administrative expenses of paying the incurred but not reported was backed out to avoid double counting.

What receivables did we study? We only operate in one state but belong to an association of similar plans. As such, we have various reinsurance mechanisms to cover out-of-area treatment as well as to participate in multistate pools. We have an accounts receivable department that creates detailed reports of amounts outstanding and when they are paid. The reports were used to generate expected receivable cash flow from A&H premiums due and unpaid, receivables from subsidiaries, receivables from uninsured plans and aggregate write-ins for other than invested assets. Spreadsheet software is adequate for allocations of amounts received by month.

Chart 2 is a summary of net cash required by month for the first 12 months and it incorporates the obligations and receivables. Chart 3 is an illustration of cash required for the first 10 years. This graph removes the first year to give a clearer perspective of later cash requirements. A cash excess is created in the second year for Medicare supplement and reinsurance received. The net cash required was given to the investment area to incorporate into their investment model. The invested assets existing on the valuation date were held until maturity or liquidated cash was required. Invested assets were divided into the following categories: (1) internal funds comprised of cash and short-term securities; (2) bond fund cash flows; (3) bond liquidations; and (4) stock fund cash flows and liquidation. Real estate was ignored since the home office was the major asset in this category and it is not marketable. Investments were held at market value not book value. So balancing to the statutory statement was not possible. Furthermore, market value changed under the various *interest-rate scenarios*.

Because of the cancellation of business assumption, assets were liquidated to meet the run-out of claims. Short-term cash equivalents were liquidated immediately. Stocks were liquidated before bonds. The stock fund was depleted in the first four months under even the most favorable scenario. The market value of a bond fund under liquidation was well defined.

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CHART 2 Total Cash Required per Month in the First Year

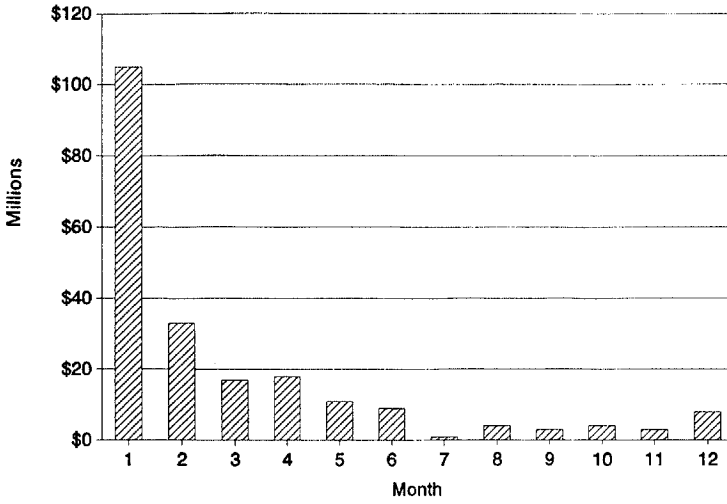
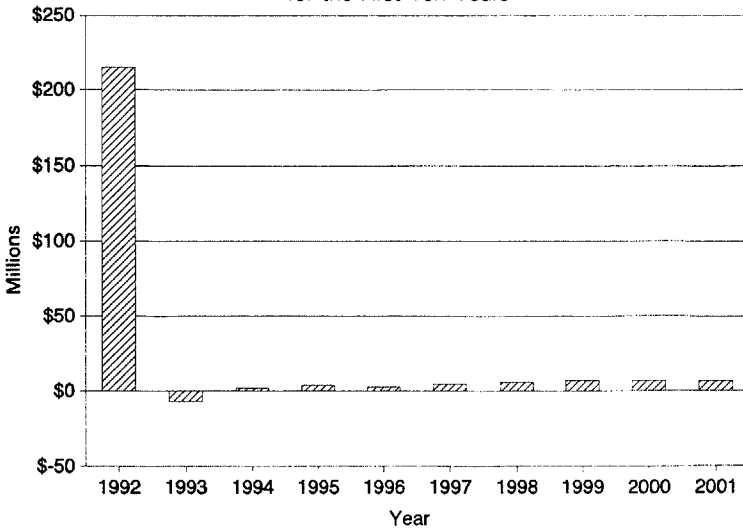


CHART 3 Total Cash Required per Year for the First Ten Years



The investment department has computer programs that easily calculate market values for various segments of their bond portfolios under given interest assumptions. These programs were purchased from an outside vendor. The market value of the stock fund under liquidation was not easily defined. We calculated the historical stock market movement and examined the present value of a growing perpetuity to get a change in market value of the stock fund given an immediate increase or decrease of 3% in the interest rate.

Results. We have an extremely conservative investment portfolio. We have a high proportion of it in short-term securities such as 90-day tables which are not particularly sensitive to changes in the interest rate. Our liabilities are not sensitive to changes in the interest rate. Each interest rate scenario produced positive cash flow at each measurement period when assets were liquidated at market. There was positive surplus at the end of 20 years under all three scenarios.

Beyond cash-flow testing. The real value of cash-flow testing for our particular circumstance is guidance of investment policy. The investment department is continuously looking for new tools to help determine how much it can invest in long-term assets to maximize its return. Cash-flow testing integrates the various financial areas. For us, although C-3 risk is small, the potential to improve earnings through more aggressive investment is large.

MR. ROBERTS: Just an editorial comment. In making the rounds of our audit clients and others in the last couple of months, I uniformly asked each actuary or management group what in the nature of cash-flow testing they had been doing for their health insurance products. The responses ranged from a blank stare to a developed methodology comparable to the one Ed has just described. I think Blue Cross of Florida is to be commended for developing this methodology. I think it's a very useful and interesting approach. The differences in how the methodology has been developed is really in defining the basic ground rules. Florida has defined a shut-down scenario as the approach it wanted to use to match its assets and liabilities. There are certainly other reasonable approaches that would produce markedly different results. I think this was a very interesting presentation.

I'd like to next introduce Julia Philips. Julia is with Fortis Benefits, formerly Western Life. She's responsible for their small group medical pricing area, and is also the valuation actuary for the company. She's going to be talking about AIDS reserving methodology which I think is another interesting subject.

MS. JULIA T. PHILIPS: Before I get into my discussion of AIDS reserving for small group medical coverage, I have just a few comments on cash-flow testing. Since the major emphasis at our company for cash-flow testing was on group long-term disability (LTD), there were some interesting issues that came up in the process of going through the cash-flow testing. I'd like to just talk about a few of those issues. One of the issues that came up was how much lower can interest rates go and what should we model in terms of interest rates. If you're in a relatively average interest rate scenario, it seems reasonable to say well, okay let's look at up three and down three. But if you think you're at an historically low level, it might not be appropriate to go down three. In the late 1930s and early 1940s, interest rates crashed to extremely low levels and insurance companies had a great deal of difficulty with that.

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I'm not sure exactly how extreme we should go in terms of our interest rate scenario. That's one of the first interesting questions that came up. Another question that specifically relates to long-term disability insurance is that morbidity is not independent of interest rate levels for group LTD. The reason for this is that the general economic situation affects both interest rates and recoveries from disability. In other words, in a poor economy where there are fewer jobs available, more people will stay disabled simply because it's harder for them to find a job. How to factor in this correlation between interest rate and morbidity is an interesting question when you're doing scenarios for cash-flow testing for group LTD.

Another question that came up for us was how far into the future is it necessary to go when you're doing group LTD. We decided this question on a practical basis. We looked at the future liability stream under various projections. The two main projections that we used were the experience table based on the 1987 SOA group LTD study and the valuation table. In either case, after about 20 years, the remaining liability is low enough that we felt it was possible to look at the excess of assets over liabilities at that point and say that it was enough of a margin, and it clearly would cover the liability in the future. It would certainly be possible to take it out for another few years because if you have an age-65 benefit on group LTD, you can theoretically have benefits that would go perhaps as far as 50 years into the future.

The last question that came up which I thought was somewhat interesting was, how carefully do you want to select the duration of your invested assets? An issue that Ed addressed in his talk was to what extent would the investment area become more aggressive in its investing on the basis of the cash-flow tests. I hadn't really thought of it that way. The way I had thought of it was that it seems to us that if you get your durations properly placed, jumps and drops in interest rates don't impact you very much. It became clear as we were doing our modeling that the outcome of the model was very, very heavily dependent of the duration of the assets in terms of its sensitivity to changes in the interest rate environment. I'll have to take the idea back that if you do enough tests, you might give the investment area liberty to invest more long term and get a better rate of return. It's an interesting concept.

I'd like to spend the rest of my time talking about AIDS reserving for small group medical coverage. I have four main topics that I'm planning to cover. The first one is the definition of incurred date. The second one is identification of claimant. The third is calculating expected future claims for each claimant. And my fourth topic is how does the reserving for AIDS relate to the rating actions that someone in your company presumably will be thinking about while you are thinking about the reserve concepts? I'm only going to talk about medical. We use a relatively simple method for our nonmedical coverage, but we have spent more time looking into medical. My comments will apply only to the Minnesota operations of Fortis Benefits. We also have a large operation in Kansas City that we merged with last October.

One item to definitely remember in looking at the impact of AIDS on medical coverage is that there are really no rules of thumb as far as I can determine about the levels of impact that AIDS will have on your block of business. The reason for this is that AIDS is an epidemic that is really targeted in some ways. The impact of AIDS on your population depends very strongly on the age and sex of your population. That may not be a major consideration because I don't think that there are many

companies that market exclusively to certain age groups or to one sex or the other. But there are other factors that are quite different among companies. One of them is geographic area.

The impact of AIDS is very geographically specific. If your insured population is concentrated in a particular geographic area, there will be a much greater impact. Another area that we found is that the group size has a tremendous impact on the AIDS experience. That may be related to the fact that we underwrite differently. For small groups, we do medical underwriting and for larger groups we do guaranteed issue, however, the impact is the reverse. On the groups that we underwrite more strictly we have seen the worst AIDS experience. My hypothesis is that it is due to antiselection of some sort. I really haven't been able to pinpoint the exact mechanism that's bringing it to the fore. It's clearly been the case at our company that the smaller the group the greater the AIDS in that group on a statistical average basis.

The first topic is the definition of incurred date. And for our non-AIDS business, we have an incurred date definition that I think is pretty common in the industry. For most claims, we use the service date as the date of incurral. There are a couple of unique situations such as hospital stays where we would define the service date as the date of admission. And then if the group has terminated and an insured is on an extension of benefits, we will normally code the incurred date back to the termination date of the group.

Now our definition of an incurred date for an AIDS claim is quite different. We completely separate the medical experience of AIDS claimants from the other medical experience of the company. The incurred date that we use is the date that we can identify the insured as being HIV positive. Now often we haven't identified them at that date but we will generally go back and say at what point we should have been able to identify them as HIV positive and we consider that the incurred date of the claim. We do that because of the philosophy that a claim is incurred at the point at which you have legal liability to pay it. The philosophy behind what we're doing is that once you have an insured who is HIV positive, the chances are pretty close to 100% that the person will eventually go on to develop AIDS. Second, our feeling is that the normal turnover that we experience among our insured population is likely to be much, much lower among people who have been identified as being HIV positive. So when we determine this incurred date this in essence codes all of the claims of that particular person back to the original date when we received information that could identify them as being HIV positive.

The next area I'd like to talk about is identification of claimants and this is something that we spent a lot of time on because it's not always easy to identify AIDS claimants. The major way of identifying them is of course the diagnosis code that comes in on a claim. But I think, partly because of the socially unacceptable nature of the illness, there are a lot of creative diagnoses that come in on AIDS claimants. And we have a long, long list of diagnoses that we would use to start the process of trying to determine whether a person is HIV positive or not. We use our catastrophic claim management system to manage AIDS claims. This is a system that we use for other claims that we expect to be high dollar. We have a lot of manual review and manual intervention on these claims.

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The next topic I would like to discuss is how to evaluate what the expected future claims are once you have identified a claimant as HIV positive. When we started setting up case reserves for AIDS claimants we used one flat dollar amount that reflected the average expected lifetime claims on an AIDS claimant. Later on we decided to become more exact because we noticed that there was a distinct geographical difference in terms of how much it cost to care for an AIDS patient until that person died. In particular, there was an adverse correlation between the frequency of AIDS in a particular geographical area and the cost of caring for them. In an area with few AIDS cases, there was very intensive treatment and they were put in the hospital and so on. And in areas where there was a lot greater frequency of AIDS, there were much more cost effective treatments developed. And so we saw that inverse correlation between the frequency and the cost of treatment.

Another element of the future claims that needs to be considered is the claim processing expense. For our normal business we include a flat percentage of our medical claim reserves as the future cost of paying those claims and that's based on expense studies that we've done. One consideration is that for an AIDS claim where we have a lot of intensive manual review and intervention which will certainly save claim dollars, it may have higher expense impact than on a normal medical claim. That's something you might want to take into account when setting up your reserve for future claim payment expense.

The last topic I'd like to cover is the relationship between AIDS reserving and rating for AIDS. One thing that we have done at Fortis Benefits is set up a kind of active life reserve. The reason that we've done this relates to the way that we've rated for AIDS. Let me spend a couple minutes just discussing how we have set up our rating procedures to cover the cost or the expected cost of AIDS claims. The problem that we were trying to address was to estimate the future liability of insureds in our population that were HIV positive where we had not yet identified those insureds. We couldn't just use the case reserves as a kind of past experience and then say okay, that's how much we paid out. Because the expectation, if you looked at any of the projections, was that it was the tip of the iceberg and there was a large hidden component of people who were infected but had not yet incurred any costs.

We took the SOA projections which had a future curve of claims. It had a high, medium, and a low projection, and we matched the shape of that projection with our business. Since we couldn't rely on any outside source to tell the absolute level of infection in our population, we took the first few years of AIDS claims. I think we had two or three years that we had actually been able to go back and track. Then we matched the shape of that curve to the shape of the SOA's curve and used that to project what we thought the level would be over the next few years. This was significantly higher than what we had seen come through in the case reserves for claimants that had already been identified. And so when we priced for it, we had more coming in from the premium load than we had going out in the paid claims and the case reserves. So we set up an active life reserve in order to prevent that extra premium load flowing through to the bottom line. Therefore, when we do our AIDS reserving we have both a case reserve and also an active life reserve that represents the sum of the future cost of people who are currently in the population but have not yet been identified as being HIV positive.

MR. ROBERTS: I'd like to next introduce Jerry Winkelstein who's a senior manager with KPMG Peat Marwick. Jerry is a consultant and the national director of his company's group health actuarial division.

MR. JEROME WINKELSTEIN: The claim lag analysis is the initial analysis that we use on both our audit support and on our group health consulting engagements. I want to share with you some of the techniques that we use. Basically when you do a claim lag analysis you want to make sure that the information is complete and accurate. As a consultant we spend a lot of our time checking. The claim lag triangles, as much as possible, should be separated by type of services or type of benefits. The first thing we always ascertain whenever we do an analysis is what are the incurred claim coding rules. This is absolutely critical to our analysis to what the claim lag triangles mean. The various type of incurred claim coding schemes I have seen in my career include by first date of batch of claim, and by last date of batch of claim. We did an estimate for a Multiple Employer Trust (MET) for which we used the last date in batch which basically moved the claims to the end of the year. When you had a partial year, it looked like the loss ratio was real low. You had to realize what was happening before you could evaluate what was going on. The incurred date may be the date of the first dollar towards the deductible or may be the date of the first expense after the deductible is satisfied. When a claimant submits a bunch of claims towards the deductible, if the claims submitted are, let's say, for January, February, March and April, some companies will use January as the incurred date if the claims in those four months are used to satisfy the deductible. Other companies will use an incurred date of April as the first claim after the deductible has been satisfied. Again, this will cause different seasonality patterns. Not only is it seasonality in the incurred date, it's also seasonality in the claim lag. Typically we will see the first dollar towards the deductible in January when incurred claims have a much longer tail than December. Again, that has to be taken into account or else the claim reserve as of December 31 will be overstated.

Claim backlog. I guess the most important thing I can say about claim backlog besides that you have to be cognizant of where it is, is that it really should be evaluated on a per-member per-month basis. To the extent that a lot of the companies here are pretty stable it's not critical. You might have a new line of business that is growing rapidly and you are able to know the claim backlog just for that line of business. If your claim backlog doubles and your number of covered insureds double, you're really no worse off.

You should also, in doing any kind of claim lag analysis, be very aware if there's been a change in the system and the type. I just listed the type of changes we have seen in the claim adjudication system. Maybe hospitals are submitting claims a new way. That will change the pattern.

Introducing utilization review can change the pattern. It can make a longer lag between the incurral and the date of payment. There, if your claim lags aren't separate by type of benefit (for instance if you have a bunch of different comprehensive major medical deductibles and people are shifting from the \$50 deductible to the \$1,000 deductible), you will get a change in the claim lag pattern. You have to realize that it's occurring and be able to deal with it. Treatment of Coordination of

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Benefits (COB) can have an impact. We had one client that went from pursue-and-pay to pay-and-pursue in COB. Again that changed the claim lags.

I want to share with you two major methods we use (Table 2).

TABLE 2
CCRs to CCFs

Relative Month	3/90 (in thousands)		CCR	4/90 (in thousands)		CCR
	No. of Claims	Cum. Claims		No. of Claims	Cum. Claims	
0.0	\$ 10.9	\$ 10.9		\$ 15.6	\$ 15.6	
1.0	314.3	325.3	0.0336	474.0	489.6	0.0318
2.0	392.7	718.0	0.4531	278.9	768.5	0.6371
3.0	63.1	781.0	0.9192	33.8	802.2	0.9579
4.0	16.0	797.0	0.9800	57.9	860.1	0.9753
5.0	36.5	833.5	0.9562	21.8	881.9	0.9753
6.0	14.5	848.0	0.9829	5.0	886.9	0.9944
7.0	5.2	853.2	0.9939	5.8	892.7	0.9935
8.0	0.3	853.5	0.9997	4.0	896.7	0.9955
9.0	2.3	855.8	0.9973	2.6	899.3	0.9971
10.0	0.9	856.7	0.9989	(7.7)	891.6	1.0087
11.0	0.0	856.7	1.0000	0.0	891.6	1.0000
12.0	0.0	856.7	1.0000	0.0	891.6	1.0000

Relative Month	3/90	4/90	5/90	6/90	7/90	8/90
0.0	0.0336	0.0318	0.0275	0.0157	0.0671	0.1008
1.0	0.4531	0.6371	0.5355	0.7715	0.7773	0.8274
2.0	0.9192	0.9579	0.9258	0.9428	0.9280	0.9514
3.0	0.9800	0.9327	0.8984	0.9531	0.9695	0.9403
4.0	0.9562	0.9753	0.9794	0.9893	0.9847	0.9897
5.0	0.9829	0.9944	0.9901	0.9947	0.9923	0.9096
6.0	0.9939	0.9935	0.9963	0.9926	0.9883	0.9983
7.0	0.9997	0.9955	0.8593	0.9978	0.9951	0.9992
8.0	0.9973	0.9971	0.9992	0.9988	1.0013	0.9806
9.0	0.9989	1.0087	0.9922	0.9818	0.9950	0.9895
10.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
11.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

The first method we call CCRs to CCFs, which is claim completion ratios to claim completion factors. This is a standard technique used by a lot of actuaries with which we deal. The top table shows claim completion ratios. For March 1990 incurrals, the pattern here is that \$10,900 was paid in March, \$314,000 was paid one month later in April, \$392,000 was paid in May. The next column, which starts with \$10.9 then goes to \$325.3 is the cumulative sum of claims paid to date. The next column, which says CCRs, is just the ratio. So the first number, the 0.0336 is \$10.9 divided by \$325.3, and that keeps going until eventually it reaches a month when no more payments are being made for relative months (Table 3). After the

CCRs are developed they're aligned on the bottom. At that point you have a lot of options on how to average them. Typically we will look at an overall average of all the months. We'll also look at a 12-month average. A 12-month average is good because it takes out seasonality. Many times we will look at a three-month average and possibly a six-month average. Based upon where it's trending along with our knowledge of what's happening with the claim backlog, we will make a decision as to which is the best average to use to predict what is happening as of the valuation date. What we have here is the historical CCRs for the last, say, 24 or 36 months and what we really have to get is not an average that's not representative of what has happened in the past, but what is the situation as of the valuation date, which in most cases is December 31.

TABLE 3
CCRs to CCFs

Relative Month	Average	CCFs
0.0	0.1418	0.0893
1.0	0.7669	0.6298
2.0	0.9199	0.8212
3.0	0.9629	0.8927
4.0	0.9807	0.9272
5.0	0.9772	0.9454
6.0	0.9906	0.9674
7.0	0.9878	0.9766
8.0	0.9952	0.9887
9.0	0.9945	0.9935
10.0	1.0000	0.9990
11.0	1.0000	0.9990
12.0		0.9990

The next column, CCFs, is a backward multiplication of the CCR average. In other words to get to the ninth CCF which is 0.9935, you take the 0.990 CCF and multiply it by 0.9945. So you kind of go up to the left and then back to the right. That is the way you normally build CCFs. CCRs take you from payments through a relative month or an incurred month on to the next month. CCFs take you through a relative month of incurred through infinity or through the ultimate tail. So when you multiply them backwards like that, you get this algebraic result. One thing we like about this approach is that it uses the latest months. In other words, you can use what's happening in November 1991 claims paid in November and paid in December for November. For a CCR you only need two consecutive months, and that can be put in the averaging with all the earlier months. Another thing we like about this is we can investigate seasonality. So if there's an unusual incurred claim coding rule being employed by the client, we can see if it affects the seasonality. And it can easily come out in the CCRs when you look at it this way.

There is a second method we like to use when there has been a very traumatic change caused by some of the items discussed. Typically the most common change is if there has been a big backlog and it's been cleared up very recently. Or another situation is if there has been a big change and there's only been a very short period of stability. So to the effect any claim experience has had other than the last several

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paid months, it's not very useful in predicting what is going on currently (Table 4). In this Table, you can see what it would be like just using the payments in November 1991. You really have to read from the bottom up. What this says is that in November 1991, \$11,000 was paid for November claims and \$227,000 was paid for October claims, \$578,000 was paid for September claims, etc. The next column is a trend adjustment. This method is somewhat circular in that by using this method you develop CCFs and then you could complete incurred claims, monthly incurred claims and then that will give you the trend. So it can be done iteratively, but it's not all that sensitive to the trend you choose.

TABLE 4
Alternate Paid Month Methodology

Paid 11/91 (in thousands)	Trend	Premium	Adjusted Paid	Cum.	CCF
\$ 27.8	1.072	\$7,111	8.0	1,914.8	0.9936
36.8	1.067	7,758	9.6	1,906.8	0.9894
14.2	1.063	7,572	3.8	1,897.2	0.9844
8.2	1.059	7,013	2.4	1,893.4	0.9825
53.2	1.054	6,616	16.1	1,891.0	0.9813
36.8	1.050	6,212	11.8	1,874.9	0.9729
56.3	1.046	5,601	20.0	1,863.1	0.9668
63.1	1.041	5,247	23.8	1,843.1	0.9564
172.4	1.037	4,691	72.4	1,819.4	0.9441
33.6	1.033	4,740	13.9	1,746.9	0.9065
62.7	1.029	4,304	28.5	1,733.0	0.8992
202.7	1.025	4,238	93.1	1,704.5	0.8845
314.5	1.021	3,538	172.4	1,611.4	0.8361
386.0	1.016	2,984	249.8	1,439.0	0.7467
718.4	1.012	2,875	480.6	1,189.2	0.6171
578.1	1.008	2,285	484.6	708.6	0.3677
227.3	1.004	2,035	213.1	224.1	0.1163
11.0	1.000	1,900	11.0	11.0	0.0057

The next column is really an exposure indicator. If we just use column one to develop claim completion factors and the block of business has been growing, the claims that are paid in November for very early months will seem to be very, very low. It is very low, not because they're complete but because there was much less exposure at that time. So we need both a trend and an exposure indicator. In this case, we had premium. In a lot of cases we will have covered lives. I remember that in this case the covered lives were really not worth anything so we had to go with the premium. So in effect, the trend is not so much a trend on pure premiums, it's actually a trend on the loss ratio. A lot of times with this approach, the trend would be zero. In this case it was a deteriorating block of business and there was a positive trend. Okay, the key column here is the fourth column which is adjusted paid. That column equals the first -- the paid column -- times the trend, times \$1,900, which is the latest premium amount divided by the premium amount in that month. In other words, the third number up, the 484.6 that is, is 578.1 times 1.008, times \$1,900, divided by \$2,285. Again, it's adjusting for the fact that there

is a trend. There has been a change in exposure to basically impute what the paid would have been, if there had been no trend or change in exposure.

We assumed the cumulative column was only 99.36% complete. That's why it doesn't come out to one at the top. But we had other indicators. I think there were claims that were beyond the claim lag table that weren't captured in 24 months and so we knew there were things even after 24 months that weren't quite complete. This is a very useful method. When there's been a real traumatic change, it is very responsive. However, it tends to be very volatile. For example, if one number in the paid column is unusually high, as if there was a catastrophic claim paid, it throws off the whole analysis. So we tend not to use this method unless there is no other choice. When we do, we like to use this method for several months and do some kind of averaging or throwing out the high and the low and averaging the remainder. But this method has had some pretty good results.

All of this rigmarole we've gone through to develop CCFs is good except for the fact that CCFs estimate the ultimate incurred claims for an incurred month when it's high enough. When the claim completion factor, after it's analyzed, is like a 0.03, you can't divide paid to date by 0.03 because you would cause huge fluctuations. Really the claim completions get you an exposure base on which to project what the real ultimate incurreds are of let's say the last quarter of the year. So if we're doing a December 31 analysis, the claim completion factors may be useful for up to September 1991 incurred claims but October, November, and December are really where the rubber meets the road. That's really where 75% of your unpaid claim liability comes from. The claim completion factors just put us in a position to figure out what the last quarter ultimate incurreds are. Bearing that in mind, let's discuss Table 5. In Table 5, I go through four methods. All of the ideas in these methods can be mixed and matched. There is nothing that says you can't combine several or all of these methods together. I want to show you the various methods. We have the incurred months. We have the paid claims to date. This is a December 31 analysis. We have the claim completion factors and the number of contracts.

Method #1 says forget everything and just divide by the CCF, a very mechanical approach. A lot of our nonactuary clients use this and wonder why their results are wrong. You get paid claims divided by CCFs in column number one, incurred claims. That is an okay approach up to December and November, and you can just see it throws up estimated incurred claims for December of \$502,000 which is obviously too low. It produces unpaid claim liability of \$2.2 million. This is the sum of the incurred claim column list less the sum of the paid claim column. So it's \$27,588 minus \$25,354.

In Method #2, I assumed that people who use this method typically say anything under a 90% completion should not be used. So they threw out the first four incurred claim ultimate estimates. Everything is identical to number one. And then they looked at the incurred claim per contract. Based upon that they say it looks like we have an average, you know the September 1990 to August 1991 average of \$5,146. It looks like the trend is 17%. Therefore, we're going to estimate December through September 1991 incurred claims, footnoted at the bottom of Table 5. The estimate is the number of contracts times the pure premium average times the trend factor, going from the midpoint of that 12-month period to the next period.

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According to this method, December is \$2,004,400. November is \$1,966,800, etc. This produces a reserve of \$3,621,200. The biggest difference between the Method #2 and Method #1 result is the estimate for December 1991.

TABLE 5
Latest Months' Projection

Incurred Month	Paid CLM	CCF	No. of Contracts	Method #1 IC	Method #2 IC	IC/ Contract
Dec 1991	\$ 42.2	0.0840	34.4	\$ 501.8	*	\$58.27
Nov 1991	999.7	0.5770	34.2	1,732.7	†	57.51
Oct 1991	1,865.0	0.8033	34.0	2,321.8	‡	56.76
Sep 1991	1,598.0	0.8869	32.9	1,801.8	§	56.02
Aug 1991	1,762.9	0.9251	32.5	1,905.6	\$1,905.6	58.63
Jul 1991	1,754.9	0.9450	32.5	1,857.1	1,857.1	57.14
Jun 1991	1,733.8	0.9667	32.5	1,793.6	1,793.6	55.19
May 1991	1,741.0	0.9772	31.9	1,781.7	1,781.7	55.85
Apr 1991	1,676.6	0.9890	31.8	1,695.2	1,695.2	53.31
Mar 1991	1,547.9	0.9945	31.5	1,556.4	1,556.4	49.41
Feb 1991	1,459.9	0.9968	31.0	1,464.6	1,464.6	47.24
Jan 1991	1,644.4	0.9979	29.6	1,647.8	1,647.8	55.67
Dec 1990	1,000.7	0.9989	22.7	1,001.8	1,001.8	44.13
Nov 1990	987.0	0.9999	22.2	987.1	987.1	44.46
Oct 1990	1,017.7	1.0000	21.8	1,017.7	1,017.7	46.68
Sep 1990	786.7	1.0000	20.0	786.7	786.7	39.33
Aug 1990	1,013.9	1.0000	19.0	1,013.9	1,013.9	53.36
Jul 1990	973.2	1.0000	18.2	973.2	973.2	53.47
Jun 1990	891.6	1.0000	16.9	891.6	891.6	52.76
May 1990	856.7	1.0000	15.6	856.7	856.7	54.92
Sum	\$25,353.7			\$27,588.6	\$28,974.9	\$51.46 9/90-8/91
12/31/91	UCL:			\$2,234.9	\$3,621.2	Assume 17% Trend

* $34.4 \times 51.46 \times 1.17^{(9.5/12)} = 2,004.4$
 $\dagger 34.2 \times 51.46 \times 1.17^{(8.5/12)} = 1,966.8$
 $\ddagger 34.0 \times 51.46 \times 1.17^{(7.5/12)} = 1,929.9$
 $\S 32.9 \times 51.46 \times 1.17^{(6.5/12)} = 1,843.2$

Now we'll discuss the next method in Table 6. I noticed Method #3 is a credibility weighting method. I know that one of our illustrious competitors seems to use this quite a bit. What credibility is really saying is how much do we weight the claim completion methodology. The pure claim completion methodology versus the pure premium. So how do we weight between Methods #1 and #2? For December, there's no credibility there. Therefore, we're going to go with the pure premium methodology. However, for November we figure that the CCF methodology is 20% credible. So we will use 20% of the Method #1 number and 80% of the Method #2 number, etc. Eventually, when the CCF gets high enough, it goes to 100% credibility on the CCF. And you see that this produces an unpaid claim liability of \$3,621,200.

The next approach is the approach I tend to use the most often. It's a derivation of the Bornhuetter-Ferguson method, which is a property and casualty methodology. It more or less says that the best estimate of your ultimate incurred is what has been,

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what claims have been paid to date, and if the CCF says you're 20% complete, you only have to estimate the remaining 80%. So it's almost as if the credibility is now the CCF. It's actually the paid claims plus the complement of the CCF.

TABLE 6
Latest Months' Projection

Incurred Month	Paid CLM	CCF	No. of Contracts	Method #2 IC	Cred. %	Method #3 IC	Method #4 IC
Dec 1991	\$ 42.2	0.0840	34.4	\$2,004.4	0	\$ 2,004.4	*
Nov 1991	999.7	0.5770	34.2	1,966.8	20	1,920.0	†
Oct 1991	1,865.0	0.8033	34.0	1,929.9	50	2,125.8	‡
Sep 1991	1,598.0	0.8869	32.9	1,843.2	100	1,801.8	\$ 1,801.8
Aug 1991	1,762.9	0.9251	32.5	1,905.6	100	1,905.6	1,905.6
Jul 1991	1,754.9	0.9450	32.5	1,857.1	100	1,857.1	1,857.1
Jun 1991	1,733.8	0.9667	32.5	1,793.6	100	1,793.6	1,793.6
May 1991	1,741.0	0.9772	31.9	1,781.7	100	1,781.7	1,781.7
Apr 1991	1,676.6	0.9890	31.8	1,695.2	100	1,695.2	1,695.2
Mar 1991	1,547.9	0.9945	31.5	1,556.4	100	1,556.4	1,556.4
Feb 1991	1,459.9	0.9968	31.0	1,464.6	100	1,464.6	1,464.6
Jan 1991	1,644.4	0.9979	29.6	1,647.8	100	1,647.8	1,647.8
Dec 1990	1,000.7	0.9989	22.7	1,001.8	100	1,001.8	1,001.8
Nov 1990	987.0	0.9999	22.2	987.1	100	987.1	987.1
Oct 1990	1,017.7	1.0000	21.8	1,017.7	100	1,017.7	1,017.7
Sep 1990	786.7	1.0000	20.0	786.7	100	786.7	786.7
Aug 1990	1,013.9	1.0000	19.0	1,013.9	100	1,013.9	1,013.9
Jul 1990	973.2	1.0000	18.2	973.2	100	973.2	973.2
Jun 1990	891.6	1.0000	16.9	891.6	100	891.6	891.6
May 1990	856.7	1.0000	15.6	856.7	100	856.7	856.7
Sum	\$25,353.7					\$29,082.6	\$28,684.0
12/31/91	UCL:					\$3,728.9	\$3,330.3

*42.2 + (1 - 0.0840) × 34.4 × 44.13 × 1.17 = 1,669.0

†999.7 + (1 - 0.5770) × 34.2 × 44.46 × 1.17 = 1,752.3

‡1,865.0 + (1 - 0.8033) × 34.0 × 46.68 × 1.17 = 2,230.3

I also threw in something else here just to show you another technique that a lot of group health actuaries use. The asterisks on the bottom pretty much say you now have the calculation for Method #4. It should be fairly self-explanatory. One thing I did different here is when I used a pure premium projection, instead of just taking the average and trending it forward at a 17% annual rate, I used a month-to-month seasonality. In other words my best estimate for December 1991 is not the average of that 12-month period trended forward 3 1/2 months. I'm saying the best estimate is to take December 1990 pure premium and trend that up 17%. When developing adjustments to that approach, you have to be very careful. The plus of that approach is it picks up seasonality. So if December claims are always low, this will project a low claim. One of the problems with this approach is that you get an echo effect. So for whatever reason December 1990 or November 1990 were unusually high or low, the error will be echoed into the following year. But again, knowing various techniques you could probably choose the best technique possible.

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Let me just run through variations for HMOs. When we look at an HMO, one piece of information they seem to have because they do a lot of precertification and have a real good idea of the number of people in the hospital and number of days in the hospital likely to be consumed is what we call hospital log, which is different from hospital lag. Whenever we can get the claims separated by hospital versus non-hospital when we project what the hospital claims are going to be, we like to use ratios of hospital log numbers. In other words, if they know that the number of days in the hospital in December is very, very low, we like to take that directly into our analysis. So it's no longer let's say 3% complete it's a lot more complete.

Table 7, a special situation and one that we've been involved with a lot lately, is aggregate and specific stop-loss. This has a whole set of problems all unto itself. One thing I wanted to bring out here is the accident year versus policy year phenomena. We're of the belief that it's best to reserve for this on a policy-year approach, meaning that you consider the premiums in the policy year times an expected loss ratio. A problem occurs when the business is increasing or conversely if the business is decreasing. I have a little model office here of three groups, illustrated in Table 7, one of them renewing on January 1, one July 1, and one September 1. Typically the incurred date is the first expense in the year leading to a claim. What that does is up front the claims into the policy year. Premium is evenly distributed over 12 months but claims are incurred as follows. The first month has 15%, the next month has 14%, etc.

In the upper chart you can see that group one had a 1990 policy year incurred loss ratio of 65%, group two and three had 67%, for a total of 66%. They did better in 1991 where group one went from 65% to 63%. Group two and three went from 67% to 64%. Yet when you look at this on an accident year basis, just because of the very fact that we're dealing with growth, you know just because of the fact that the premium is evenly distributed and we're dealing with a growth in the claims on these three groups, that the average incurred loss ratio for calendar year 1991 is 68%, which is higher than anybody's policy loss ratio. Even more surprising, although I kind of fooled with the numbers a little bit to make it more surprising for impact, is that the accident month loss ratio was 76% for October through December 1991, which is extremely high. However, the business is running between 66% and 64%. You should be able to duplicate these numbers. There's not a great deal of mathematics involved here although just looking at this chart it's hard to see it. It might be worth while to really run these through a Lotus program and see what you come up with. Hopefully my calculations are correct.

MR. ROBERTS: Our last speaker is Lynn Peabody who is a principal with the firm of Milliman and Robertson. He's been with Milliman and Robertson 18 years, is located in the Seattle office, and specializes in life and health topics. Lynn is going to talk to us about general health valuation actuary issues and will also give us some comments relating to individual health products.

MR. J. LYNN PEABODY: The approach that I want to take is a little bit different because it's a bit more generalized. It is oriented more toward those of you who are going into the current year and future years as valuation actuaries and looking at some new stepping stones. Perhaps you are a little bit bewildered in terms of what you need to do. Even though my experience is related to individual insurance, the

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TABLE 7
Accident Year Versus Policy Year

	Renewal Date	1990 PY Income Claims	1990 PY Premium	1991 PY Income Claims	1991 PY Premium	1990 PY ILR	1991 PY ILR
Group 1	Jan 1	\$60,000	\$92,000	\$78,000	\$124,200	65%	63%
Group 2	July 1	90,000	135,000	117,000	182,250	67	64
Group 3	Sept 1	120,000	180,000	156,000	243,000	67	64
						66%	64%

Premium is earned evenly over 12 months. Claims are incurred as follows:	
First Month	0.15
Second Month	0.14
Third Month	0.13
Fourth Month	0.12
Fifth Month	0.10
Sixth Month	0.09
Seventh Month	0.07
Eighth Month	0.06
Ninth Month	0.05
Tenth Month	0.04
Eleventh Month	0.03
Twelfth Month	0.02

	Incurred Claims	Earned Premiums	Accident Month ILR
Jan 1991	\$30,000	\$36,600	82%
Feb 1991	27,120	36,600	74
Mar 1991	23,040	36,600	63
Apr 1991	20,160	36,600	55
May 1991	16,500	36,600	45
Jun 1991	13,620	36,600	37
Jul 1991	26,610	40,538	66
Aug 1991	23,460	40,538	58
Sep 1991	42,510	45,788	93
Oct 1991	39,000	45,788	85 }
Nov 1991	34,320	45,788	75 }
Dec 1991	30,810	45,788	67 }
	\$327,150	\$483,825	68%

Note: The situation becomes even more distorted if the number of covered groups grows.

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things that you've heard relative to group are very consistent with concerns of the valuation actuary, whether they're group valuation actuary or an individual valuation actuary. I want to try to emphasize some of the major points. I thought a way to do that was to look at it from the standpoint of a toolbox, and what do you need in a toolbox if you're a valuation actuary. To me a toolbox is kind of a catch all. It's got a lot of things that you keep in it that you need for special projects. It really provides all the necessities that you need to do the complete job. The analogy I'd like to make is really sort of similar to building something, maybe it's building a house, maybe it's a shed maybe it's something smaller than that. But we need to talk about planning the actual building, using whatever you come up with, and maintaining it in the future. So let's take a look in this toolbox and see what we can come up with.

The first thing, and one of the most important, is blueprints or plans. Now from a standpoint of a valuation actuary, I think that deals with guidelines. What sort of things do we have that are providing guidance to us as we do our work? Well certainly most of you are familiar with the actuarial standards of practice that relate to cash-flow testing: Number 7 and Number 14. I think another one that's kind of interesting even though it doesn't necessarily relate specifically to a valuation actuary is Number 8 which deals with regulatory filing for new policies. There's a lot of consistent information that, as an actuary, you're required to include in your policy filings and your submissions of policy rate changes that are very consistent with the type of work that you need to do as a valuation actuary. So when you're looking at your guidelines I'd suggest that you look at Number 8 as well as 7 and 14 which deal with cash-flow testing.

Another thing to be aware of is that there is now an actuarial committee that is supporting the actuarial standards board that is coming up with a new standard specifically for supporting the valuation actuary. It's going to try and answer some of those questions like what happens if interest rates are very low and it really doesn't make sense to look at interest rate scenarios that drop down? Or what happens if you fail one scenario and you pass the rest of the scenarios? What kind of leeway do you have? I think the exposure draft of that may be coming out in spring or early summer of 1992. So you might want to look for it. It's really oriented a little bit more towards some of the work that's been done in the life area, it applies to health actuaries as well. So be sure and take a look at that when it comes out -- relate it to your own work and see if you can make some comments so we can come up with a standard that everyone can live with.

Of course, outside the actuarial realm there are other things that we have to worry about. The NAIC is right up there setting some regulations that impact those of us who are valuation actuaries. The 1990 valuation law which you'll see coming into play in most of your states by the end of 1992 is really important for you as health valuation actuaries as well as life valuation actuaries.

I think the reason I keep talking life and health is there are some similarities from an individual standpoint. And I think the life people for the most part have been ahead of us as far as worrying about the valuation actuary concepts. And with the valuation law, all of a sudden, it's an important element of what we do as health actuaries as well. So you need to be aware of that and take a look at it. There are, of course, other model laws that are being considered and discussed now. Those will impact us

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as valuation actuaries as well. And of course, there are the risk-based capital considerations that Jim mentioned. That's important for you as a valuation actuary as well. So as we're looking at the guidelines and the things that impact us, as we look at the plans and the blueprints we have to go by, we should look at the actuarial standards. We should look at the NAIC valuation law, the risk-based capital regulations.

Another important element here is establishing the goals that you want to meet in your valuation actuary work. You know valuation actuary work really isn't important just for establishing the adequacy of reserves. One of the ideas that Ed talked about is that cash-flow testing provided some benefits for their investment people. It's got a lot of management information that if you approach your valuation actuary responsibilities correctly and appropriately I think you can develop a lot of information for management. Also it's going to provide important information for your surplus standards as you get into the risk-based capital.

There are certain individual product considerations that cause special concerns. We'll talk about a few of these down the line but they're reserve elements that are different for individual products. The renewability is something that has an impact. You've got to take into account those reserves and the way that they're handled. As mentioned earlier, there are economic considerations. People do react differently in different phases of the economy. And there are other risks that are included as well. Whether it's pricing risks or whether it's interest rate risks. So all of these things are important in the tools that we use. They're all part of the original planning process that we need to go through.

A saw is something that's standard in a toolbox. You need to be able to shape the valuation project. And as I talk about this I look at your valuation actuary responsibilities as a project. It's something that's an ongoing project. It's got an undefined beginning and end. But it is a project and it's something that you need to plan for and you need to shape. You need to decide where you're going to devote your time and your energies. It's a process that you can spend much more time on than you or most of your staff have. And I think it's important to decide early on exactly what you want to spend your time on and how you want to devote those energies.

You need to evaluate the specific risks that are involved as well. I mentioned guaranteed renewable and noncancelable policies. How should those differ and how should those be viewed differently than collectively renewable policies or cancelable policies? You've got certain benefits that are short term versus long term. The long-term benefits such as disability income and long-term care are good examples of situations that require different considerations. Another thing that you're going to want to do in this early stage is to model your business. It's not necessary to look at every policy to formulate your plans. It's very easy to try and model your business combining the different risk characteristics so that as you are evaluating the risks you can do it in such a way that you minimize the effort that you take.

Another tool that I look at is the hammer. You know, what we've been talking about so far has really been planning and shaping but at some stage it's time to get busy. You need to develop a good solid frame work for what you're going to be testing and what your results are going to be. It should not be overly complicated, something

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that really creates kind of stable underpinnings for the results of your analysis. Evaluate what you can do, what you can't do, and then get on with it. One of the hardest things to do in the current valuation actuary environment is finally saying I have to do it. I've got to get started with something. It may not be everything I'd like to be able to do but I need to get underway. That's where the hammer comes in. Eventually you've got to get to the nuts and bolts of the whole process. One of the things that is important here is establishing the different assumptions that you're going to be looking at. This isn't unlike pricing in a way. Remember assumptions are just that. They're not necessarily facts. They may be guesses supported by facts to some extent. But, as valuation actuaries, you're going to have to look at your expenses, your morbidity, and your persistency in some cases, depending on their type of policy and the renewability. I think in most individual policies that's the case.

Another important element is the claim patterns. We were just talking about the analysis of the claims and the claim payout and that sort of thing. This becomes very important on long-term types of policies, especially when you're looking at cash-flow analysis. You've got to look at the claims pattern. You've got to make some assumptions about that. Rate increases, and how you are going to handle them, are two other things that you may want to consider. You need to be familiar with the regulations in that area. It goes back to your planning. But rate increases need to be brought into play. Otherwise in a situation where you have a level premium and you have increasing benefits and increasing risks, you're going to get into an untenable situation. At some point you need to make a decision about how to handle rate increases. Many of you may have done that in your pricing. But at this point it's something you need to consider from the valuation actuary's standpoint as well. You need to incorporate your own experience to the extent that you can. Your experience really lends credence to the results that you end up with. It also creates a good learning process and understanding about your business. I don't think that we've ever really worried about this from a valuation standpoint other than possibly in the claims experience area. But in the valuation actuary process you do need to look at your other experience as well.

Cash-flow testing is something that needs to be considered. It really doesn't necessarily need to be done but it certainly needs to be considered. I don't know how many of you are actuaries involved with insurance companies that have life insurance as either a major or minor portion of your business. But you can bet you're going to have to tie the results of your analysis into the results of their analysis. The valuation law is going to require the valuation actuary to take into account the life and the health business and all other lines as well. So you are going to have to be able to tie the results of your cash-flow testing together. I see cash-flow testing, in terms of health insurance, as being a little different than what you might consider asset adequacy. We were talking earlier about the risks associated with the assets of health insurance. There also are even greater risks associated with the liabilities. So it's not necessarily asset adequacy that you need to be looking at but you certainly need to be looking at cash-flow testing to some extent.

I always think of a screwdriver when something needs tightening and fine tuning. This is one of the things that I think is important with respect to alternative scenarios. The scenarios really give you an idea of the impact of the environment, and the impact of the economy. One of the speakers was talking about how difficult it is to

come up with an assumption about the impact that changes in the economy and the environment have on your experience. To tell you the truth, you're not going to know. So you're going to have to make some guesses and assumptions and do some testing so that you understand the relative impact of some of those things. So I think that scenario testing is important from that standpoint.

It's also important to relate that to all of the various risks that you're looking at that have a strong impact on the results. Of course, with the fine tuning, you're going to want to take your projected cash flows and compare those to actual experience. For those of you who are not going to be doing cash-flow testing to support your valuation actuary opinion, you're going to have to develop some other methods for fine tuning your estimates and results.

A tape measure can be used to make sure that everything you're doing fits together. And in a project like this, the fit can be relative. If you're building a four inch by four inch picture frame, for instance, and you cut one of the pieces a half inch too short, it just doesn't work. But if you're working with a big picture frame that's six feet by six feet and you cut one of the pieces a half inch too short you can probably work around that. So as you start working on the whole process, try and understand the impact of small changes in assumptions. Many times they are not going to be that important. You need to summarize your results in a way that's meaningful not only to you but to others who will be looking at these results. You have to check the reasonableness of the results. Do they make sense. Do they make sense in light of the regulation that you're trying to satisfy.

Of course, you have to measure the risks. And this gets back to something I mentioned before. As actuaries, we look at the C-1, C-2, C-3 and C-4 risks. Again, I don't think those terms have been as common for the health actuaries as they have been on the life side in the last few years. C-1 and C-3 relate to assets. In my opinion, with respect to health insurance, the C-2 risk, which is basically the risk of pricing incorrectly given the experience that evolves, and the C-4 risk, which is a business management risk, are probably more critical than the C-1 and C-3 risks. So it's something that you need to consider. You need to be able to measure those risks.

When I work with pliers I kind of think of it in terms of taking wires and binding them together. So that they hold, it creates a cohesiveness to some extent. You need to combine all your health results in the same way. You know you're going to be working with policies that have completely different characteristics. A disability income policy is very different than a major medical policy and very different than a long-term care policy. Yet, at some point, you have to bring all that information together so that you can start looking at each of them on a separate basis. Not only do you have to do it with the health policies themselves but you're going to have to combine them with other lines of business. And that becomes even more difficult. One of the difficult parts of it is the extent to which you talk to people who are working with other parts of other lines of business. In many companies that's not easy to do. It's been tough enough to get actuaries to work with the investment people. It's going to be especially difficult to get actuaries in large companies to work together within lines of business. How many life actuaries know what health

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actuaries do and vice versa? Yet, in some way, you're going to have to bring all your results together and make them meaningful.

The final element in this aspect is capital considerations. You are going to have to think about risk-based capital. It's just on the drawing board now, but it's been exposed. There are formulas that are available for companies to review. And they do specifically take into account the capital that's necessarily related to health insurance. And as you do your valuation actuary work you're going to run into some pressures as far as setting reserves at a level that is also going to create additional capital. Any time you run into that, it's going to create some conflicts from the actuarial standpoint. I think they'll probably talk about that at the session that is devoted to the risk-based capital element.

Every toolbox needs a telephone. A phone represents communication. This gets back to who is the audience, and what do they need to know? I think probably one of the most difficult elements of the valuation actuary's work is communicating the results to people who are not involved with it on a day-to-day basis. One aspect of the valuation laws is that you are going to have to develop an actuarial report to support your opinion. If you're not the valuation actuary but you're basically providing information to the valuation actuary within your company, then I would imagine you'll probably be the one that will be creating that report. And in a way I see the actuarial report as the valuation actuaries' friend. It kind of gives us a chance to document some of the assumptions that we made. Actually, it forces us to document them, and by doing so we have to think about them. And I think that's part of the whole process.

It's important to keep the lines of communication open -- not just internal but external lines. There has been a lot of discussion about the valuation actuary in the last few years, although most was not very much related to health insurance. But you're going to see a lot more of it this year and a lot more in the future. I think it creates good opportunities for you to learn from other people at these meetings and I think it's a good way for you to find resources. You use 911 as an emergency number. To quote an ad, it sort of knows when to say "when." This is a new area. It's a new area for a lot of us. Do not hesitate to look for help when you need it. It doesn't matter whether it's at the beginning of the project, the middle of the project, or whether you need somebody to look over your shoulder at the end of the project to see if you did the things that made sense. But it is a new area, and valuation actuaries will be the ones doing the work. There's a lot of other resources out there. Call if it's necessary.

The last thing that I always have in my toolbox, and I think is important, is a band-aid. We're going to have to patch things up every once in a while. We're going to have to do things to make all of this kind of hold together. In the analysis that you perform of your valuation actuary work, you need to use it. You need to learn from it, and it creates an opportunity for you to learn. It creates a need to learn. It's an ongoing process. You need to update it continually. It's got to be a living process. And as important as anything, just like a band-aid, it's got to be flexible. You know when you get done with your work at the end of the first year and you get into the first quarter of the next year and you try and bend your finger and all of a sudden

everything falls apart. You need to have the flexibility. And I think that's a very important element in everything you do in your valuation actuary work.

In summary, different situations that you're going to be facing require different approaches. Some of the things you've heard are approaches that people have taken with group insurance, with their own company's business. You can use some of the specific aspects in claim reserving. But in fact all of you as valuation actuaries are going to have to decide your own course and decide how the results are going to be used. Much of the basis of the basic information is the same. No matter what kind of business it is. There are probably some special elements of individual health insurance that are a little more tied to life insurance which you can learn from the life people.

MR. ROBERTS: I was trying to figure out what we'd do with a sledge hammer but we didn't get to that one.

MR. LEONARD KOLOMS: Jerry, in your discussion it seems to me the claim reserves that you were calculating were based on the incurred date the company was using but this may not have relevance at all to the ultimate liability. What liability do you feel represents the proper reserves that we should be holding? Are we supposed to be doing this on a contract termination basis? So, if a group has a two-year extension, should we be reserving for the two-year extension which is not the coding basis that companies are using?

MR. WINKELSTEIN: Well, in the course of my work I see a lot of variation in the way companies code the incurred date of the claim. If you're saying that the incurred claim coding should relate to the benefit provisions, I agree with you.

MR. KOLOMS: Well at least the liabilities should. It doesn't matter how we code our plans, we should be setting up a liability regardless of how the company codes our claims.

MR. WINKELSTEIN: That is true. A lot of times you would get a company that may have an extension of benefits, have a permanent disability extension benefits for up to a year, or something like that. What these companies will typically do is calculate a claim reserve on a service date basis and then add a percentage. This, in a lot of cases, is based upon what additional liability they need to set up for the extension portion. But you do have some companies that do set up liabilities on a termination basis, assuming everything terminates.

MR. KOLOMS: Which is correct? As a valuation actuary are we supposed to do that on a termination basis?

MR. WINKELSTEIN: I don't know if I consider that area black and white. It may have shades of gray. I believe it's appropriate if there is a contractual liability to pay extension of benefits claims to set up an additional liability for that. A lot of times what has happened is it was a mute issue because a lot of our clients were over adequately reserved. So even if they didn't specifically set up that amount, it's in their margin in their base claim reserves.

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MR. KOLOMS: Does that mean you have tested their basis to see whether or not their extension reserves had enough margins? I mean did you perform studies to determine whether or not the factors they're using are appropriate? How did you approach that problem?

MR. WINKELSTEIN: In most cases, for the larger companies we audit (and here I would really talk about the audit more than the consulting), the client has performed the study and we've looked at it. Frankly, for a lot of the smaller companies we audit, there is no study and we're really forced to use a rule of thumb based upon the studies we've seen larger clients perform.

MR. KOLOMS: I guess one other question you didn't talk about is loss adjustment expense reserves. I am assuming that you are also doing something along those lines in testing the adequacy of those and making sure those companies are establishing all those now?

MR. WINKELSTEIN: Yes. Typically on non-HMOs, almost all of our clients set up loss adjustment expense and it is typically set up as a claim payment expense divided by paid claims times the unpaid claim liability. For HMOs, we see about 50-60% which set up loss adjustment expense where the other ones set up nothing. Again, the question was mute in most cases this year end because companies were very profitable and that led to high margin in their claim reserves. But if push came to shove and there was no loss adjustment expense out there I would feel that I would have to demand something in that regard.

MR. ROBERTS: I also work for a public accounting firm and I agree with Jerry that the guidance in these questions that you've asked are not totally clear. From our standpoint, whether it's a GAAP audit or a statutory audit may make a difference in how we respond to these things. My opinion is that, in terms of the contract, it's pretty clear when a given flow of expense dollars should attach to the company. With extended benefits under a disability provision, in my opinion, those future payments do become the liability of the company at the point where the person becomes disabled. So if the policy remains in force, you can tie it to expenses and use the normal incurred methodology, by coding the results and going through the normal calculation. I think it has to be considered specifically although I don't think that the actuarial profession, the regulators, or the gurus that define GAAP requirements have given us totally clear guidance on these issues.

MR. KOLOMS: Do you think there is a proper matching of premiums and claims under GAAP without establishing that reserve?

MR. ROBERTS: I do not.

MR. KOLOMS: Okay. So you feel it's correct for GAAP purposes, but you're concerned maybe with statutory?

MR. ROBERTS: My concern is that the rules and the way they're interpreted are fuzzy. And so I don't think I can really make a clear statement for the profession. I can only give you my personal opinion.

