DEMYSTIFYING ACTUARIAL REPORTS

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Health care providers, whether hospital systems, managed care organizations, senior housing entities or group practices, have long recognized the benefits of self-insuring significant portions of their medical professional liability risk.

It is not unusual for a group practice to retain a $250,000 deductible each claim, while large health systems may use a captive to self-insure the first $2 million or $10 million of each claim. Regardless of the approach or level of retention, the provider organization must make provision for funding the claims incurred within the retention.

The reason for hiring an actuary is to receive a scientific, reasonably accurate estimate of the dollars one must accrue to pay for ultimate claims within a self-insured retention. Accurately estimating future losses is important for reasons beyond what an organization must budget and accrue. Different parties will use the study in different ways.

- Insurance companies who would provide coverage in excess of the retention may require an actuarial report.
- Certified public accountants, bond-rating services and other entities interested in the long-term financial viability of an institution or group may expect (or require) a report.

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Each time an actuarial study is completed, new projections for past, current and future years' losses are calculated. If the most recent study suggests that prior estimates were too low, additional accruals would be indicated. With each study the health care provider receives a new estimate of how many dollars will eventually be needed to handle liabilities within their retention.

ONE ACTUARIAL METHODOLOGY

Exhibit I displays how losses develop over time. Since this exhibit is valued at the end of 2010, the 2010 accident period has only one entry in the valuation columns. The 2005 accident year has six entries across the page as loss values have changed over time. This recapping of multiple years' information creates a "loss triangle."

Please refer to the first row titled "2005." Note that in the first column, "Valuation @ 12-Months" (that is, at the end of an annual period running from January 1 to December 31), losses for the 2005 accident year totaled $300,000. Twelve months later, at the 24-month valuation, they had increased to $1,200,000, or a four-fold increase.

Claim development over time is expected because incidents may have happened but not been reported or reserved at the 12-month valuation. As additional reports are received, new information is developed through the discovery process and reserves are established, losses (both paid and reserved) tend to increase.

EXHIBIT I **SAMPLE HOSPITAL PROFESSIONAL LIABILITY TOTAL LIMIT INCURRED LOSSES AS OF 12/31/10**

ACCIDENT YEAR	VALUATION @ 12 MONTHS	@ 24 MONTHS	@ 36 MONTHS	@ 48 MONTHS	@ 60 MONTHS	@ 72 MONTHS
2005	300,000	1,200,000	2,000,000	2,600,000	2,500,000	2,900,000
2006	260,000	1,090,000	1,750,000	2,290,000	3,220,000	
2007	620,000	2,600,000	4,400,000	4,950,000		
2008	580,000	2,400,000	3,360,000			
2009	550,000	2,490,000				
2010	330,000					

Note the further development in the 2005 accident year from 24 to 36 to 48 months. Between 48 and 60 months, Sample Hospital experienced some "negative development." Claims decreased from $2.6 million to $2.5 million – presumably because a claim settled for less than its reserve, or a reserve was decreased because of new information on the claim. However, by 72 months, the 2005 year developed positively (increased) to $2.9 million.

Each year's losses are tracked in this way. The assumption is that the past will be predictive of the future. So, if 2005 claims increased by four times between the 12- and 24-month valuations, 2010 claims might be expected to do the same. However, development varies from year to year, so we can't automatically assume that at 24 months the 2010 accident year will increase by 400%. Other years above have developed differently, so actuarial techniques need to be employed to take the variability into consideration.

Exhibit II displays these changes from valuation date to valuation date as factors. Note that the four-fold increase from 12 month incurred amount of $300,000 to the 24 month total of $1,200,000 for the 2005 accident year becomes a factor of 4.000. The development factor for 2006 between the 24- and 36-month valuations is 1.606 – the increase in losses from $1,090,000 to $1,750,000 between these valuation dates.

EXHIBIT II **REPORT-TO-REPORT FACTORS**

ACCIDENT YEAR	12-24	24-36	36-48	48-60	60-72	72-ULT
2005	4.000	1.667	1.300	0.962	1.160	***
2006	4.192	1.606	1.309	1.406		
2007	4.194	1.692	1.124			
2008	4.138	1.400				
2009	4.527					

These factors will be used as guidelines to "guesstimate' the ultimate value of prior losses as well as project future losses. Actuaries' art and science is in using a number of techniques to choose the most appropriate factors for their projections.

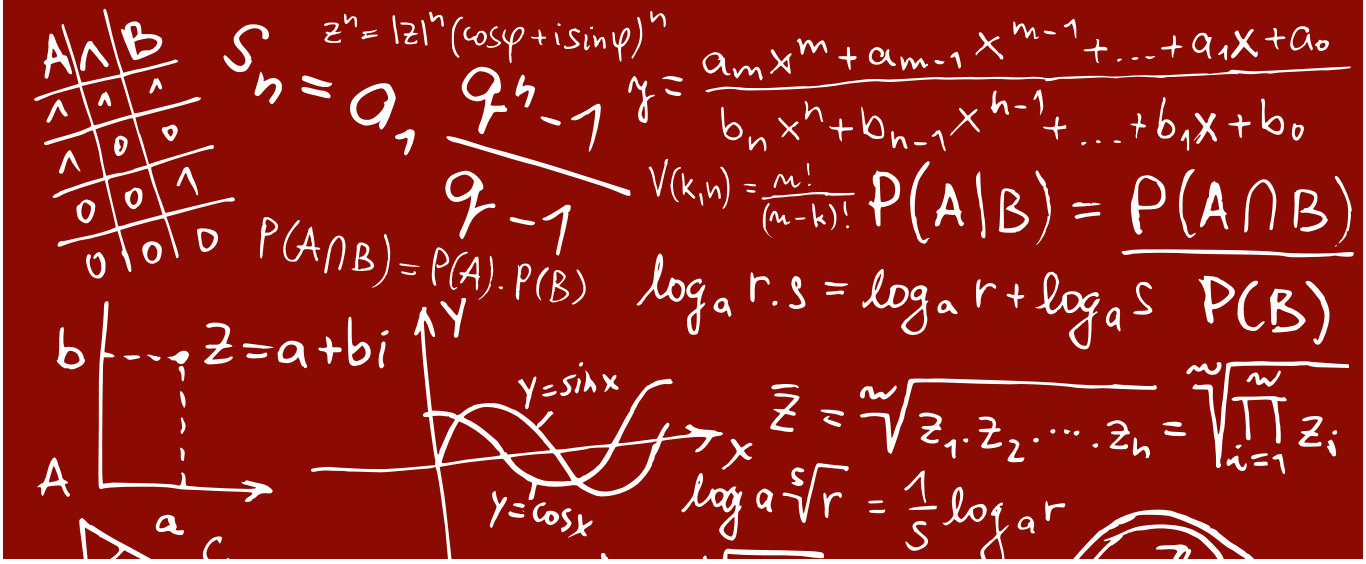
Exhibit III compares a simple average of the three most recent factors in each column with a weighted average and an "industry" average factor. The industry factor could be published by a national rating agency, such as the Insurance Services Office (ISO), or developed by the actuary in-house. The actuary now selects his/her preferred report-to-report factor and takes the product of those factors to arrive at "cumulative loss development factors to ultimate," as shown in Exhibit IV.

EXHIBIT III

Report-to-Report Periods	12-24	24-36	36-48	48-60	60-72	72-ult
Simple Average of Latest Three	4.286	1.566	1.245	1.184	1.160	***
Weighted Average of Latest Three	4.280	1.562	1.207	1,170	1,160	***
Industry	3.610	1.030	1.430	1.160	1.120	1.250

EXHIBIT IV

Report-to-Report Periods	12-24	24-36	36-48	48-60	60-72	72-ult
Selected Report-to-Report Factor	4.200	1.650	1.250	1.160	1.120	1.250
Cumulative Loss Development Factor To Ultimate	14.066	3.349	2.030	1.624	1.400	***



After selection, the process is multiplication. The factor furthest to the right is multiplied by the one to its left to arrive at the cumulative factor. So 1.250 x 1.120 = 1.400. And 1.400 multiplied by 1.160 = 1.624. These cumulative factors will be used to estimate loss development for each accident year. The newest year 2010 will receive the largest cumulative factor, while the oldest year will be expected to develop the least. This is because the oldest year has already developed over four periods, so it is (presumably) closer to its ultimate value than the newest year.

Exhibit V displays how those cumulative factors are then used to project ultimate losses for each prior year. This is the actuary's best guess of what the ultimate cost of claims incurred each accident year will be. (You'll note that the ultimate loss projection for all years is more than double the incurred losses in this example. While this may seem like a lot, it is not unrealistic.)

EXHIBIT V

OCCURRENCE PERIOD	TOTAL LIMIT INCURRED LOSSES	TOTAL LIMIT LOSS DEVELOPMENT FACTOR TO ULTIMATE	TOTAL LIMIT PROJECTED
2005	$2,900,000	1.250	$3,625,000
2006	3,220,000	1.400	4,508,000
2007	4,950,000	1.624	8,038,800
2008	3,360,000	2.030	6,820,800
2009	2,490,000	3.349	8,339,010
2010	330,000	14.066	4,641,780
Total	$17,250,000		$35,973,390

Before the actuary can predict future losses, s/he needs to match prior years' losses with prior years' exposures so that changes in exposure (such as closing a wing of beds or adding a new service) are factored into the calculation of cost per exposure. Although an actuary would collect very detailed exposure information (acute care beds, cribs, psych beds, ER visits and so on) and convert everything to an "occupied bed equivalent," we'll just assume beds = exposures in this example.

EXHIBIT VI

OCCURRENCE PERIOD	BASIC LIMIT INCURRED LOSSES	BASIC LIMIT LOSS DEVELOPMENT FACTOR TO ULTIMATE	DEVELOPED LOSSES	EXPOSURES	DEVELOPED LOSS COST PER EXPOSURE UNIT
2005	$2,600,000	1.15	$2,990,000	604	$4,950
2006	2,840,000	1.26	3,578,400	602	5,944
2007	3,800,000	1.58	6,004,000	593	10,125
2008	2,400,000	1.86	4,440,000	615	7,220
2009	2,260,000	3.12	7,051,200	650	10,848
2010	330,000	12.30	4,059,000	652	6,225
2011	***	***	***	650	?

In Exhibit VI, developed losses are compared with bed exposures by year. The actuary calculates a "loss cost per exposure" by simply dividing developed losses by exposures. Each bed in 2005 is expected to produce $4,950 in ultimate losses; each 2006 bed is expected to produce $5,944 in losses, and so on. Future losses are projected based on selecting a loss cost per bed and multiplying it by the estimate of beds for 2011.

BASIC LIMITS VS. TOTAL LIMITS

Now some confusing nuances. Note that the exhibit now has a column labeled "Basic Limit Incurred Losses." You may also notice that the loss amounts shown have changed. We've lopped off the top portion of any individual claim paid or reserved in excess of a somewhat arbitrary limit of $500,000. We also have a column labeled "Basic Limit Loss Development Factor to Ultimate." We've changed our "total limit" factor to a "basic limit" factor. Using only losses under $500,000 minimizes the impact of a few very large claims, which are somewhat random and not necessarily predictive of the future. The actuary will then apply an "increased limits factor" to his/her estimate to calculate a "full limits" amount.

EXHIBIT VII

Increased Limits Factors	500-1000	1000-2000
Industry	1.20	1.16
Cumulative	***	1.40

THE ESTIMATE

So at this point the actuary has several different basic limits loss costs per exposure unit to choose from. The actuary uses averaging techniques and compares them to industry average costs, allowing him/her to select the appropriate one to apply to expected exposures. For example, the simple average loss cost from Exhibit VI is $7,552, but based on trends the actuary sees, and an industry average factor of $9,000 per bed, he or she might select $8,500 per bed. Multiplying that loss cost by the 650 beds expected to be occupied in 2011 generates a basic limit ultimate loss estimate of 650 x $8,500 = $5,525,000.

That basic limit figure is multiplied by the industry average increased limits factor of 1.40 from Exhibit VII to estimate the total accrual necessary to fund losses up to the provider's full retained limit of $2,000,000 (rather than the $500,000 "basic limit"). Therefore, $5,525,000 x 1.40 = $7,735,000 is the ultimate expected full value of claims incurred from January 1, 2011, through December 31, 2011 within the $2 million retention.

The actuary has used past loss experience and exposure history to develop and select an expected loss cost per bed. S/he has then applied that expected cost to future expected exposures, and given his or her best estimate of what the future will bring. In this case that estimate is $7,735,000.

The actuary recognizes two additional factors that affect his/her recommended funding amount:

- The time value of money
- The need to provide for a margin of error

THE TIME VALUE OF MONEY

The lag time between a medical incident and the potential payment of damages is often called the "tail." During this lag, funds set aside to meet projected claim obligations can be invested. An actuary will estimate the rate at which claims will pay out and reduce the total limit value estimate by a discount factor that recognizes expected investment income. Therefore, the $7,735,000 figure might be reduced by 10% or more, depending on the timing of expected payout and prevailing interest rates.

CONFIDENCE LEVELS/MARGIN

At this point, the actuary has provided his/her best estimate of expected claim costs and has discounted that figure to reflect expected investment income. However, most organizations are uncomfortable funding only for 'expected' losses.

Some choose to pick an explicit margin funding amount (for example, a $1.5 million margin is added to the ultimate funding value), but most request their actuary to calculate the additional amounts of funding necessary to provide confidence that the accrued funds will be adequate to meet future liabilities. The actuary computes probabilities of funds being adequate at various levels and creates a table.

EXHIBIT VIII

Confidence Level	Discounted Funding
Expected	$6,000,000
70%	$9,000,000
75%	$11,000,000
80%	$13,000,000
85%	$15,000,000
90%	$17,000,000

There is a 70% probability that a fund level of $9,000,000 will be enough to dispose of all claims incurred in 2011. That implies that even at this level, there is still a 30% chance of not having funded enough. Many programs fund in the 65-75% range.

CONCLUSION

Ask your actuary to walk you though his or her exhibits and show you how the projections were developed. You should be able to verify the "raw" loss and exposure information in the report because the actuary will have asked you to provide it. Keep in mind that actuarial approaches will vary if funding is on a "claims-made" basis (rather than the "occurrence" basis outlined here), or if the actuary believes an entirely different methodology is more appropriate for you.

Since there is art as well as science in an actuarial study, different actuaries may provide very different estimates, even when they are beginning with the same raw data. And be forewarned – in almost every case, you'll be surprised by the numbers they produce!

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