

**1989 VALUATION ACTUARY  
SYMPOSIUM PROCEEDINGS**

**CASE STUDY -- INDIVIDUAL MAJOR MEDICAL**

MR. DAVID A. RICCI: My company is a large health insurer now writing approximately \$700 million of small group and individual major medical business along with a more modest life division. Our organization is composed of three strategic business units (SBUs) which operate independently in terms of the pricing, reserving, underwriting and payment of benefit functions. My remarks are confined primarily to the individual major medical SBU.

Originally we carried a large block of per-cause medical insurance policies with relatively restrictive inside schedules. Until the early 1980s these types of policies, although cyclical in nature, generally experienced good growth with limited competition. With the intervention of more active players into the market, a number of aggressive actions needed to be taken to defend our market position. We gradually shifted toward calendar year benefits with significant deductibles and very few inside limits. Our premium structure recognized the effects of selection on a tiered basis, which meant we had to periodically resubmit significant rate increases even with experience realized as projected.

This change in marketing produced a tremendous strain on the valuation structure with the emergence of more growth in expected medical trend, high adverse lapsation, a growing skepticism on the part of the regulator and a distribution system which developed a rapidly increasing commodity mentality. In addition, significant regional differences appeared which generally acted against the profitability of the business block.

So it is with this perspective, that the following case study is presented (see Slides 1-5). The assumptions show a steep selection pattern with 20% trend and attained age increases, lapses that begin at around the 40% level and an 8% interest discount. The scenarios recognize different levels of this pattern ranging from total (no plan rerating through the policy period) to annual (150% second-year rate increase, followed by 40%, 13% and 10% annually). If as a company one is looking for 6% of earned premium as profit, (see Slide 6) with annual recognition methodology, you can start out with an initial premium one-half the size of one that recognizes the entire morbidity flow. The bad news is that, even without recognizing the additional adverse selection and cost spirals produced, by the second year the premium charged under the annual scenario has surpassed all others.

The moral of the exercise is that short-term, competitive advantages will generate long-term solvency situations. The major contribution of the valuation actuary is to present the financial consequences of these changes in marketing philosophy.

SLIDE 1

<b>CASE STUDY</b>							
<b>INDIVIDUAL MAJOR MEDICAL ASSUMPTIONS</b>							
<b>DURATION:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>ACTIVE POLICIES</b>							
BEG OF YEAR	100	60	36	25	18	14	10
EFF YEARLY	82	49	31	22	16	12	9
<b>CLAIMS PER POL</b>							
SELECTION ONLY	30	70	90	95	100	100	100
TREND @20% YEARLY		6	15	22	28	34	41
ATTAINED AGE		2	4	6	7	9	10
<b>DISCOUNT</b>							
INTEREST 8.0%	0.9623	0.8910	0.8250	0.7639	0.7073	0.6549	0.6064
<b>TOTAL CLAIMS</b>							
SELECTION	2,460	3,444	2,795	2,076	1,620	1,220	865
DISCOUNTED	2,367	3,069	2,305	1,586	1,146	799	525
TREND		295	472	486	449	418	355
DISCOUNTED		263	389	371	317	273	215
ATT AGE		74	118	121	112	104	89
DISCOUNTED		66	97	93	79	68	54
TOTAL	2,460	3,813	3,384	2,683	2,181	1,742	1,309
DISCOUNTED	2,367	3,397	2,792	2,050	1,542	1,141	794

SLIDE 2

SCENARIO I - TOTAL RECOGNITION

NET PREMIUMS

DISCOUNTED FROM ISSUE

SELECTION	62.17
TREND	9.64
ATT AGE	2.41
TOTAL	74.22

BY DURATION

SELECTION	30.00	70.00	90.00	95.00	100.00	100.00	100.00
TREND	0.00	6.00	15.20	22.24	27.69	34.23	41.07
ATT AGE	0.00	1.50	3.80	5.56	6.92	8.56	10.27
TOTAL	30.00	77.50	109.00	122.80	134.61	142.78	151.34
PREMIUM - ORIGNL	6,086	3,652	2,305	1,622	1,202	906	642
PREMIUM - ADDTL	0	0	0	0	0	0	0
INV INC	239	143	90	64	47	36	25
TOTAL INCOME	6,325	3,795	2,395	1,685	1,250	941	667
BENEFITS	2,557	3,963	3,517	2,788	2,266	1,810	1,360
INCR RES	3,769	(168)	(1,122)	(1,103)	(1,017)	(869)	(693)
TOTAL OUTGO	6,325	3,795	2,395	1,685	1,250	941	667
NET GAIN	0	0	0	0	0	0	0
RESERVE BAL	3,769	3,902	3,093	2,237	1,399	642	0
LOSS RATIO	42.0%	108.5%	152.6%	171.9%	188.5%	199.9%	211.9%
ADJ LOSS RATIO	103.9%	103.9%	103.9%	103.9%	103.9%	103.9%	103.9%

### SLIDE 3

#### SCENARIO II - RECOGNIZE SELECTION

#### NET PREMIUMS

##### DISCOUNTED FROM ISSUE

SELECTION	62.17
TREND	0.00
ATT AGE	0.00
<b>TOTAL</b>	<b>62.17</b>

##### BY DURATION

SELECTION	30.00	70.00	90.00	95.00	100.00	100.00	100.00
TREND	0.00	6.00	15.20	22.24	27.69	34.23	41.07
ATT AGE	0.00	1.50	3.80	5.56	6.92	8.56	10.27
<b>TOTAL</b>	<b>30.00</b>	<b>77.50</b>	<b>109.00</b>	<b>122.80</b>	<b>134.61</b>	<b>142.78</b>	<b>151.34</b>

PREMIUM-ORIGNL	5,098	3,059	1,930	1,358	1,007	758	538
PREMIUM-ADDTL	0	369	590	607	561	522	444
INV INC	200	134	99	77	62	50	39
<b>TOTAL INC</b>	<b>5,298</b>	<b>3,562</b>	<b>2,619</b>	<b>2,043</b>	<b>1,629</b>	<b>1,331</b>	<b>1,020</b>
BENEFITS	2,557	3,963	3,517	2,788	2,266	1,810	1,360
INCR RES	2,741	(400)	(898)	(745)	(637)	(480)	(340)
<b>TOTAL OUTGO</b>	<b>5,298</b>	<b>3,562</b>	<b>2,619</b>	<b>2,043</b>	<b>1,629</b>	<b>1,331</b>	<b>1,020</b>
NET GAIN	0	0	0	0	0	0	0
RESERVE BAL	2,741	2,560	1,867	1,271	736	315	0
LOSS RATIO	50.1%	115.6%	139.6%	141.8%	144.5%	141.4%	138.6%
ADJ LOSS RATIO	103.9%	103.9%	103.9%	103.9%	103.9%	103.9%	103.9%
PREM INCR		12.1%	16.5%	10.8%	7.6%	8.4%	8.2%

**SLIDE 4**

**SCENARIO III - INCREASE ANNUALLY**

**NET PREMIUMS**

**DISCOUNTED FROM ISSUE**

SELECTION	30.00
TREND	0.00
ATT AGE	0.00
TOTAL	30.00

**BY DURATION**

SELECTION	30.00	70.00	90.00	95.00	100.00	100.00	100.00
TREND	0.00	6.00	15.20	22.24	27.69	34.23	41.07
ATT AGE	0.00	1.50	3.80	5.56	6.92	8.56	10.27
TOTAL	30.00	77.50	109.00	122.80	134.61	142.78	151.34
PREMIUM-ORIGNL	2,460	1,476	932	656	486	366	260
PREMIUM-ADDTL	0	2,337	2,453	2,028	1,695	1,376	1,050
INV INC	97	150	133	105	86	68	51
TOTAL INCOME	2,557	3,963	3,517	2,788	2,266	1,810	1,360
BENEFITS	2,557	3,963	3,517	2,788	2,266	1,810	1,360
INCR RES	0	0	0	0	0	0	0
TOTAL OUTGO	2,557	3,963	3,517	2,788	2,266	1,810	1,360
NET GAIN	0	0	0	0	0	0	0
RESERVE BAL	0	0	0	0	0	0	0
LOSS RATIO	103.9%	103.9%	103.9%	103.9%	103.9%	103.9%	103.9%
ADJ LOSS RATIO	103.9%	103.9%	103.9%	103.9%	103.9%	103.9%	103.9%
PREM INCR		158.3%	40.6%	12.7%	9.6%	6.1%	6.0%

## SLIDE 5

### SCENARIO IV - RECOGNIZE TWO YEARS

#### NET PREMIUMS

##### DISCOUNTED FROM ISSUE

SELECTION	44.29
TREND	0.00
ATT AGE	0.00
<b>TOTAL</b>	<b>44.29</b>

##### BY DURATION

SELECTION	30.00	70.00	90.00	95.00	100.00	100.00	100.00
TREND	0.00	6.00	15.20	22.24	27.69	34.23	41.07
ATT AGE	0.00	1.50	3.80	5.56	6.92	8.56	10.27
<b>TOTAL</b>	<b>30.00</b>	<b>77.50</b>	<b>109.00</b>	<b>122.80</b>	<b>134.61</b>	<b>142.78</b>	<b>151.34</b>

PREMIUM-ORIGNL	3,631	2,179	1,375	968	717	540	383
PREMIUM-ADDTL	0	1,134	1,694	1,493	1,298	1,078	838
INV INC	142	130	120	97	79	63	48
<b>TOTAL INCOME</b>	<b>3,774</b>	<b>3,443</b>	<b>3,189</b>	<b>2,558</b>	<b>2,095</b>	<b>1,681</b>	<b>1,269</b>

BENEFITS	2,557	3,963	3,517	2,788	2,266	1,810	1,360
INCR RES	1,217	(520)	(328)	(231)	(171)	(129)	(91)
<b>TOTAL OUTGO</b>	<b>3,774</b>	<b>3,443</b>	<b>3,189</b>	<b>2,558</b>	<b>2,095</b>	<b>1,681</b>	<b>1,269</b>

NET GAIN	0	0	0	0	0	0	0
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RESERVE BAL	1,217	795	530	342	198	85	0
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LOSS RATIO	70.4%	119.6%	114.6%	113.3%	112.4%	111.9%	111.4%
ADJ LOSS RATIO	103.9%	103.9%	103.9%	103.9%	103.9%	103.9%	103.9%
PREM INCR		52.0%	46.8%	14.0%	10.5%	6.6%	6.5%

SLIDE 6

**GROSS PREMIUM ANALYSIS**

**POL YEAR:**      1                      2                      3                      4                      5                      6                      7

**EXPENSES**

PCT PREM	30.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
PER POL	20.00	5.00	5.00	5.00	5.00	5.00	5.00

**LEVELIZED**

PCT	23.67	6.58	3.84	2.50	1.72	1.20	0.79
FLAT	1,578.09	219.18	128.08	83.45	57.29	39.95	26.23
WGT	78.90	43.84	25.62	16.69	11.46	7.99	5.25

WEIGHTED PCT      21.24%  
 WEIGHTED FLAT    \$11.24

PROFIT = 6% OF GROSS

**GROSS PREMIUMS**

**SCENARIO**

I	117.45	117.45	117.45	117.45	117.45	117.45	117.45
II	100.89	111.19	127.00	139.09	148.45	159.68	171.44
III	56.67	121.96	165.25	184.21	200.44	211.68	223.44
IV	76.31	107.98	151.27	170.24	186.47	197.70	209.46

8,272.67 TOT PREM SCENARIO II  
 3,174.80 LOADING  
 4,121.80 EXPENSES

4,646.34 TOT PREM SCENARIO III  
 2,187.34 LOADING  
 3,034.20 EXPENSES



## CASE STUDY -- INDIVIDUAL MAJOR MEDICAL

The report of the new NAIC health valuation model (see Slide 7) was presented. The most major difference is the use of net unearned premium reserve rather than the current specified gross, but net plus continued reserves must be at least as large as the gross. A gross premium valuation is specified whenever doubt of premium adequacy exists.

Major factors affecting morbidity experience and its measurement were also discussed (see Slide 8). Finally issues for Statutory, GAAP and tax reporting were presented (see Slide 9).

SLIDE 7

NAIC MODEL BILL

1. Prospective gross premium valuation
  - a. Doubt of adequacy
  - b. Immediate loss recognition
  
2. Claim reserves
  - a. Include expense of settlement
  - b. Runoff test for adequacy
  - c. Minimum interest/morbidity
  
3. Premium reserves
  - a. Use gross for no contract reserve
  - b. Net plus contract reserves not less than gross
  
4. Contract reserves
  - a. Must have when value of future benefits greater than value of future net premiums
  - b. Appropriate company morbidity rates
  - c. Can use termination rates (when premium not guaranteed)
  - d. Minimum - 2 year FPT
  - e. Alternative method
  - f. Adequacy tests
  
5. Specification of standards

## SLIDE 8

### MAJOR FACTORS CHANGING MORBIDITY EXPERIENCE

1. Adverse lapsation
2. Trend cycles
3. Business growth
4. Distribution
5. Management
  - a. Underwriting
  - b. Administration
  - c. Case management
6. Regulatory environment
7. Geographical changes
8. Competition
9. AIDS, transplants, dialysis, etc.

### MAJOR FACTORS AFFECTING EXPERIENCE MEASUREMENT

1. Business shifts
  - a. Deductible
  - b. Sex
  - c. Age
  - d. Area
2. Incurred dating changes
3. Processing changes (systems)
4. Mail processing
5. Claim lag
6. Plan changes/re-rates

SLIDE 9

STATUTORY ISSUES

1. Is FPT sufficient to offset acquisition costs?
2. How is capital defined?
3. What is a reasonable ROE?

TAX ISSUES

1. Claim reserve "margins"
2. Effect of the new law
3. Health insurers and the Public Health Service account
4. Contingent liabilities
5. AIDS active life reserve

GAAP ISSUES

1. Recoverability
2. Reserve recognition
3. Re-rating
4. Antiselection lapsation