



SOCIETY OF ACTUARIES

**Health Spring Meeting  
May 2008**

**Session # 23: Valuation, Reserving, Deficiency  
Issues for the Health Actuary**

Rowen B. Bell, FSA, MAAA  
Martin E. Staehlin, FSA, MAAA, FCA  
Russell D. Willard, ASA, MAAA

**Moderator:**  
Rowen B. Bell, FSA, MAAA

## Margins in Medical Claim Liabilities Under Future Accounting Models

Rowen B. Bell, FSA, MAAA  
Health Care Service Corporation

SOA Spring Health Meeting, Session #23  
May 28, 2008 – Los Angeles, CA

## Introduction

- New tools and techniques in valuation often emerge only in response to regulatory changes
- Major changes in accounting for insurance contracts put on the table by International Accounting Standards Board (IASB) in its 2007 Discussion Paper
- Many observers believe it is likely that U.S. GAAP insurance accounting will change to be consistent with outcome of IASB project
- Over next few years, evolution in health valuation tools and techniques may be required to comply with these new accounting rules

## Introduction

- For general background on IASB Discussion Paper, see cover article in Sept 2007 SOA *Health Watch*
- Today's focus is on one specific IASB-related issue: margins in claim liabilities for medical insurance
- This talk is an abbreviated version of a paper, "Margins in Medical Claim Liabilities Under Future Accounting Models", recently submitted for publication in the SOA *Actuarial Practice Forum*
- For a preprint of the paper, send an email to [rowen\\_bell@bcbsil.com](mailto:rowen_bell@bcbsil.com)

3

## Background

- In light of ASOPs 5 & 28, today medical claim liabilities are generally set at a level that is intended to be "adequate under moderately adverse conditions"
- Many actuaries accomplish this by adding an explicit margin to an unbiased base estimate of the liability
- In this traditional view, the role of the margin is to provide a desired level of confidence regarding adequacy of the claim liability
- Level of margin is often set by reference to measures of reserve variability (usually retrospective studies, but perhaps prospective actuarial models)

4

## Background

- In the IASB Discussion Paper model, claim liability must consist of a base liability (reflecting best estimate cash flows), plus explicit risk and/or service margins
- The risk margin brings the insurer's compensation for bearing risk into income over time, proportional with the insurer's release from risk
- The service margin brings the insurer's compensation for providing non-risk services (e.g., extension of provider discounts to customers) into income over time, as services are provided
- Margins as compensation, not as shock absorber

5

## Issues

- IASB Discussion Paper model requires margins in claim liabilities; today, many actuaries include margins in claim liabilities....
- .....so, what's to discuss?
- Author's paper addresses two issues:
  1. Is the current approach to including margins in claim liabilities consistent with the objectives of the IASB Discussion Paper model?
  2. If not, how might one calculate margins in medical claim liabilities under the IASB Discussion Paper model?

6

## Current Formula

$C_t^k$  = Cumulative paid claims through end of month  $t$  for claims incurred in month  $k$

$I_t^k$  = Unbiased estimate made at end of month  $t$  of the ultimate claims incurred in month  $k$

Base estimate of liability at end of month  $t$  is  $\sum_{n=0}^N (I_t^{t-n} - C_t^{t-n})$

Under typical current practice, the recorded liability is

$$V_t = (1 + \mu) \sum_{n=0}^N (I_t^{t-n} - C_t^{t-n})$$

That is, the margin is equal to the total base liability estimate multiplied by a margin factor,  $\mu$

7

## Criticism of Current Formula

- Currently, margin factor typically selected based on analysis of reserve variability, with no explicit tie to expected profitability of products
- Implication: Establishing the initial claim liability for a product will usually lead to immediate recognition of a gain or loss (depending on the relationship between the margin factor and the target profit margin)
- Under the IASB Discussion Paper model, margin in the initial claim liability often needs to be calibrated to target profit margin, in order to avoid immediate recognition of a gain or loss

8

## Criticism of Current Formula

- Currently, the margin established for a particular incurral month is released over time in proportion to the payment of claims for that month
- Under the IASB Discussion Paper model: risk margin is supposed to be released in proportion to the insurer's release from risk; service margin is supposed to be released in proportion to provision of services
- Insurer's risk of misestimating incurred claims goes down over time more slowly than claim payments
- Issue: premature recognition of expected profit

9

## Proposed Formula

$$V_t = \sum_{n=0}^N \left[ \left( 1 + \frac{\rho^S}{\lambda} \right) (I_t^{t-n} - C_t^{t-n}) + \frac{\rho^R}{\lambda} \varphi_n I_t^{t-n} \right]$$

$\lambda$  = Target loss ratio

$\rho^R$  = Target profit margin for bearing risk

$\rho^S$  = Target profit margin for providing non-risk services

$\varphi_n$  = *Risk release factor*: the proportion of the original incurred claims estimation risk that still exists after  $n+1$  months of claim payments have been made

10

## Proposed Formula

Four principles guiding the proposed formula:

1. Total margin has an explicit decomposition into a risk margin and a service margin
2. Total margin is calibrated to expected profitability of contract so that no gain or loss is immediately recognized
3. Risk margin for a given incurral month is released over time in proportion to insurer's release from risk
4. Service margin for a given incurral month is released over time in proportion to insurer's payment of claims

11

## Risk Release Factors

- These factors measure the insurer's release from the risk associated with a given incurral month
- Non-increasing sequence in  $[0,1]$ , converging to 0
- Key observation: release from risk is not proportional to the payment of claims!
  - Say 25% of expected incurred claims for a given incurral month are paid during the first month. Has the insurer really experienced any release from risk?
  - Say 99% of expected incurred claims for a given incurral month are paid during the first year. Has the insurer really been released from 99% of the risk associated with mis-estimating claims for that month?

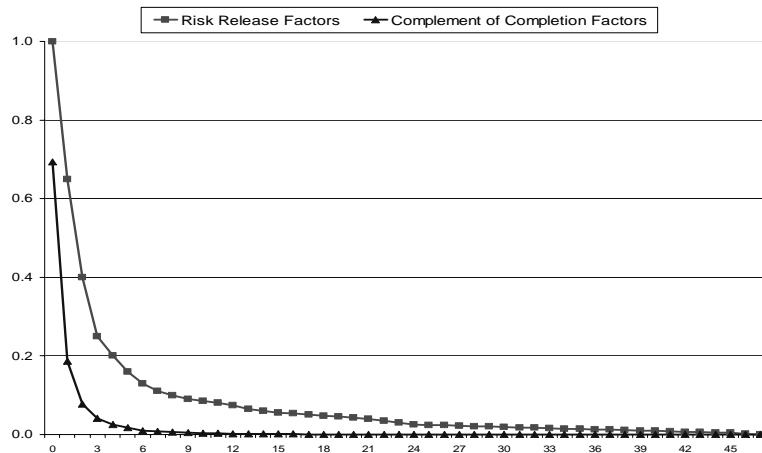
12

## Risk Release Factors

- Paper outlines a methodology for estimating risk release factors from insurer's historical experience
  - Measure how the variability of estimation error changes, as  $n$  varies, in the insurer's estimates of incurred claims based on  $n+1$  months of paid claims data
  - Risk release factor estimates based on experience from a large block (300K-400K members) over a 6-year period
  - Assume that no credibility is associated with the first month's paid claims, and hence that  $\varphi_0 = 1$
- As shown in graph, for this block the risk release factors converge to zero much more slowly than the block's completion factors converge to one

13

## Example



14

## Example

- Suppose that:
  - Product has an administrative expense ratio of 12%
  - Risk release factors & completion factors are those shown in graph on previous page
  - Premiums are growing at rate of 1% per month
- Table on the next page shows the margin (risk + service) in our proposed liability formula, expressed as a percentage of the base claim liability
- Rows represent total profit margin,  $\rho^R + \rho^S$
- Columns represent the profit margin for providing non-risk services,  $\rho^S$

15

## Example

	0.5%	1.0%	1.5%	2.0%	2.5%	3.0%	3.5%
2.0%	6.94%	5.40%	3.86%				
2.5%	9.11%	7.56%	6.02%	4.47%			
3.0%	11.31%	9.75%	8.20%	6.64%	5.09%		
3.5%	13.53%	11.97%	10.40%	8.84%	7.27%	5.71%	
4.0%	15.78%	14.21%	12.63%	11.06%	9.48%	7.91%	6.34%
4.5%	18.06%	16.48%	14.89%	13.31%	11.72%	10.14%	8.56%
5.0%	20.36%	18.77%	17.18%	15.58%	13.99%	12.40%	10.80%
5.5%	22.70%	21.09%	19.49%	17.89%	16.28%	14.68%	13.08%
6.0%	25.06%	23.44%	21.83%	20.22%	18.61%	16.99%	15.38%
6.5%	27.45%	25.82%	24.20%	22.58%	20.96%	19.33%	17.71%
7.0%	29.87%	28.23%	26.60%	24.97%	23.34%	21.70%	20.07%

16

## Conclusion

- Upcoming changes in insurance accounting literature will likely stimulate changes in health valuation tools & techniques
- Current practice (augmenting base claim liability estimate by a flat percentage) does not meet the objectives established in the IASB Discussion Paper for the role of explicit margins
- New approaches, such as the one outlined herein, will be needed to address the evolving accounting rules
- U.S. health actuarial community needs to engage in discussion of these concepts & their implications

## Premium Deficiency Reserves

Society of Actuaries Spring Meeting

May 28, 2008

Session # 23

Speaker:

**Marty Staehlin**



## Session Objectives

- Why another PDR paper?
- Does this paper have any authority?
- What do I have to do different?
- Everything else you wanted to know (Q&A)



# Company Perspective

**Actuaries**  
Risk Is Opportunity.™

## When Is A PDR Necessary

- Short Term Deficiency?
- Focus On Year End Valuation Date?
- Product Specific?
- Case Size?
- Case By Case?
- Statutory vs GAAP?



SOCIETY OF ACTUARIES

# Company Perspective

**Actuaries**  
Risk Is Opportunity.™

## How?

- Time Horizon?
- Impact and Timing of Corrective Action?
- Expenses?
- Claim Reserves?
- Time Value of Money?



SOCIETY OF ACTUARIES

# Another PDR Paper?!

**Actuaries**  
Risk Is Opportunity.™

- **NAIC Discussions**



- **Industry Inconsistencies**



SOCIETY OF ACTUARIES

# Authority over PDR

**Actuaries**  
Risk Is Opportunity.™

- SSAP 54
- State rules – written or otherwise
- NAIC guidance manual
- ASOPs
- White Paper



SOCIETY OF ACTUARIES

# The Problem

- Actuaries perform many functions within a specific company – pricing, reserving, informatics, data warehouse maintenance, data mining, projections, business planning, financial reporting, solvency evaluation, strategic thinking
- Lack of communication and/or understanding between actuaries and accountants
- Inconsistent guidance and practice



# What's New

## General Principles

Keep in mind when judging Methods and Assumptions...

- Situations that should result in PDR
- Minimize “false positives”
- Minimize “false negatives”



# What's New

**Actuaries**  
Risk Is Opportunity.™

## Examples

- Financial Reporting
- Appendix III – various issues

## Frequently Asked Questions

- Throughout the paper



SOCIETY OF ACTUARIES

# Main Challenges

**Actuaries**  
Risk Is Opportunity.™

## Assumptions/Methods

- Business to be included
- Contract Grouping
- Projection Periods
- Expenses



SOCIETY OF ACTUARIES

# Challenges

**Actuaries**  
Risk Is Opportunity.™

## Business To Be Included

- New Business?
- Known premium-deficient contracts



SOCIETY OF ACTUARIES

# Challenges

**Actuaries**  
Risk Is Opportunity.™

## Contract Grouping

- Much Debate
- Consistency
- Marketed, Serviced and Measured
- How granular should the analysis be?



SOCIETY OF ACTUARIES

# Challenges

**Actuaries**  
Risk Is Opportunity.™

## Contract Grouping

- Testing Level
- Reporting Level
- Reasonable and Credible
- HRGM
- Medical Conversions?



SOCIETY OF ACTUARIES

# Challenges

**Actuaries**  
Risk Is Opportunity.™

## Projection Periods

- Remainder of a contract period
- Typically shorter period
- Fluctuations in results – be careful
- Cancellations
- Monthly results



SOCIETY OF ACTUARIES

# Challenges

**Actuaries**  
Risk Is Opportunity.™

## Expenses

- Must cover all expenses
- Questions about how to allocate
- Start-up companies/“Wind-down” situations
- Many small subsidiaries



SOCIETY OF ACTUARIES

# “Words of Wisdom”

**Actuaries**  
Risk Is Opportunity.™



SOCIETY OF ACTUARIES

## **“Words of Wisdom”**

**The PDR is an actuarial reserve and is to be contained in any actuarial opinion of the reserves of a health entity. Thus, both actuarial standards and accounting standards may have to be consulted.**



## **“Words of Wisdom”**

**“0” is a number**



## “Words of Wisdom”

The implications of various degrees of grouping – the “granularity” of the analysis – are addressed in Section IV.C.

“For purposes of determining if a premium deficiency exists, contracts shall be grouped in a manner consistent with how policies are marketed, serviced and measured. A liability shall be recognized for each grouping where a premium deficiency is indicated. Deficiencies shall not be offset by anticipated profits in other policy groupings.”



## “Words of Wisdom”

### Factors Affecting Contract Grouping

- 1) Materiality of a group relative to size of the whole reporting entity
- 2) Similarity of product types
- 3) Differences in marketing methods
- 4) Potential rate restrictions
- 5) Geographical rating areas



## “Words of Wisdom

**Actuaries**  
Risk Is Opportunity.™

### Factors Affecting Contract Grouping

- 6) Length of rate guarantee periods
- 7) Regulatory requirements
- 8) Line of business
- 9) Case size within group business
- 10) Expected future growth or decline of a possible grouping



SOCIETY OF ACTUARIES

## Session Objectives

**Actuaries**  
Risk Is Opportunity.™

- ✓ Why another PDR paper?
- ✓ Does this paper have any authority?
- ✓ What do I have to do different?



SOCIETY OF ACTUARIES

# Questions?

**Actuaries**  
Risk Is Opportunity.™



SOCIETY OF ACTUARIES

# Society of Actuaries Spring Health Meeting May 28, 2008

*Session #23  
Valuation,  
Reserving, Deficiency  
Issues for the Health  
Actuary*



SOCIETY OF ACTUARIES

## Presented By:

- Martin Staehlin, FSA, MAAA
  - PWC
- Rowen B. Bell, FSA, MAAA
  - Health Care Service Corporation
- Russell D. Willard, ASA, MAAA \*
  - Humana Inc.

\* Moderator



SOCIETY OF ACTUARIES

# Individual A&H GAAP Reserves



*Society of Actuaries  
Spring Meeting  
May 28, 2008  
Session # 23  
Speaker:  
Russ Willard*



SOCIETY OF ACTUARIES

## Presentation Objectives

### **Understand:**

- GAAP Accounting Rules Applied to Individual A&H Policy Reserves
- The Impact of GAAP Benefit Reserves upon the Timing and Level of Company Profits



SOCIETY OF ACTUARIES

## Session Overview

**Actuaries**  
Risk Is Opportunity.™

### Accident & Health Product Descriptions

- **Short Term vs Long Term Products**
  - Group Medical (Short Term) vs
  - Individual Major Medical (Long Term)
  
- **Short Duration vs Long Duration Liabilities**
  - Major Medical Claim Liabilities (Short Duration) vs
  - Major Medical Policy Benefit or Contract Reserves (Long Duration)



SOCIETY OF ACTUARIES

## Session Overview

**Actuaries**  
Risk Is Opportunity.™

### GAAP Reserves

- Basic GAAP Principles
- Benefit (or Contract) Reserves
- Deferred Acquisition Costs
- GAAP Assumptions – including PAD
- Impact upon the Timing and Amount of Company Profits



SOCIETY OF ACTUARIES

## Examples of Accident & Health Product Benefits

**Actuaries**  
Risk Is Opportunity.™

### Short Term Benefits

- Group Major Medical
- Group Ancillary Coverages
- Medicare Advantage



### Long Term Benefits

- Individual Major Medical
- Disability Income
- Long Term Care
- Medicare Supplement



SOCIETY OF ACTUARIES

## Examples of Accident & Health Product Liabilities

**Actuaries**  
Risk Is Opportunity.™

### Short Duration Liabilities

- Major Medical Claim Liabilities
- Dental Claim Liabilities
- Premium Deficiencies



### Long Duration Liabilities

- GAAP, Statutory and Tax Policy Reserves
  - Individual Major Medical
  - Individual Disability Income
  - Long Term Care
  - Medicare Supplement
- Claim Reserves
  - Disability Income
  - Premium Waiver
- DAC for All Products (usually...)



SOCIETY OF ACTUARIES

## Basic GAAP Accounting Principles Applied to A&H Reserves



SOCIETY OF ACTUARIES

## GAAP for Accident & Health Products

### Group Products vs Individual Products

- |                           |                                 |
|---------------------------|---------------------------------|
| ▪ Short Life Time         | ▪ Longer Life Time              |
| ▪ Short Guarantees        | ▪ Longer Guarantees             |
| ▪ Level Acquisition Costs | ▪ Substantial Acquisition Costs |
| ▪ Aggregate Liabilities   | ▪ Individual Liabilities        |
| ▪ Fewer Rules             | ▪ Highly Regulated              |



SOCIETY OF ACTUARIES

# GAAP for Accident & Health Products



## GAAP Objective:

- Match Revenues and Expenses
- **Profits as a Level % of Premiums**



## With the Use of:

- Benefit Reserves;
- Expense Reserves; and,
- Deferred Acquisition Costs (DAC)



SOCIETY OF ACTUARIES

# GAAP For Individual Products



## Pricing Premium Example

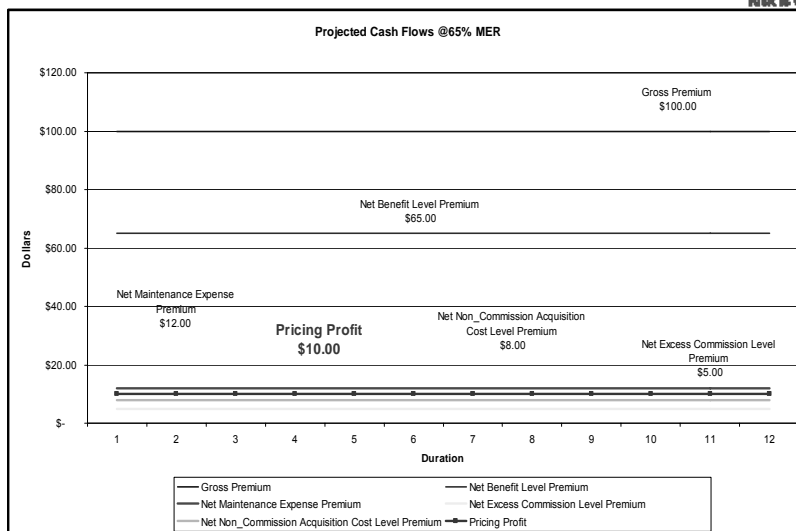
Pricing Benefit Net Premium	\$	65.00
Pricing Maintenance Net Premium	\$	12.00
Pricing Excess Commission Net Premium	\$	5.00
Pricing Non-Commission Acquisition Costs		
Net Premium	\$	8.00
 Total Net Premium	 \$	 90.00
 Gross Premium	 \$	 100.00
 Net to Gross Ratio		 90.00%
Projected Pricing Profit as a % of Premium		10.00%



SOCIETY OF ACTUARIES

# Management Expectations

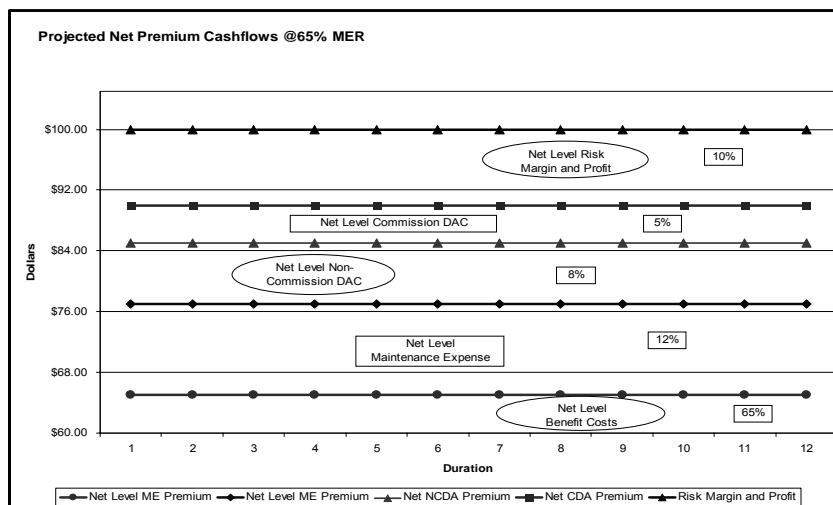
**Actuaries**  
Risk is Opportunity.™



SOCIETY OF ACTUARIES

# Management Expectations

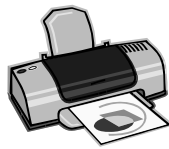
**Actuaries**  
Risk is Opportunity.™



SOCIETY OF ACTUARIES

## GAAP For Individual Products

### FAS 60 Benefit Reserves, a.k.a., Policy or Active Life Reserves



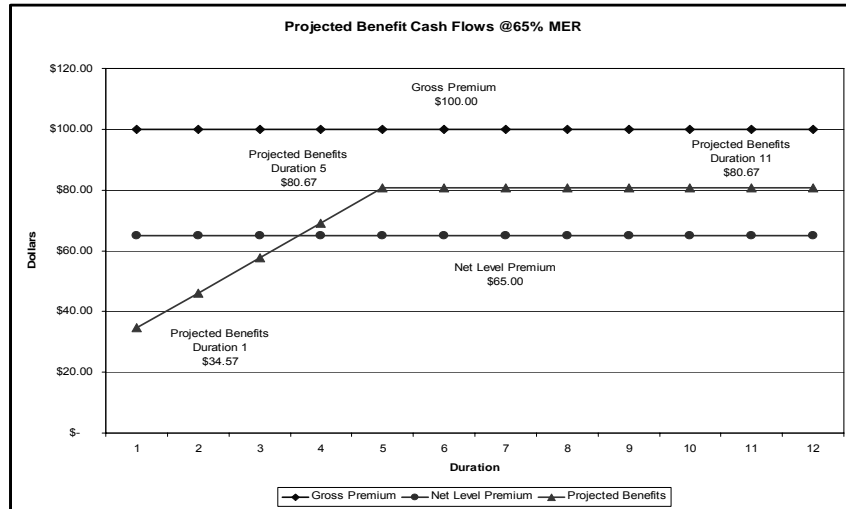
## GAAP For Individual Products

### Benefit Reserves

- Pre-funding Concept:
  - Early premiums higher than necessary
  - e.g., Issue Age Premiums; or
  - Select Underwriting Curve
  
- Net Level Benefit Premium Methodology
  - Net Premiums Proportional to Gross Premiums
  - Various Formulas To Choose From



# GAAP For Individual Products



SOCIETY OF ACTUARIES

# GAAP For Individual Products



## Benefit Reserve – Development

- Select Platform
  - Worksheet
  - System Software
- Select Reserve Formula
  - Prospective, Retrospective, Fackler Accumulation
- Choose Assumptions
  - Pricing “Best Guess” + PAD

2 5 54  
10 726 18



SOCIETY OF ACTUARIES

## Policy Reserves Prospective Reserve Calculation

${}_tV_x =$  Terminal Reserve at Duration  $t$ , for a Benefit Issued at Age  $x$

$${}_tV_x = PVFB(x+t) - PVFNP(x+t)$$

$$= A_{x+t} - P_x \cdot \ddot{a}_{x+t}$$



## GAAP For Individual Products

### Active Life Benefit Reserve Assumptions

▪ **Best Estimate Assumptions plus PAD\***

- Morbidity
- Discount Rate of Interest
- Persistency or Lapse Rates
- Maintenance Expenses
- Mortality

\*PAD - Provision for Adverse Deviation



# GAAP For Individual Products **Actuaries** Risk Is Opportunity.™

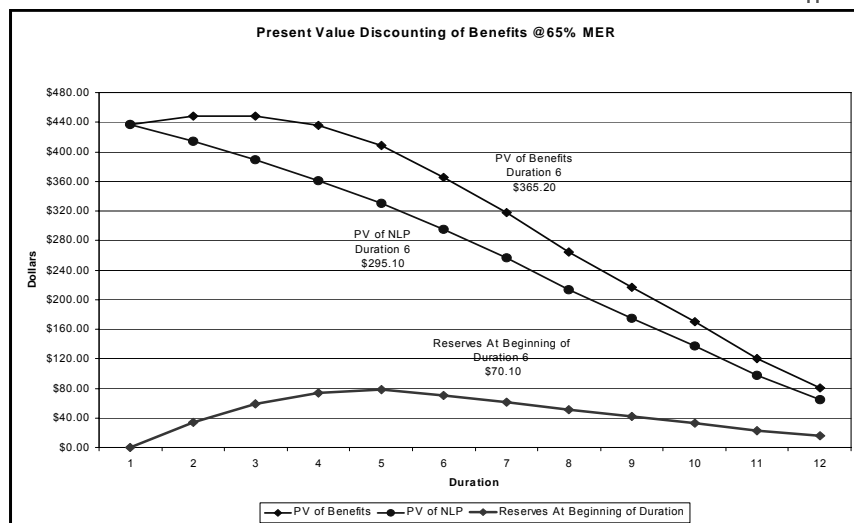
## PAD Discussion

- FAS 60 Margin
- Applies To All Assumptions; except
- Persistency
  - Difficult to Determine Impact
  - Timing
- Consider Reasonableness by Assumption; and
- In Total



SOCIETY OF ACTUARIES

# GAAP For Individual Products **Actuaries** Risk Is Opportunity.™



SOCIETY OF ACTUARIES

## GAAP For Individual Products

**Actuaries**  
Risk Is Opportunity.™

### Pricing Premium Example

Pricing Benefit Net Premium	\$	65.00
Pricing Maintenance Net Premium	\$	12.00
Pricing Excess Commission Net Premium	\$	5.00
Pricing Non-Commission Acquisition Costs Net Premium	\$	<u>8.00</u>
Total Net Premium	\$	90.00
Gross Premium	\$	100.00
Net to Gross Ratio		90.00%
Projected Pricing Profit as a % of Premium		10.00%



SOCIETY OF ACTUARIES

## GAAP For Individual Products

**Actuaries**  
Risk Is Opportunity.™

### GAAP Premium Example

GAAP Benefit Net Premium w/ PAD	\$	69.00
GAAP Maintenance Net Premium	\$	12.00
GAAP Commission DAC Net Premium	\$	5.00
GAAP Non-Commission DAC Net Premium	\$	<u>8.00</u>
Total Net Premium	\$	94.00
Gross Premium	\$	100.00
Net to Gross Ratio		94.00%
Projected GAAP Profit as a % of Premium		6.00%



SOCIETY OF ACTUARIES

# GAAP For Individual Products



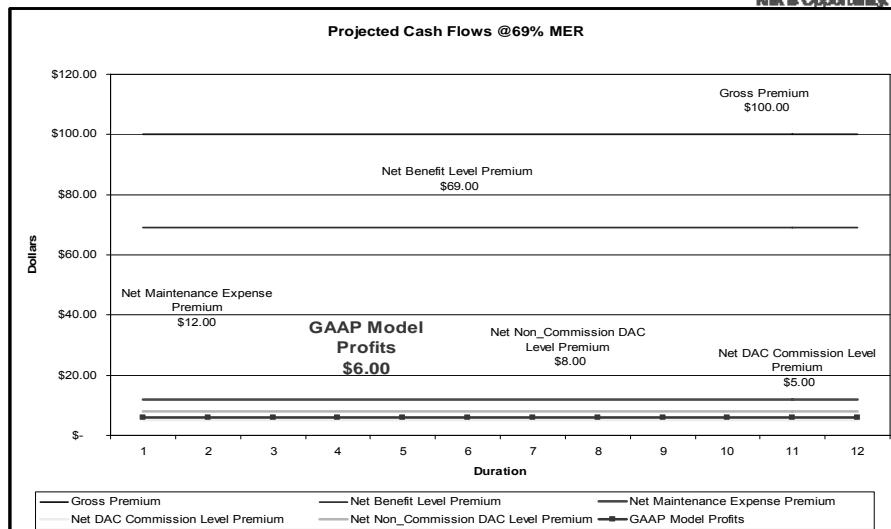
## Example Assumptions

- Benefits Paid at End of Period
- Lapses Occur After Benefits Paid
- Discount Rate @ 3.5%
- Gross Premium = \$100.00
- Time Horizon = 12 Durations
- Expenses are Ignored (for now...)
- Mortality is Ignored as Immaterial



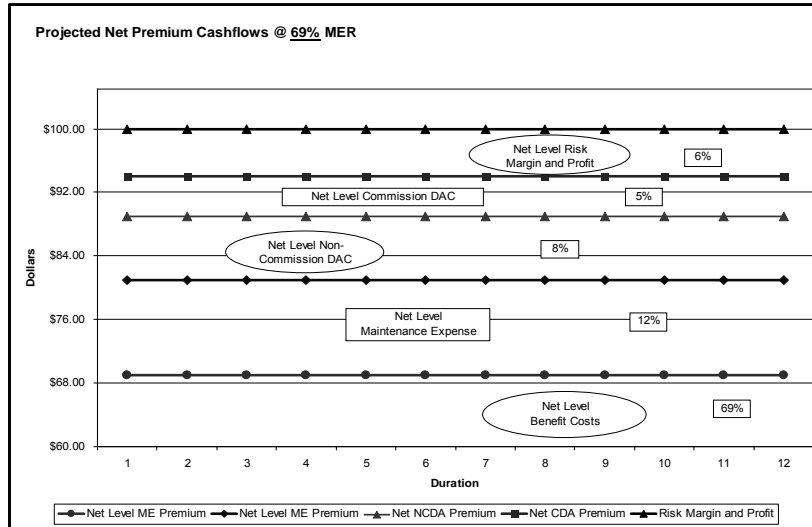
SOCIETY OF ACTUARIES

# GAAP Valuation Expectations



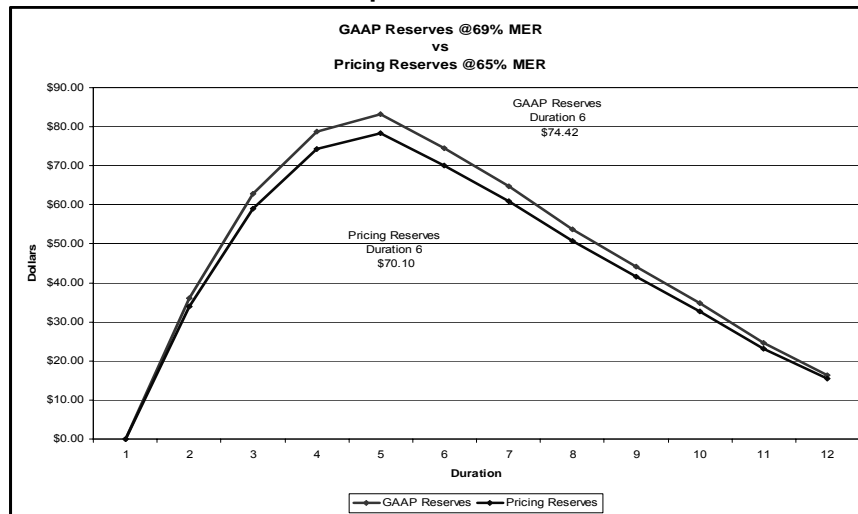
SOCIETY OF ACTUARIES

# GAAP Valuation Expectations



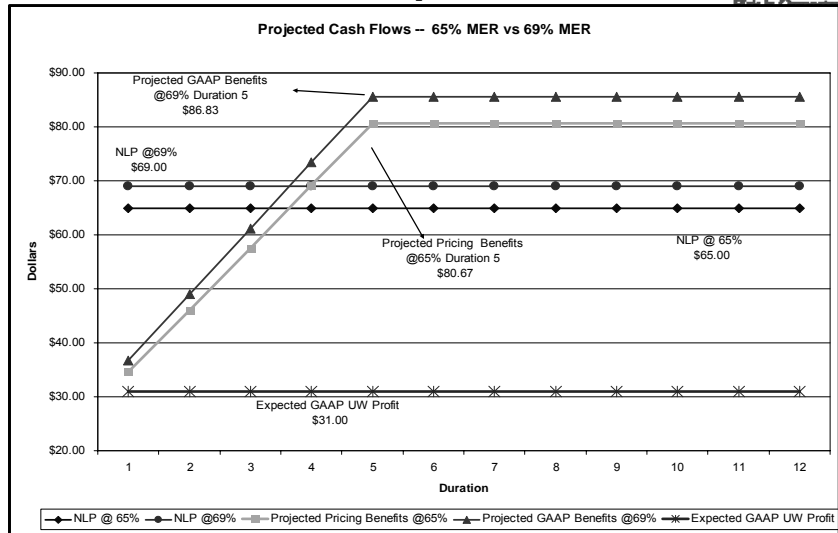
SOCIETY OF ACTUARIES

# GAAP Valuation Expectations



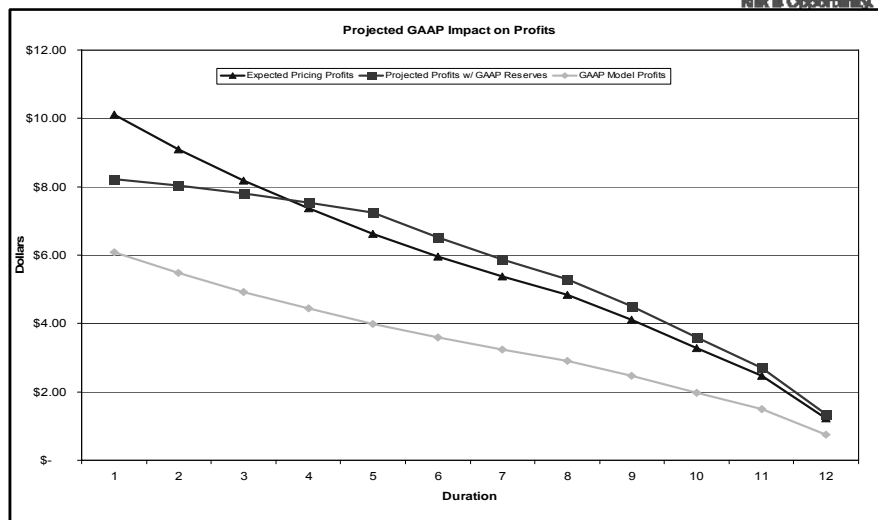
SOCIETY OF ACTUARIES

# GAAP Valuation Expectations **Actuaries**



SOCIETY OF ACTUARIES

# GAAP Valuation Expectations **Actuaries**



SOCIETY OF ACTUARIES

## GAAP For Individual Products

**Actuaries**  
Risk Is Opportunity.™

### Maintenance Expense Reserves

- For Example
  - Customer Service,
  - Claim Processing,
  - Premium Billing, ...
- Similar to Benefit Reserves
  - Net Level Maintenance Expense Premium
  - May Be Combined with Benefit Reserves
- Often Immaterial



SOCIETY OF ACTUARIES

## GAAP For Individual Products

**Actuaries**  
Risk Is Opportunity.™

### Deferred Acquisition Costs (DAC)

- Deferrable Expenses
  - Excess Commission
  - Non-Commission Expenses Prior To Issue
- Must be Recoverable!
- Actuarial Formula -
  - Net Level DAC Premium
  - Similar to Benefit Reserves
- PAD
  - Time Horizon
  - Interest Discount Rate



SOCIETY OF ACTUARIES

## GAAP For Individual Products

**Actuaries**  
Risk Is Opportunity.™

### DAC Recoverability

- DAC Recoverability - Current Year
  - Actual Expenses to Assumed Expenses Capitalized
  - Adequacy of Future Revenues
- Loss Recognition - Aggregate Business
  - Adequacy of Future Revenues
    - All Business Written To Date
    - To Support Total DAC Balance; and,
    - Future Benefits and Expenses



SOCIETY OF ACTUARIES

## Presentation Objectives

**Actuaries**  
Risk Is Opportunity.™

### **Understand:**

- GAAP Accounting Rules Applied to Individual A&H Policy Reserves
- The Impact of GAAP Benefit Reserves upon the Timing and Level of Company Profits



SOCIETY OF ACTUARIES