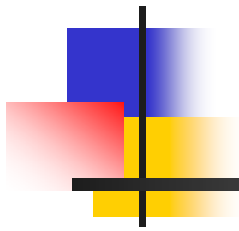


# Principles-Based Reserving for Health Insurers



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Session 17  
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# Session Outline

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- Principles-Based System Introduction
  - State Long Term Care Principles-Based Work Group
  - State Health Principles-Based Work Group
- Recent work of the LTCPBWG
  - Issues Subgroup
  - Technical Subgroup



# Principles-Based System

## Introduction

### Long Term Care Products

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- LTC is the Academy's starting focal point for the Healthcare Insurance Industry - LTCPBWG
- A second committee was formed this year to address all other health lines - HPBWG

# Principles-Based System Introduction

## Current Valuation & Accounting Bases

### *Current Valuation Bases*

- ❖ Standard Valuation Law
- ❖ Health Insurance Reserve Model Regulation
- ❖ Health Reserve Guidance Manual

### *Current Statutory Accounting Bases*

- ❖ AP&P Manual, SSAP #54 & SSAP #55
- ❖ AP&P Manual, primarily Appendix A-010
- ❖ AP&P Manual, primarily Appendix A-641

### *LTC Statutory Reserves Must Meet:*

Minimum Statutory Reserve Standards  
Gross Premium Valuation Testing  
Asset Adequacy Test

# Principles-Based System Introduction

## Current Valuation of LTC Policies

### ***Before Claim (Active Life Reserves)***

- ❖ One-Year Preliminary Term Method (Generally)
- ❖ Defined Mortality Tables
- ❖ Limitations on Lapses and Interest Rates
- ❖ No Prescribed Morbidity Table

### ***After Claim (Claim Reserves)***

- ❖ PV Future Payments
- ❖ Include Incurred But Not Reported Claims
- ❖ Interest Rates by Incurred Year

# Principles-Based System

## Introduction

### Reasons for Change

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- Current Statutory Standards include “lock-in”
  - May not capture all risks
  - Over/understate reserves and capital
- Value of consistency with PBR within companies and with GAAP
  - Coordination with the IASB and FASB

# Principles-Based System

## Introduction

### The Principles

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- As developed by AAA for LHATF
- June 3, 2007 NAIC exposure draft of overarching principles
  - Principles-based reserving framework
  - Reserve liabilities
  - Capital adequacy
  - Corporate governance
  - Disclosure & financial examinations

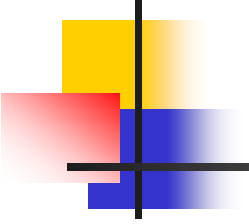
# Principles-Based System

## Introduction

### Statements Defining PBA – for LHATF

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1. Reserves reflect all material risks
2. Utilizes risk analysis & risk management techniques
3. Incorporates assumptions & methods consistent with company's overall risk assessment process
4. Use of company experience
5. Assumptions based on prudent estimate
6. Reflects risk in calculation of reserves and capital



# Principles-Based System

## Introduction

### LTC Risk Characteristics

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- Lapse Rates
- Morbidity
  - Incidence/severity
  - Claim variability
- Mortality
- Interest Rates & Economic Environment
- Movement among status categories

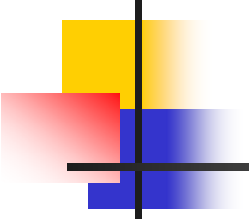
# Principles-Based System

## Introduction

### Key Concerns for LTC

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- Reflection of rate increases in future cash flows under stochastic scenarios
- Changing marketplace & government programs' impact on assumptions, products
- Margin in rates vs. margin in reserves
- Limited experience
- Anticipated limits on interest rate assumptions



# LTCPBWG

## Issues Subgroup

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- Chair: John Timmerberg
- Identify and address PBS Issues for LTC
- Monitor and support PBS development in life/annuity products
- Monitor international developments



# LTCPBWG Issues Subgroup

## Discussions to Date

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- Defining risk margins
  - What level
  - Variability by business
- Investigating statistical distributions of claims
- Monitoring efforts relating to data availability for morbidity table
- Developed outline of modeling issues



# LTCPBWG Issues Subgroup

## Issues to Address in Stochastic Model

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- Premium rate changes
  - Unscheduled vs. planned
  - Timing
    - Trigger point
    - Reaction time
    - Effectiveness
  - Policyholder behavior



# LTCPBWG Issues Subgroup

## Issues to Address in Stochastic Model

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- Interest Rate Scenarios
  - Traditional impacts
  - Impact on policyholder behavior



# LTCPBWG Issues Subgroup

## Issues to Address in Stochastic Model

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- Unanticipated changes in morbidity or benefit utilization
  - Shift in claim cost curve
  - Examples



# LTCPBWG Issues Subgroup

## Issues to Address in Stochastic Model

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- Regulatory Intervention
  - Examples
  - Retroactive application



# LTCPBWG Issues Subgroup

## Issues to Address in Stochastic Model

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- Morbidity and/or mortality improvement?
  - Measurable “population” impact
  - Treatment breakthroughs
  - Exist in isolation?



# Health PB Work Group

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- Chair: Shari Westerfield
- Purpose
- Discussion Items to date
  - Health Reserves Guidance Manual
  - Commenting on Principles



# Recent Work of the LTCPBWG Technical Subgroup

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John K. Heins, FSA, MAAA  
PolySystems, Inc



# LTCPBWG

## Technical Subgroup

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- Chair: Al Schmitz, Milliman
- Specify Model Requirements
- Design, Develop and Test Model
- Analyze Results
- Monitor and Support LRWG and LRWG Modeling Subgroup
- Coordinate with SVL2 Economic Scenario Group



# LTCPBWG Technical Subgroup

## Considerations and Progress

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- Consider potential management action
- Ease of ability to program the multi-stochastic-variable LTC product lines
- How much variance is acceptable?
- # of trials to run to establish the proper reserve and capital levels



# LTCPBWG Technical Subgroup

## Modeling Stage

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- Non-Excel models not viable
  - confidentiality issues
  - portability
- Launching pad: Excel-based Cash Flow projection model developed by Jim Robinson, independent consultant
- Must consider business segmentation



# LTCPBWG Technical Subgroup

## Modeling Stage – Method 1

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### Method 1 – Random Walk on each Policy

Generate a random number to test each policy's probability of a change in status, duration by duration



# LTCPBWG Technical Subgroup

## Modeling Stage – Method 2

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### Method 2 – Random Walk by Duration

- Generate the book of business at a specific point in time
- Generally the same as method 1, but better suited to management action considerations



# LTCPBWG Technical Subgroup

## Modeling Stage – Method 3

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### Method 3 – Stochastic Simulation by Database Lookup

- Every Possible Random Walk is Generated and placed into a table
- Generate the book of business at all points in time based on a random number generator data lookup from the table
- Method effectively eliminated from consideration due to run time and data storage considerations



# LTCPBWG Technical Subgroup

## Modeling Stage – Method 4

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### Method 4 – Waiting Time Model

- Developed by Eric Stallard, Research Professor, Duke University
- Generate two random numbers
  - The first determines the time of the next change in status
  - The second determines what the status change is



# LTCPBWG Technical Subgroup

## Modeling Stage – Method 4

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### Method 4 – Waiting Time Model

- Relies on the hazard rate function:

$${}_k H_{x+t} = -\log {}_k p_{x+t}^r$$

- Assuming independent probabilities,  
Total Hazard Rate =  $\Sigma$  Individual Hazard Rates



# LTCPBWG Technical Subgroup

## Modeling Stage – Method 4

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- Results provide a cash flow projection for each policy
- May permit use of fewer trials to establish statistical significance of results
- Point-in-time analysis is possible for management action



# LTCPBWG Technical Subgroup

## Modeling Stage – All Methods

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- Interpolation used to choose the exact point of occurrence within the random period generated
- Assets and Yield Rates must be chosen since PBS requires Asset Cash Flow net of Liability Cash Flow
- Survival at valuation date  $x$  is normalized to that date from the issue date  $x-n$
- Change in assumptions required for policies that have been on claim?



# LTCPBWG Technical Subgroup

## - All Methods

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- Method 1 & Method 2 to be used as corroboration for Method 4 results
- Method 3 seems overly time-intensive and space-intensive and not a viable option



# LTCPB Work Group

## Next Steps

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- Development of a Standard Morbidity Table to assist companies with small blocks of LTC business -- Issues Group
- Model 4 runs, timing and checking with Model 1 and/or Model 2, discussion of results, findings documentation – Technical Group



# Questions/Discussion

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