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Advanced Actuarial Topics

Session #9

ILTCl

Orlando

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14th Annual Intercompany Long Term Care Insurance Conference

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Advanced Actuarial Topics

Mortality & First Principles Modeling – Al Schmitz

Benefit Utilization – Phil Sanchez

Benefit Utilization & Inflation – Jim Berger

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Mortality and First Principles Modeling

Presented by
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Principal & Consulting Actuary
Milliman, Inc.



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Mortality – Active, Disabled, and Total

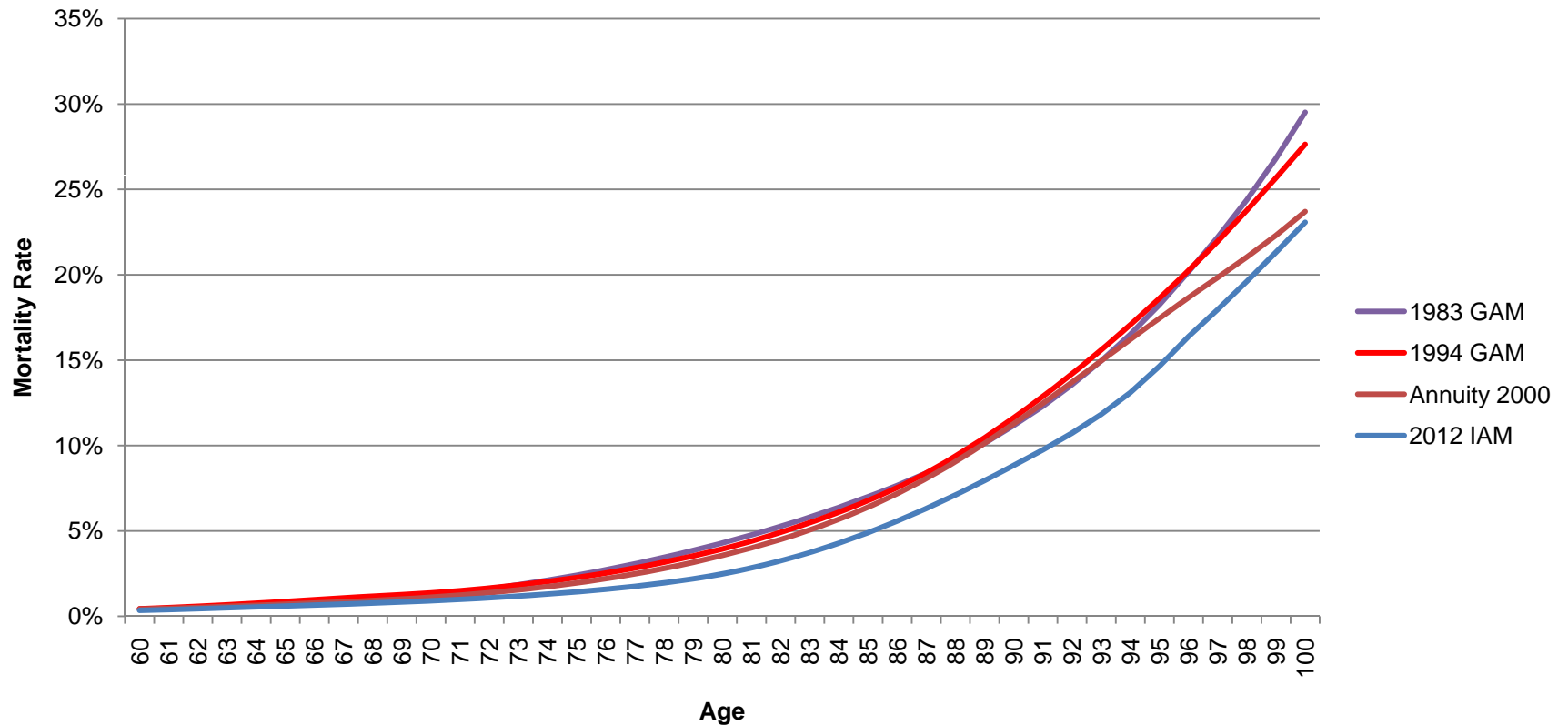


- LTC modeling has historically used a total mortality table (applicable to active and disabled lives).
 - 1983 GAM
 - 1994 GAM
 - Annuity 2000
 - 2012IAM
 - Others
- How does that compare to active and disabled mortality experience?
 - Active is defined as those not on claim
 - Disabled includes those on claim

Females 1983GAM, 1994GAM, A2000, and 2012IAM



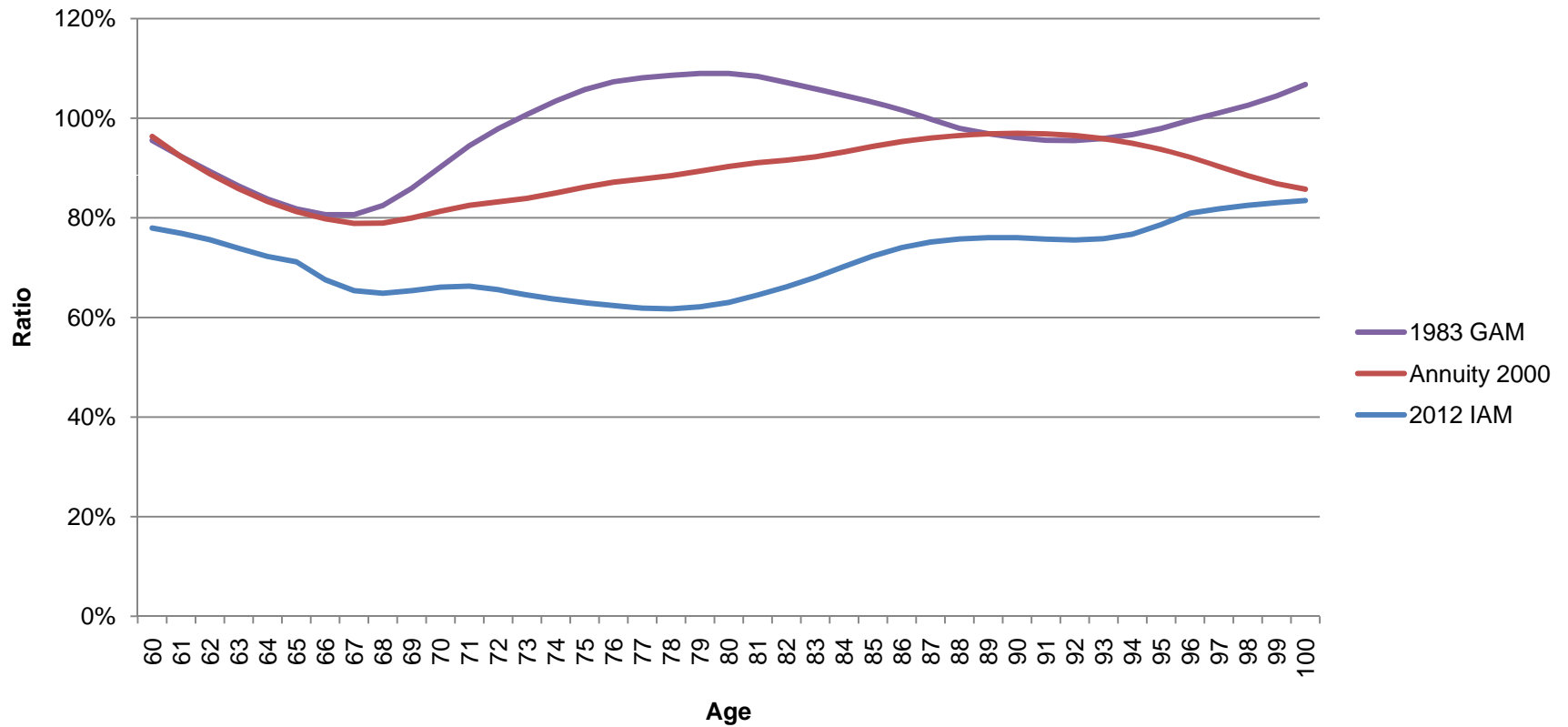
Mortality Rates – Ratio to 1994 GAM Female



Females – Ratio to 1994 GAM



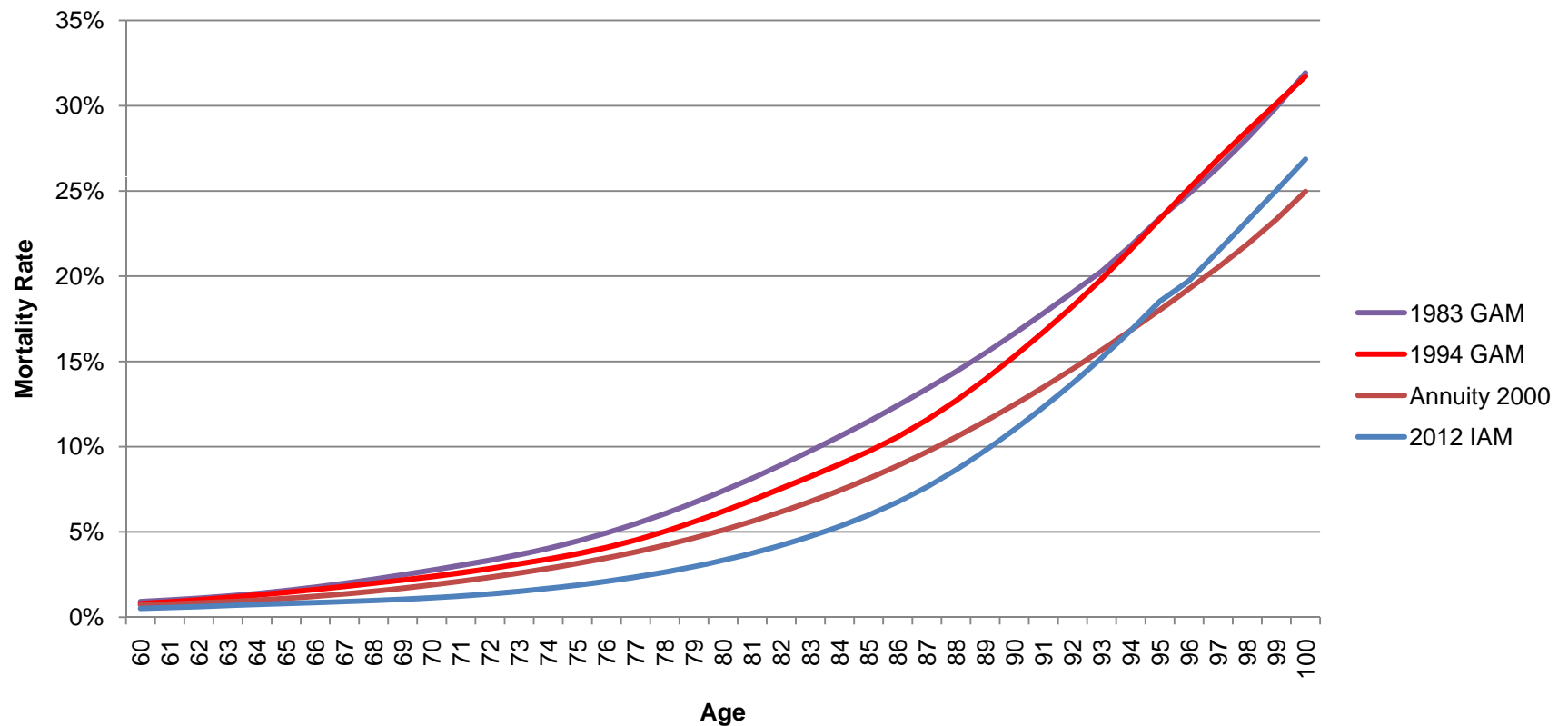
Mortality Ratios



Males 1983 GAM, 1994 GAM, A2000, 2012IAM



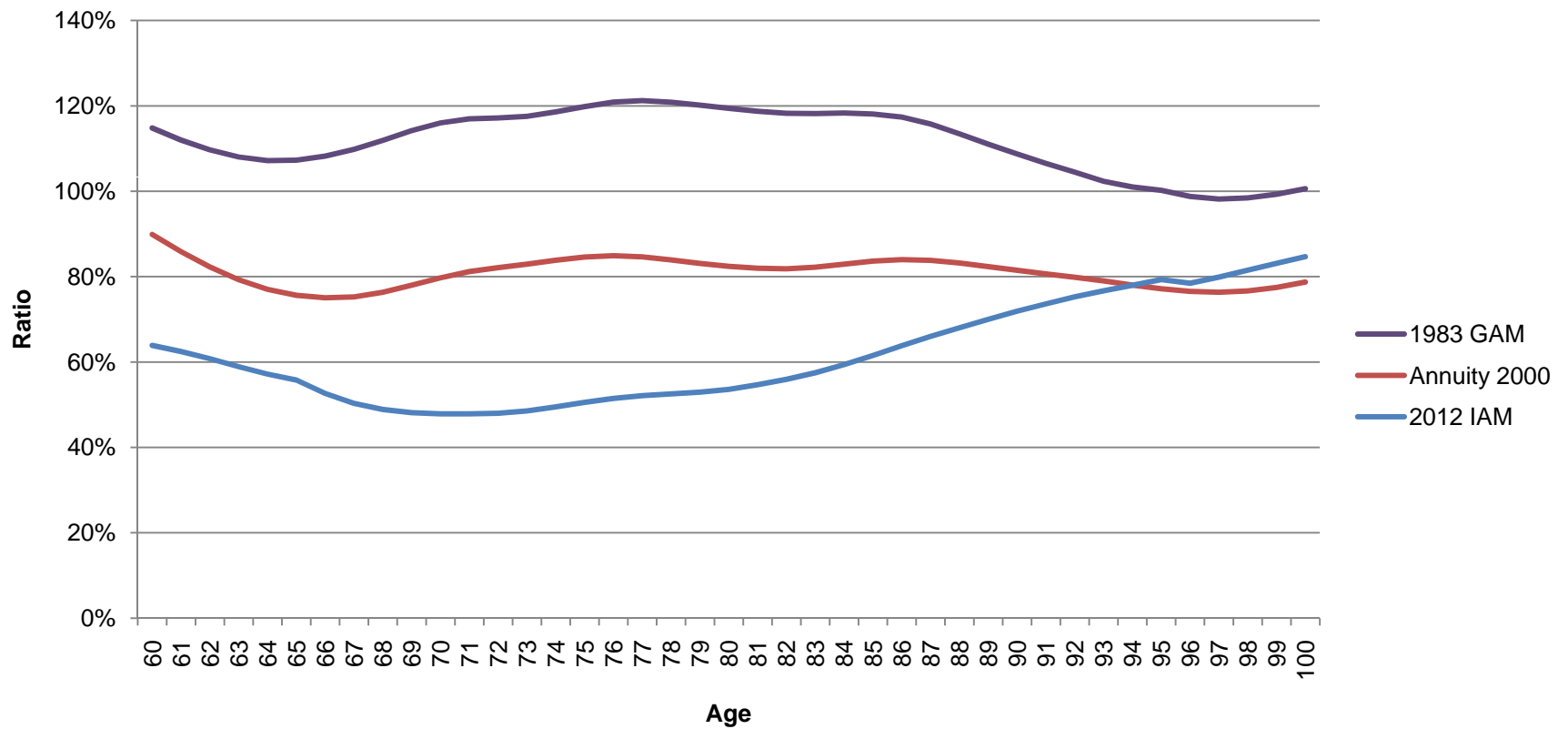
Mortality Rates - Males



Males Ratio to 1994 GAM



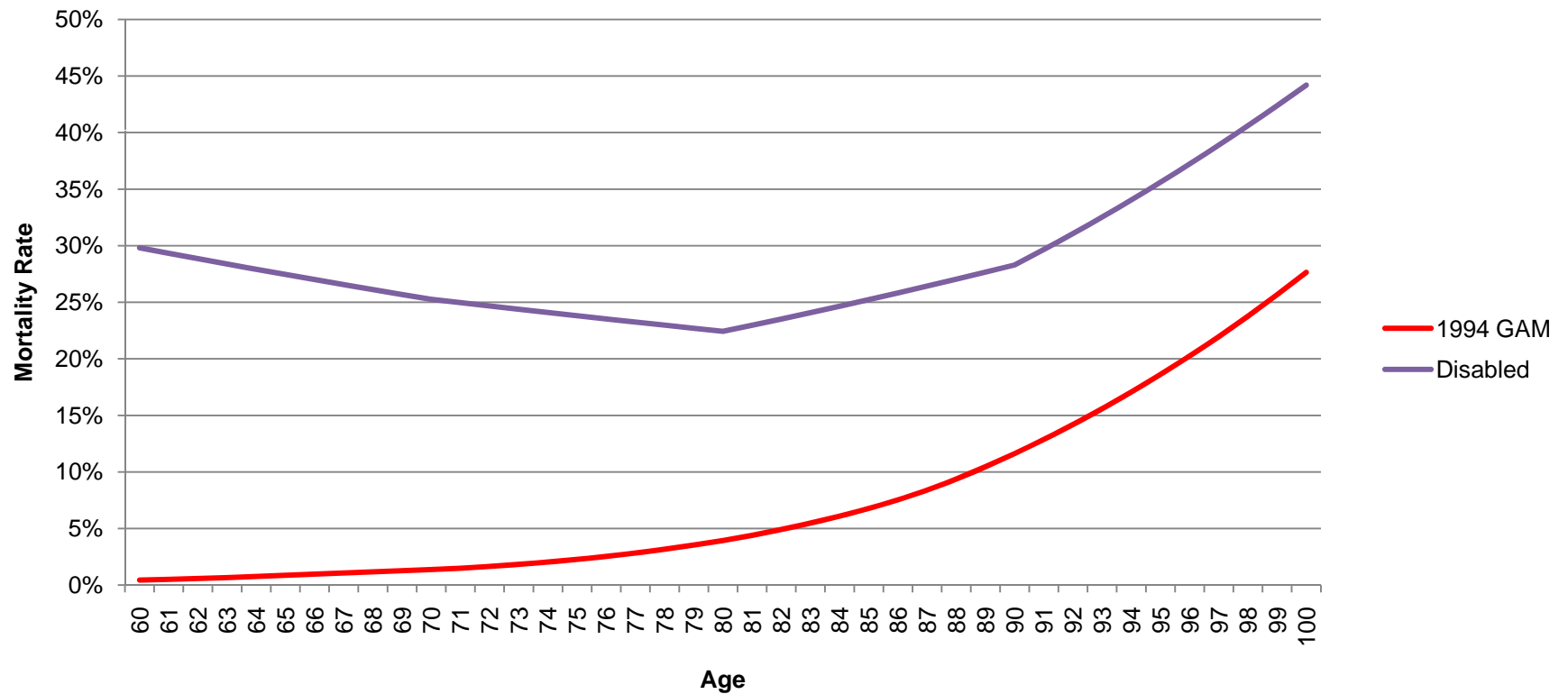
Mortality Rates: Ratio to 1994 GAM Male



Females – Disabled Mortality Estimate



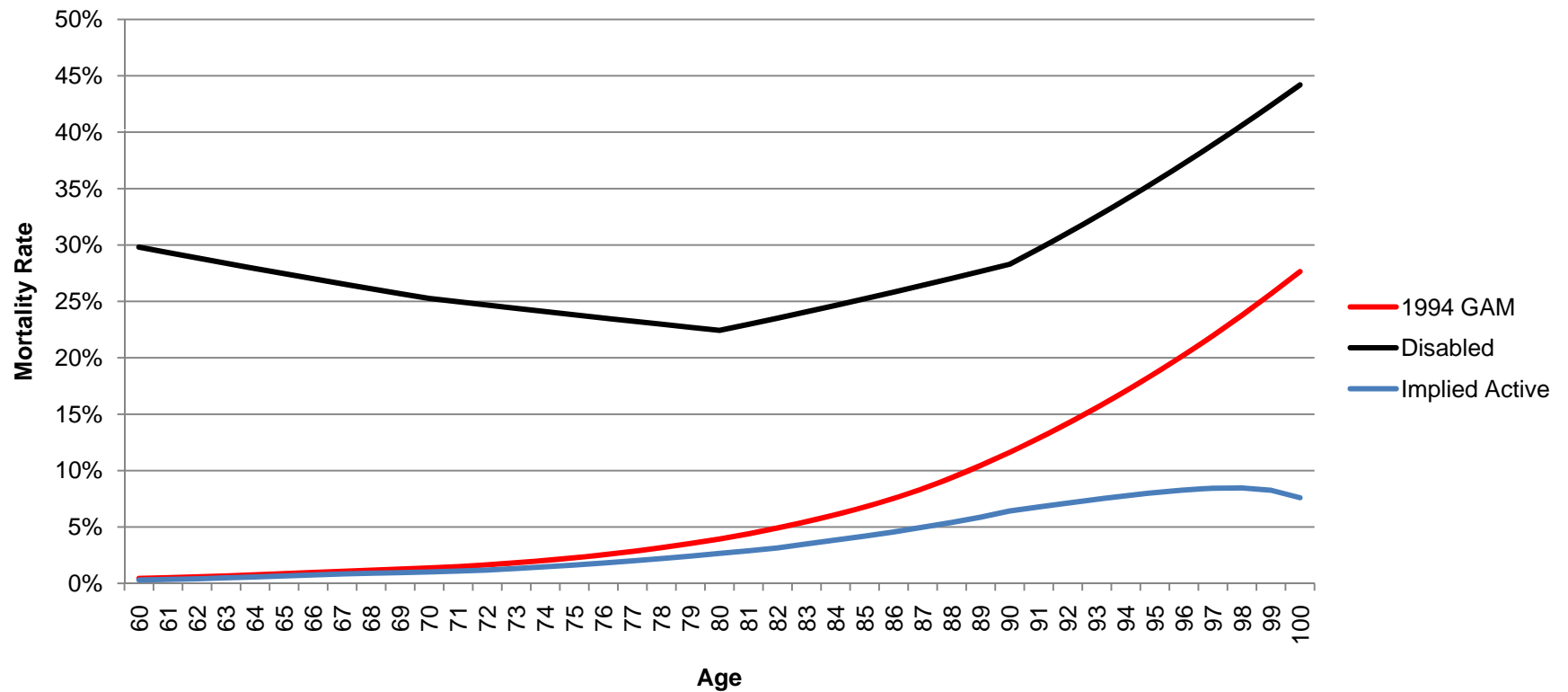
Female Mortality Disabled & 1994 GAM



Disabled, Active, and Total Mortality



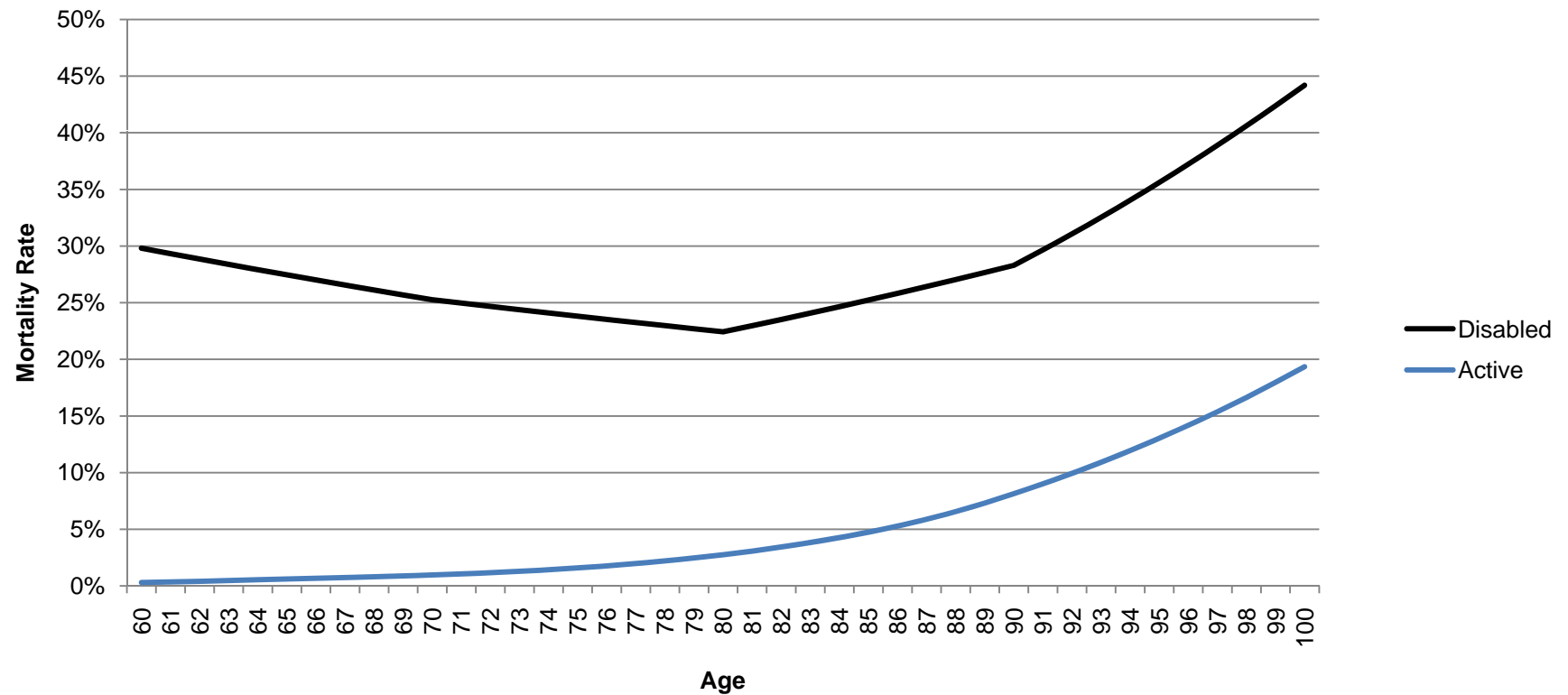
Female Mortality Disabled, 1994 GAM & Implied Active



Disabled and Observed Active Mortality



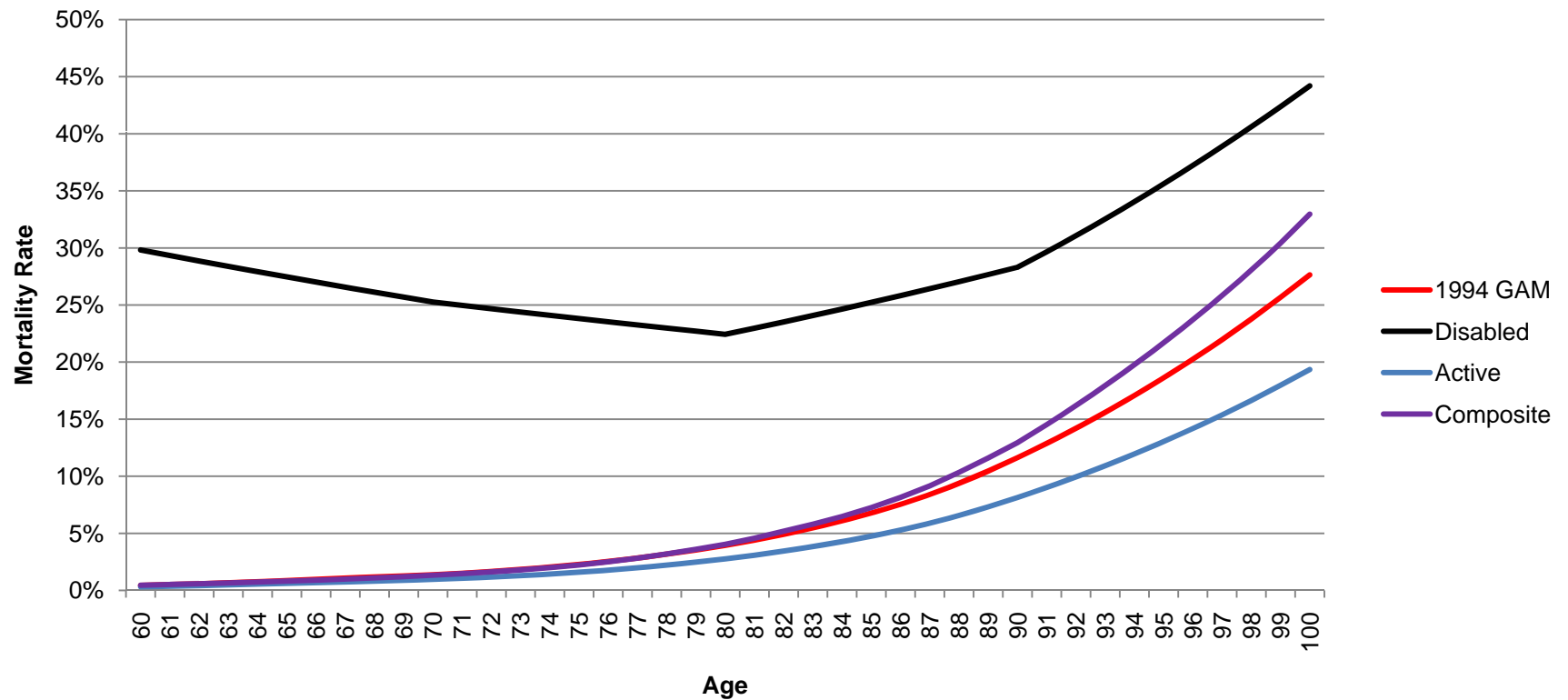
Female Mortality Disabled & Active



Implied Total Mortality vs. 1994 GAM



Female Mortality Disabled, Active, 1994 GAM & Composite

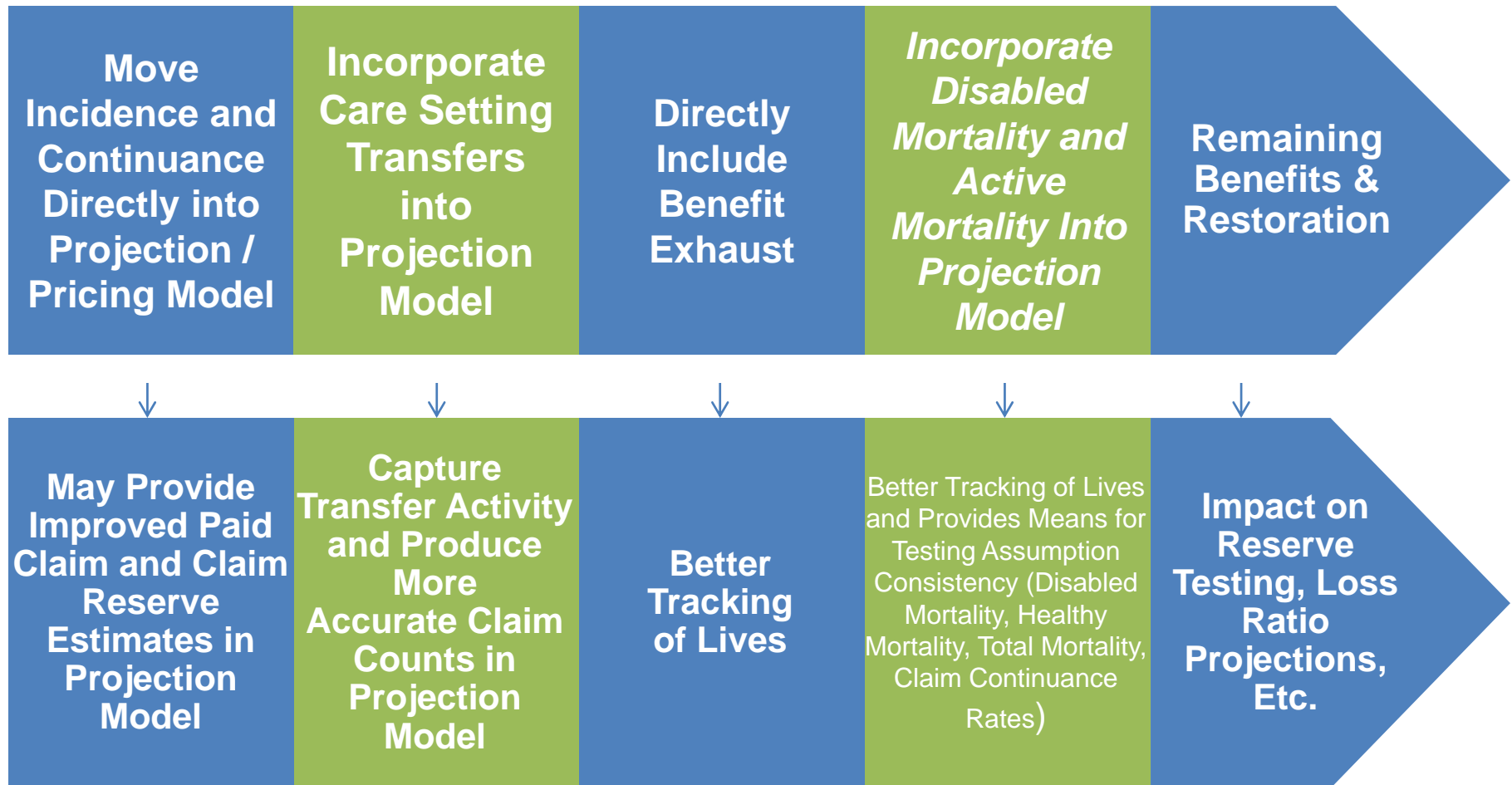


- What is First Principles?



Increasing Complexity →

- Potential Advantages of First Principles



- First Principles Incidence and Continuance in Projection Model Improves Paid Claim Estimates

Discounted Incurred Claim		\$60,379					
	Year	Continuance Table	Discounted Run-out Factors	Paid Claims		Alternate Run-out Factors	Alternate Paid Claims
	1	1	0.50	\$30,113		0.67	\$40,223
	2	0.65	0.30	\$18,250		0.31	\$18,771
	3	0.35	0.17	\$10,038		0.09	\$5,363
	4	0.2	0.09	\$5,475		0.00	\$0
	5	0.1	0.03	\$1,825		0.00	\$0
	6	0	0.00	\$0		0.00	\$0
Sum				\$65,700			\$64,357
Present Value				\$60,379			\$60,379

- More Detailed Claim Counts for Benchmarking
 - Include Incidence and Continuance

Policy Year	Disabled Lives Start	Incidence	Terminations	End
1	-	110	-	110
2	110	196	55	252
3	252	337	112	477
4	477	474	203	747
5	747	644	307	1,084
6	1,084	856	435	1,505
7	1,505	1,110	561	2,054

- Include Disabled Mortality and Recoveries

Policy Year	Disabled Lives Start	Incidence	Deaths	Recoveries	End
1	-	110	-	-	110
2	110	196	27	27	252
3	252	337	58	55	477
4	477	474	106	97	748
5	748	645	164	143	1,086
6	1,086	859	237	198	1,509
7	1,509	1,114	312	250	2,061

First Principles LTC



- Include Information by Care Setting

Policy Year	Disabled Lives Start	Incidence	Deaths	Recoveries	End	NH	ALF	HHC
1	-	110	-	-	110	40	33	38
2	110	196	27	27	252	91	76	86
3	252	337	58	55	477	172	143	162
4	477	474	106	97	748	269	224	254
5	748	645	164	143	1,086	391	326	369
6	1,086	859	237	198	1,509	543	453	513
7	1,509	1,114	312	250	2,061	742	618	701

- Can also measure disabled mortality, recoveries, and incidence for each care setting

Inforce Modeling – Mix Matters

- Sample Inforce Block of Business (attained Age 80 Cohort)

	Total Lives	Disabled Lives	Active Lives
	10,000	579	9,421
Mortality Rate	3.7%	19.6%	2.8%
Deaths	374	113	261

- **Caution: Incorrect Estimate to apply 3.7% rate to 9,421 Active Lives!**

- Mix matters

- Mix of active and disabled will vary
 - Different for different issue age cohorts for same attained age
- Duration of those on claim (mortality for a new claimant versus claimant that has been on claim for a period of time)
- If ultimate claim costs by issue age are assumed to vary, then one aggregate mortality might not be appropriate

Active and Disabled Mortality vs. Total Mortality

- Active and Disabled allows for more accurate reflection of true mortality levels, particularly to the extent the mix of active and disabled individuals may be different for a given attained age. However, two challenges include:

- 1) Availability of data
- 2) Models that can accommodate

Remaining Benefit Period Measurement

- Can be estimated with first principles model
- May be best measured with a simulation model

Restoration

- Impacted by modeling remaining benefits, disabled mortality, and recoveries
- Also may be best measured with simulation model

Moving to First Principles by Modeling Active and Disabled Mortality will Impact Projections.

- Degree of impact depends largely on assumptions
- (If total mortality assumption varies by issue age and duration and never reaches an ultimate level – theoretically possible to tie total mortality to active and disabled for each issue age and duration.)
- Reserves could increase or decrease 10% or more

Is First Principles Modeling Worth the Effort?

- As better data and assumptions become available, it provides some significant advantages over a claim cost model
 - Improved Paid Claim and Claim Reserve Estimates
 - More Accurate Capture of Claim Counts and Transfer Activity
 - Better Tracking of Lives in Projection
 - Help Ensure Assumption Internal Consistency (Disabled Mortality, Healthy Mortality, Total Mortality, Claim Continuance Rates)
 - Impact on Reserve Testing and Loss Ratio Projections

Qualifications and Limitations



- *The information contained in this presentation is for discussion purposes only and should not be relied upon by its recipients. The data contained in this presentation are for illustrative purposes only. Actual results for any specific situation would differ. Opinions expressed in the presentation are those of the author only and do not necessarily represent those of his employer.*

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Advanced Actuarial Topics Benefit Utilization

Presented by:
Philip Sanchez, FSA, MAAA
Vice President & Actuary
CNA



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What is *Utilization*?



- Commonly referred to as *Salvage*
 - Focuses on the benefits **not used**
 - In the P&C world Salvage refers to property collected after a claim has been paid that can be liquidated to offset the claims paid (think of a totaled car being sold for scrap)
- *Utilization* is the ratio of benefits used over the maximum benefits available
 - Focuses on the benefits **used**

What Drives Claim Payments?



- The product purchased
- The claimant
- The provider
- The claims department or administrator
- External forces?

- Indemnity or Reimbursement
 - Indemnity not always a 100% payout
- The maximum daily benefit
 - Care setting maximums
- Incentives to preserve benefits
- The level of inflation protection

- How frail are they?
- How intensive are their needs?
- Their family & support network
- Their diagnosis & any co-morbidities
- The plan of care
- Where do they stand on the claim progression spectrum?

- The situs of care
- Geographical location
- Provider discounts

The Claims Department



- Consistency
- Timeliness & accuracy
- Fraud prevention
- Claims oversight
- Automation
- Claim volume

- The weather?
- The economy?
- Inflation?
 - Dependent on wage (HHC) or medical inflation
 - Cost of Capital (Facility)

Are claims (Utilization) interest sensitive?

- Claim mix
 - Short vs, long-term claims
 - Age, gender,...
 - Benefit features
 - Turnover
 - New claims replacing closed claims

- Associating payments with service periods
 - Payment lags
 - Breaks in service
 - Multiple services in a single payment
 - Payment Reversals
 - Claim progression (situs & diagnosis groupings)
 - What are you trying to understand?
 - Current period earnings
 - Experience to support assumption setting

Example of Payment Trends



Claim Months	J-11	F-11	M-11	A-11	M-11	J-11	J-11	A-11	S-11	O-11	N-11	D-11	Total	Available Benefits	Utilization Rate
1					6,000								6,000	9,000	67%
2					6,000								6,000	9,000	67%
3					3,000	3,000							6,000	9,000	67%
4						3,000	3,000						6,000	9,000	67%
5													-	9,000	0%
6									3,000				3,000	9,000	33%
7									3,000	3,000			6,000	9,000	67%
8										3,000	3,000		6,000	9,000	67%
9											3,000	3,000	6,000	9,000	67%
10												3,000	3,000	4,500	67%
11													-	-	
12													-	-	
Total Payment	-	-	-	-	15,000	6,000	3,000	-	6,000	6,000	6,000	6,000	48,000	85,500	56%
Available Benefits	4,500	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	103,500		
Utilization Rate	0%	0%	0%	0%	167%	67%	33%	0%	67%	67%	67%	67%	46%		

Example of a claim incurred on January 15, 2011

- 0-day elimination period
- \$300 per day maximum benefit
- A given payment includes services provided over a calendar month
- Initial payment lags
- No services provided in the 5th month

**Is there really a 167% utilization rate in May?
Introduce a study lag to let the data cure**

- What is the purpose
 - Pricing
 - Active life reserves
 - Management planning
 - Claim reserves
- System capabilities

Consistency between application & development of assumptions is critical, but also strive for consistency across models

- Focus is on future claims
- Claim costs vs. First Principles
- Single situs or multi
- Trends for claim progression
 - Downward trends with inflation protection?
 - Upward trends for claimant deterioration?
 - Is utilization interest sensitive?

- Focus is on existing claims
- How do you consider existing information?
 - Single situs or multi?
 - Diagnosis?
 - Original or current status?
 - How reliable is your data?
- Dynamic vs. tabular assumptions
- Trends for claim progression
 - Downward trends with inflation protection?

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Advanced Actuarial Topics Benefit Utilization and Inflation

Presented by:
Jim Berger, FSA, MAAA
Senior Actuary
GE/ERAC



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- Inflation $<5\%$
- LTC inflation vs. CPI
- Sources for LTC inflation
- Inflation assumption implicit within projections
- What do we want? LTC inflation correlation to bond yields?

- Once we have LTC inflation rates that are consistent with other components of our projection, then what?
- Can this be implemented into stochastic scenario work?
- What about other projections?
 - LRT
 - Rate increases
 - Management projections
 - Regulatory thoughts