Mortality Table Development Update 2014 VBT/CSO

Society of Actuaries & American Academy of Actuaries Joint Project Oversight Group

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March 27, 2014

Agenda

- Mortality development for VM-20
  - 2014 VBT
  - 2014 CSO
  - Margins for determination of Prudent Estimate Mortality under VM-20 (PBR Margins)
- 2014 CSO Considerations and Guidance
- PBR Margin for Mortality v Aggregate Margin
  - Consideration for PBR Margins
  - Resource discussion

Comparison of life valuation mortality table structures

Criteria/Table Structure	2001 CSO	2014 CSO	Prudent Estimate Mortality
Uses	•Net Premium Reserves •Tax Reserves •Non-forfeiture	•Net Premium Reserves •Tax Reserves •Non-forfeiture	•VM-20 Deterministic •VM-20 Stochastic Reserves
Underlying mortality table and experience	2001 VBT (1990-1995 data)	2014 VBT (2002-2009 data)	Blend of (a) and (b) (a) Own Company (b) 2014 VBT (2002-2009 data)
Number of tables	•Gender distinct/Composite •Smoker distinct/Composite •3 NT/NS •2 TB/SM	Expect to be similar to 2001 CSO	Subject to # of company mortality segments
Risk class tables aggregate back to composite	Yes for underlying VBT 3NS/2SM classes used in preferred structure tables	Yes (proposed similar to 2001 preferred structure table underlying mortality)	No
Own company experience	None	None	Yes, subject to sufficient data period and credibility
Prescribed table	Yes	Yes	No, subject to VM-20 requirements
Considers mortality improvement	No	No	Yes, to valuation date – prescribed and own company
Smoothness versus fit	Smoothness	Smoothness	Fit
Omega age	121	121	None

2014 Valuation Basic Table (VBT) Development

2014 VBT development

- Status to date
  - Developed aggregate select and ultimate experience tables
  - NS/SM/Unismoker, M/F, ANB
  - Extensive analysis for older ages
  - Underwriting Criteria Scoring Tool revised
- Remaining to develop
  - Final adjustments:
    - To age 80-85 select rates
    - Post level term experience
    - Changes in mix of business
    - Improve to 2014
  - Final Relative risk (RR) tables
  - ALB tables
  - Written report

Target completion: end of April

Target completion: August

Underlying experience

- SOA's Individual Life Experience Committee (ILEC) experience data from 2002-2009
- Significant increase in experience from 2008 VBT:
  - 7 exposure years (2008 VBT: 2 years)
  - Exposure: $30.7 trillion by amount; 266 million by count
    - 2008 VBT: $7.4 trillion by amount; 75 million by count
  - Number of claims: 2.55 million claims (2008 VBT: ~700k)
  - Data from 51 companies (versus 35 for 2008 VBT)
  - Preferred experience
  - Blood tested business and smoker/non-smoker distinct rates
  - Non-tobacco versus non-smoker classification
  - Older issue ages
  - Female risks

Underlying experience

- Overall, mortality improved from 2008 VBT

Study Period	Male	Female	Aggregate	Exposure (Trillion)	# Death Claims
2002-2004 (underlying 2008 VBT)	101.1%	100.5%	100.9%	$ 7.4	699,890
2002-2009 (underlying 2014 VBT)	94.2%	94.7%	94.3%	30.7	2,549,490
2002-2009 experience for common companies to 2002-2004 study	92.3%	94.3%	92.8%	19.2	1,940,403
2002 – 2009 100k+	88.3%	89.2%	88.5%	26.9	162,095
2002 – 2009 250k+	84.1%	85.4%	84.4%	20.6	46,570

Expected basis is 2008 VBT RR 100 Table

Source: Society of Actuaries, Individual Life Experience Reports 2003 through 2009 Preliminary

Underlying experience

In addition to gender, life insurance mortality experience varies by many factors including face amount, smoker status, and issue age.

A/E* Ratio –NS versus SM

Smoker Status	A/E Ratio by Amount
Non-smoker	92.3%
Smoker	97.5%
Unknown Status	99.8%
Aggregate	94.3%

A/E* Ratio – By Amount

Face Amount Band ($)	A/E Ratio by Amount
50,000 – 99,999	105.6%
250,000 – 499,999	88.6%
1,000,000 – 2,499,999	81.9%
5,000,000 – 9,999,999	74.1%
Aggregate	94.3%

A/E* Ratio – By Issue Age

Issue Age	A/E Ratio by Amount
40 – 49	100.1%
60 – 69	95.1%
80-89**	61.6%

* Expected basis = 2008 VBT Primary Tables, ANB
** 80-90 for common companies drops to 55%

Source: Society of Actuaries, Individual Life Experience Reports 2003 through 2009 Preliminary

Table structure

- Similar structure as 2008 VBT, with Primary and RR Tables
  - RR Tables expected to be same in number but perhaps have different relativity amongst the classes.
  - Currently not proposing a limited underwriting table but will revisit after GI/SI study completed.
- Select factor variation by gender and issue age
- Omega rate per 1,000 (500.0 per 1,000 at attained age 112) but no omega age
  - CSO has proposed omega age of 121

Select period

- Varies by issue age
- Considered both observable as well as prospective select period
- Underlying select period independent of preferred wear-off
- Observable select period
  - Based on underlying data of both common companies as well as all companies
  - Data analyzed based on count rather than amount to remove influence of variations/fluctuations by size of claim.
  - Attempted to normalize the socio-economic impact over time.
  - Focused on gender/smoker status level, quinquennial age groupings.
  - Used GAM (Generalized Additive Model) to test fit of actual mortality to mortality predicted by the GAM model by duration; results shown as ratios to ultimate mortality, averaged across all attained ages.

Select period, cont'd

- Prospective select period
  - Looked to "events" or changes in underwriting that have impacted the select period in the underlying 2002-2009 data.
  - E.g., Movement from unismoker to smoker/non-smoker rates (1980s), movement from smoker/non-smoker to non-tobacco/tobacco distinction (1990s), liberal underwriting period with increased level of underwriting exceptions (2000-2005), development of mature age underwriting requirements such as cognitive function (2005-present).
  - Most "events" thought to shorten select period from that in observed data; a couple such as NT versus NS and older age cognitive function testing may elongate.
- Modified the observed select period for changes in smoker prevalence.

Select period, cont'd

Select Period

Issue Age	MALE	FEMALE	Issue Age	MALE	FEMALE
0-17	0	0	79	12	12
18-54	25	20	80-81	11	11
55	24	19	82	10	10
56-57	23	19	83	9	9
58-59	22	19	84-85	8	8
60-61	21	19	86	7	7
62-63	20	18	87	6	6
64-65	19	17	88-89	5	5
66-69	18	16	90	4	4
70-72	17	15	91	3	3
73-74	16	14	92-94	2	2
75	15	14	95	1	1
76	14	14	96+	0	0
77-78	13	13			

Juveniles

- Examined mortality relative to population mortality and insured mortality (2008 VBT)
  - No clear relationship to population mortality
- Consider ages 0-17 as juveniles
- No smoker/non-smoker distinction
- No observable select period
  - Proposed table juvenile rates attained age only
  - Some grading/graduation was necessary to smoothly grade at attained age 26 into adult attained ages

Graduation approaches

- Explored 3 separate approaches to graduating data and resulting fit
  - Projection pursuit regression (PPR);
  - Whittaker-Henderson (WH); and
  - Generalized Additive Model (GAM).
- PPR – good fit with ultimate model but loss of monotonicity and over-fit data in select period
- WH – loss of monotonicity
- GAM – best fit overall, little to no loss of monotonicity

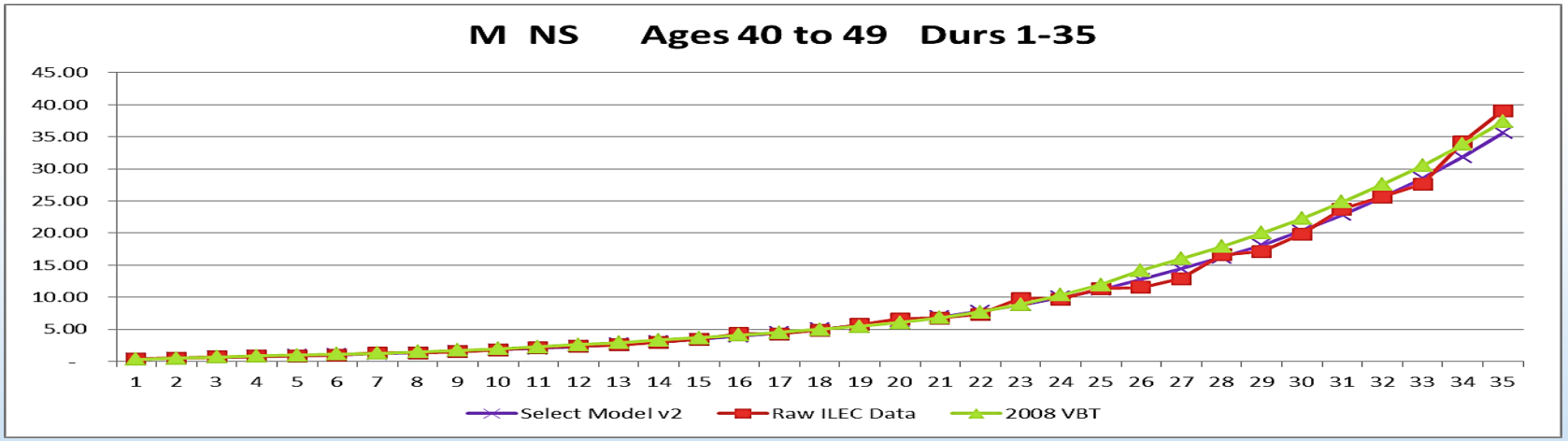
Graduation approaches, cont'd

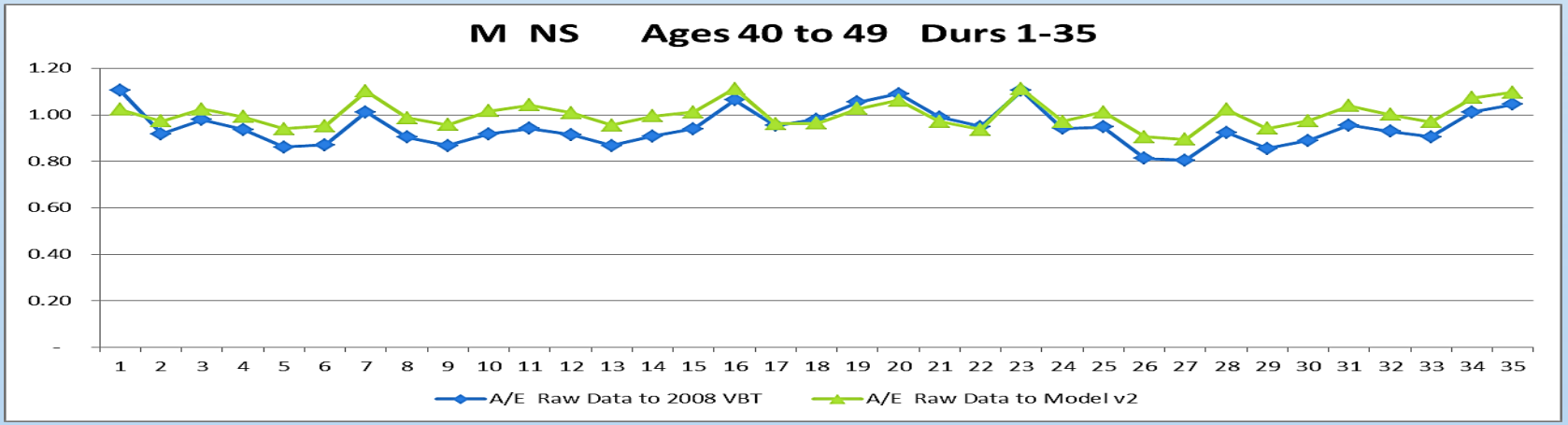
- Split the data into a select dataset and an ultimate dataset.
- Created 2 models using the Generalized Additive Model (GAM) approach to graduate the raw mortality rates by amount:
  1. Unismoker ultimate model (rates by attained age and gender only); and
  2. Select model with rates by gender, smoker status, issue age, and duration.
- Both models used all of the available data in their respective domains.

Graduation approaches, cont'd

- A significant proportion of the underlying select data is smoker/non-smoker distinct whereas the ultimate data was almost all issued as uni-smoker.
- Therefore, needed to determine smoker prevalence rates for the ultimate data to split into respective smoker class. To do so, the team:
  - Extrapolated smoker-distinct select rates at late durations to predict the mortality rate at the first ultimate duration;
  - Determined the implied smoker prevalence rates by comparing the extrapolated smoker-distinct ultimate rates to the initial unismoker ultimate model and the implied smoker-to-non-smoker mortality ratio; and
  - Applied smoker prevalence to the initial unismoker ultimate GAM model to create the smoker-distinct ultimate rates.
- The smoker/non-smoker mortality ratios and the smoker prevalence rates were then applied to the raw experience data for the ultimate period to create a split of the ultimate data by presumed smoking status.

Resulting experience table – Issue ages 40-49





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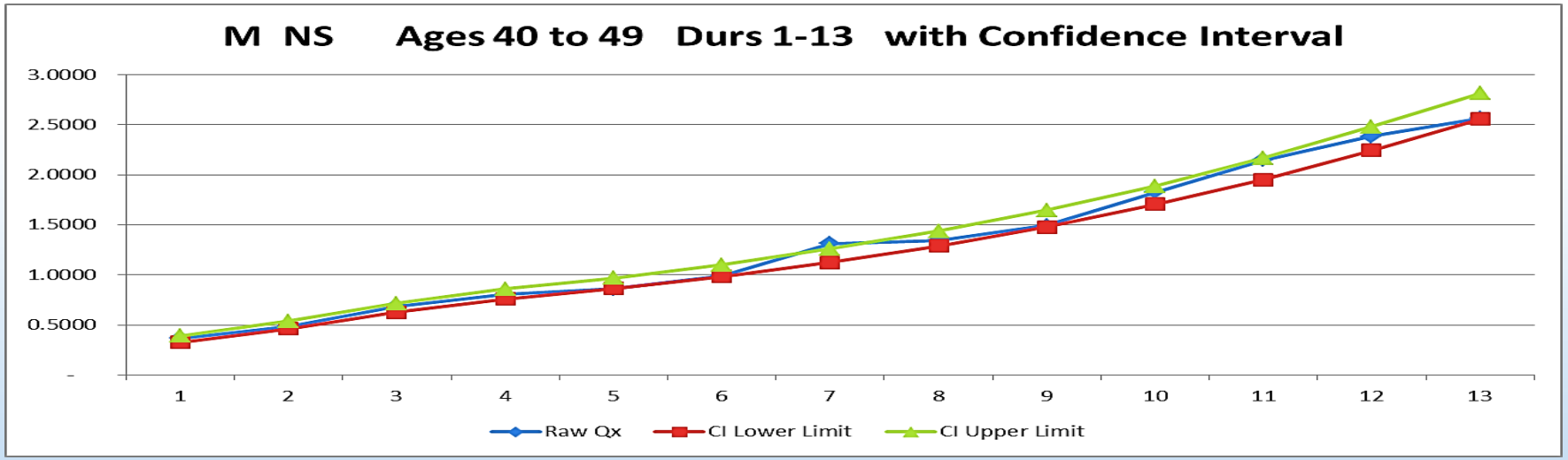
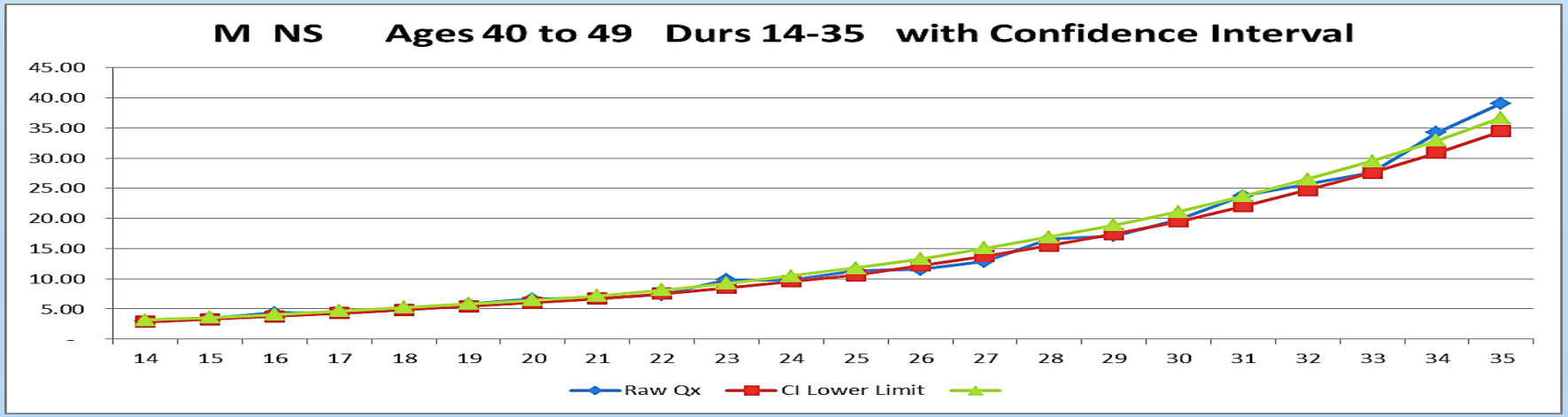
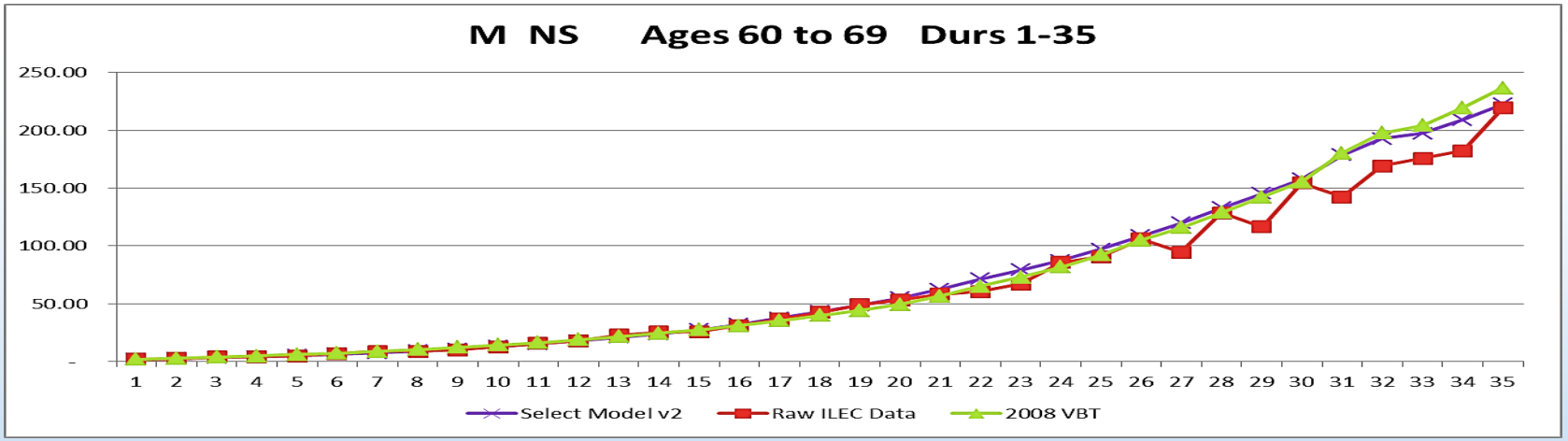
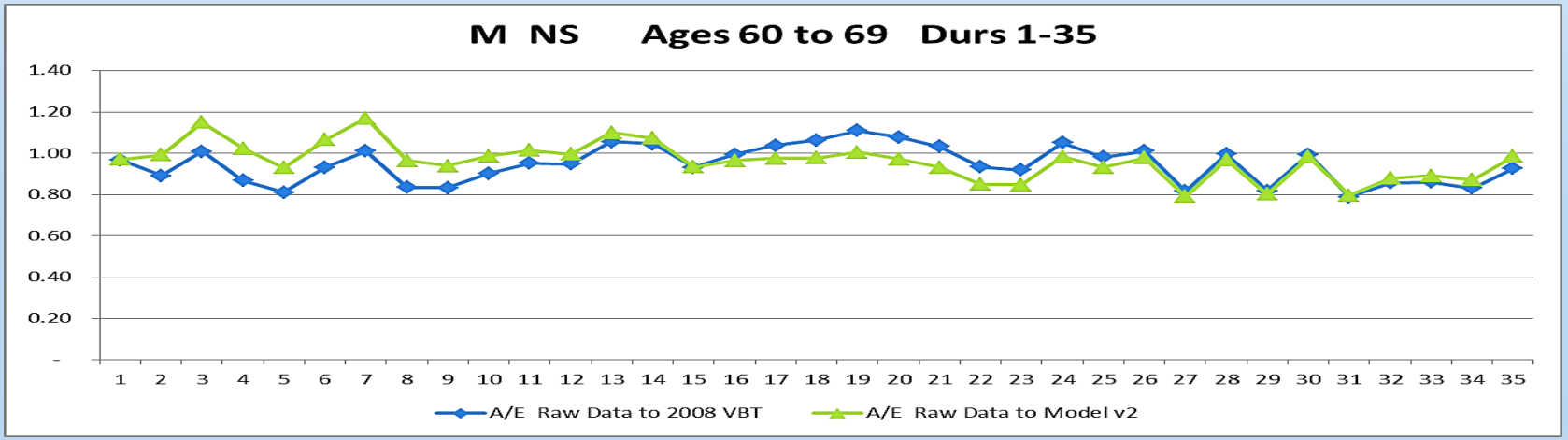




Resulting experience table – Issue ages 60-69





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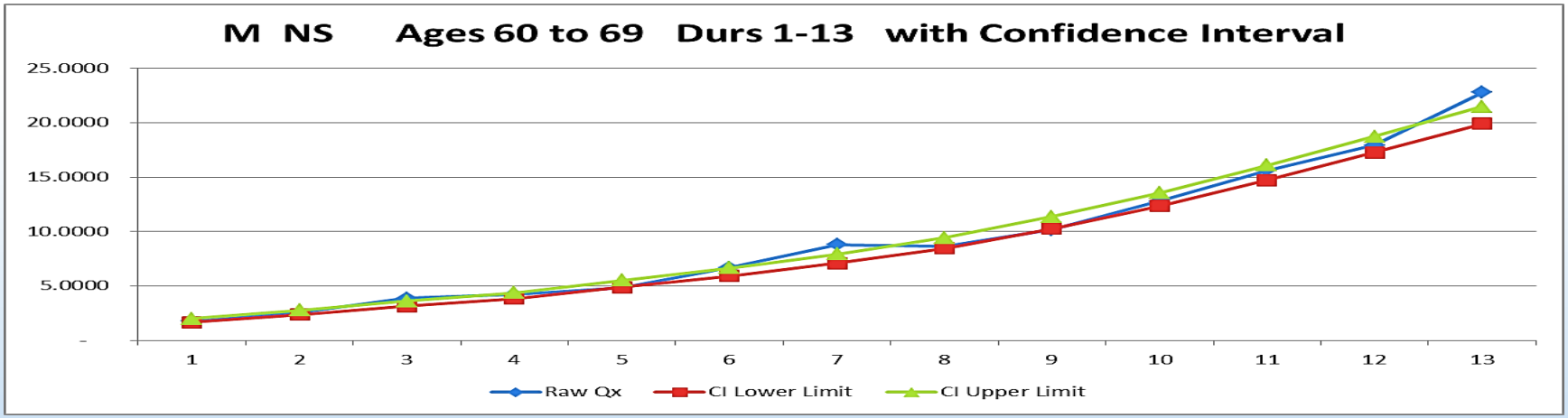
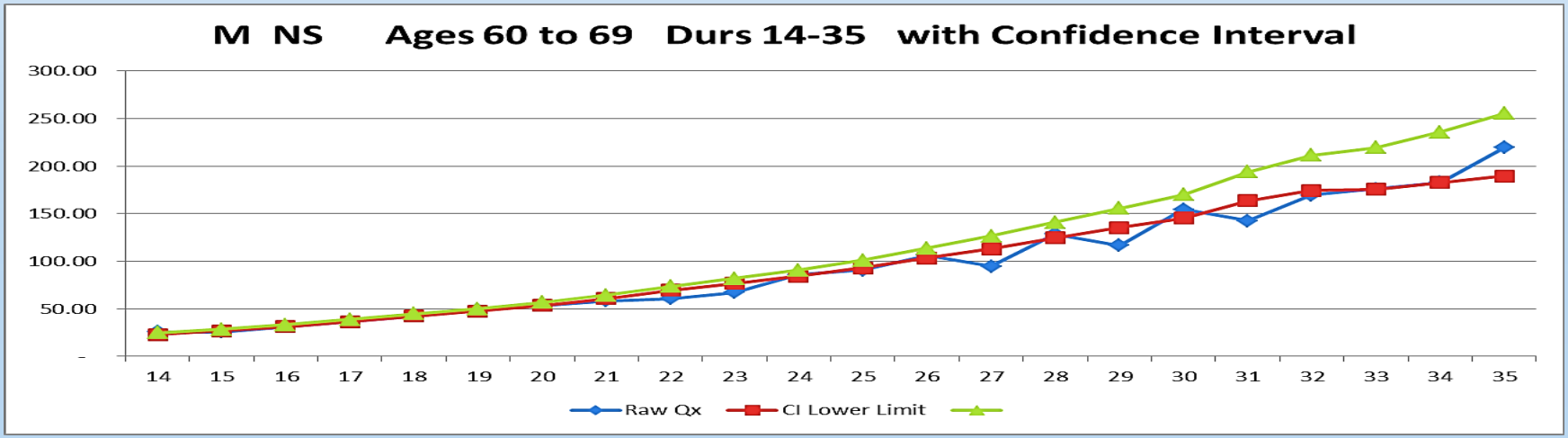




3 adjustments to underlying experience

1. Adjust data to remove post level term anti-selective mortality;
2. Adjust data to recognize differences in experience from different underwriting eras; and
3. Improve the underlying experience to start date of table (2014).

1. Adjustment to remove effects of post level term mortality

- Examined underlying experience for term plans only
- Calculated actual to expected (A/E) ratios based on face amount by issue age group and duration in total and for 10, 15 and 20 year term plans.
- The ratios were calculated for male and female separately and for both genders combined and were not split by smoker status (that is, the ratios were calculated for all smoker statuses combined).
- Recalculated the A/E ratios estimating impact of removing the post level term experience
- Determined the ratio of the A/E excluding post-level term to the total A/E. This provided the proposed adjustment to decrease the total rates to account for the impact of post-level term experience
- Factors vary by issue age/duration
  - Average 2.9% at duration 13 versus 1.3% at duration 18

1. Adjustment to remove effects of post level term mortality

Adjustment factors to remove effects of post level term

Issue Ages	Durs 11-15	Durs 16-20	Durs 21-25	Durs 26+
18-24	99.9%	99.3%	99.9%	99.2%
25-29	98.7%	99.6%	99.7%	97.4%
30-34	96.5%	98.8%	99.9%	98.1%
35-39	97.0%	99.3%	99.8%	98.1%
40-44	97.5%	99.2%	99.8%	99.4%
45-49	97.5%	98.4%	99.7%	100.0%
50-54	96.1%	97.1%	100.0%	100.0%
55-59	98.3%	99.1%	99.9%	100.0%
60-64	99.1%	99.6%	99.9%	100.0%
65-69	95.7%	99.8%	100.0%	100.0%
70-74	99.4%	100.0%	100.0%	100.0%
75-79	99.8%	100.0%	100.0%	100.0%
80-84	100.0%	100.0%	100.0%	100.0%
85-89	100.0%	100.0%	100.0%	100.0%

2. Select period adjustments for different underwriting eras

- The Select Period in the observed data reflects different and distinct product and underwriting eras:

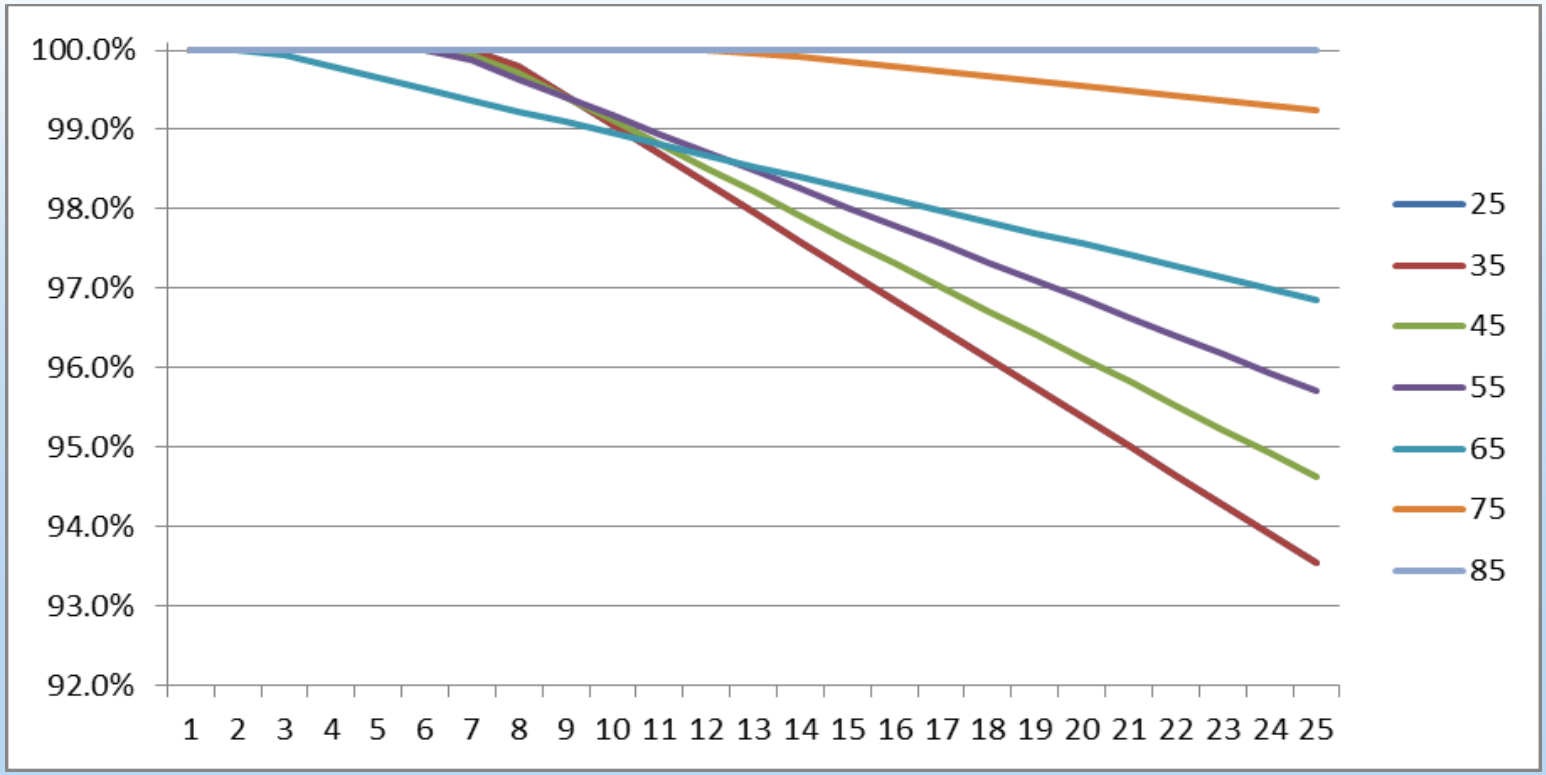
Issue era	Underwriting	Consideration
Prior 1980	• Aggregate smoker basis	• This experience comprises the bulk of the ultimate data
Early to mid-1980s	• Introduction of Smoker/non-smoker distinct rates; • Introduction of blood testing	• High replacement activity amongst NS risks • Anti-selective mortality • High preponderance of SM risks in underlying data
Mid-1980's to early 1990's	• SM/NS distinct rates	• Preponderance of experience on aggregate NS or aggregate SM basis
Early 1990's and later	• Introduction of preferred underwriting and better utilization of blood profiles	• High replacement activity amongst Preferred risks • Anti-selective mortality • Exhibit lower overall mortality than the earlier generations of policies both through the select period and beyond.

2. Select period adjustments for different underwriting eras, cont'd

- Believe the slope of the select period mortality is affected by the changes in products and underwriting processes that occurred for policies issued that contribute to the underlying data.
- In the 2002-09 Study, about 64% of the duration 1 business was categorized as having a preferred class structure.
- In the more recent eras where preferred class structures are more prevalent, insureds with better expected mortality tend to buy more and bigger policies which over time improves the overall experience.
- Going forward we would expect the experience in later durations to look better than it has historically as the mix of preferred business in the later durations begins to look more like the mix in recent (and presumably future) years.
- Analyzed experience to try to determine how the experience might look different going back in time if the current mix of preferred business had been sold.
- Further discussion of the analysis performed will be in the written report.

2. Select period adjustments for different underwriting eras, cont'd

Adjustment factors to select period mortality to account for differences in underwriting eras



3. Mortality improvement

- Considerations
  - General population improvement
    - US Vital Statistics
    - Human Mortality Data Base (HMD)
    - Social Security Administration Data (SSA)

After looking at 3 sources, SSA data selected as source for general population

  - Insured data
    - Common company data for period 2002-2009
    - Given short period of time for historical experience and volatility from year over year, believe general population data is preferable
  - Additional factors

3. Mortality improvement, cont'd

- Additional factors considered
  - Gender;
  - Attained age;
  - Smoker status;
  - Socio-economic status; and
  - Differences in cause of death for insured lives vs general population.

3. Mortality improvement, cont'd

- Recommendation
  - For period 2002-2009:
    - Apply actual mortality improvement to adjust each experience year.
  - For period 2009-2014:
    - Apply average annual improvement rates varying by attained age and gender.
    - Based on general population data (SSA) = average of
      (a) Average annual improvement rates implied by the SSA's most recent intermediate level projection of mortality for the social security population; and
      (b) Actual average annual improvement rates from historical SSA data for the most recent 10-year period.

3. Mortality improvement, cont'd

2014 VBT Sample Mortality Improvement Factors

Attained Age	Male	Female
25	0.4%	0.4%
35	1.5%	0.8%
45	0.7%	0.0%
55	1.1%	1.2%
65	1.8%	1.2%
75	1.4%	0.8%
85	1.0%	0.4%
90	0.5%	0.1%

Relative risk (RR) tables

- Have developed initial set of preferred wear-off factors.
- Work will proceed to develop the tables once the aggregate VBT is complete.
  - Structure similar to 2008 VBT RR Tables

Preferred wear-off factors

- Analyzed level of wear-off but experience still emerging.
- There is virtually no additional information available from the 2008 VBT analysis, which was extensive.
- The preponderance of aggregate NS data in early durations further complicated the analysis; therefore, also examined Milliman's MIMSA study.
- Therefore, the preferred wear-off factors are the same as for the 2008 VBT, with the exception that they grade off to age 95, same as the underlying select period rather than 90.
- The factors used to grade from age 90 to 95 were based on professional judgment.

Preferred wear-off factors, cont'd

2014 VBT Preferred wear-off factors

Issue Age	Dur 6	Dur 16	Dur 26	Att. Age
25	0.0%	0.0%	2.8%	50
35	0.0%	2.7%	13.0%	60
45	2.3%	12.6%	32.6%	70
55	6.7%	27.8%	61.6%	80
65	14.0%	51.0%	84.0%	90
75	29.0%	76.0%	100.0%	100
85	34.7%	100.0%	100.0%	110

2008 VBT Preferred wear-off factors

Issue Age	Dur 6	Dur 16	Dur 26	Att. Age
25	0.0%	0.0%	4.0%	50
35	0.0%	0.0%	34.0%	60
45	0.0%	0.0%	34.0%	70
55	0.0%	0.0%	50.0%	80
65	0.0%	0.0%	84.0%	90
75	0.0%	36.0%	100.0%	100
85	34.7%	100.0%	100.0%	110

The 2014 preferred wear-off factors are subject to change as the relative risk tables are further developed.

2014 CSO Considerations and Guidance

2014 CSO considerations

- CSO Tables and Uses
- Purpose of margins
- Comparative of margin structure and level
- Other considerations for CSO table under VM-20

<u>Request:</u> LATF to provide guidance to Valuation Table Team on the level of margins (i.e., company coverage) and guidance on additional considerations.

CSO tables and uses

- Net premium reserves
- Tax reserves
- Nonforfeiture determination
- Basis for 7702/7702A
- Cap for universal life cost of insurance charges

Purposes of the margin

- We believe there are four possible purposes of mortality loads (margins):
  1. Confidence of experience study – mortality should cover the "true" mortality underlying the experience study;
  2. Variation among companies – the margin should be large enough to cover a large proportion of companies;
  3. Random fluctuation – margin should address random fluctuations caused by having a small amount of exposure; and
  4. Unknown variation – this covers catastrophic events (epidemics) and future trends (e.g., possible deterioration in general health conditions). By definition, this cannot be quantified.

Valuation table team's views on margins
1. Confidence of experience study

- The 2014 VBT primary tables are based on 2002-2009 industry experience, which has a large volume of data.

	Exposure		Actual deaths
Study/Table	**By Amount**	**Number**	**Number Claims**
2002-2009 / 2014 CSO	$30.7 trillion	266 million	2.5 million
1990-1995 / 2001 CSO	$5.7 trillion	175 million	~ 1.25 million
Increase	439%	52%	100%

- Given the large volume of experience data, the Valuation Table Team does not propose an explicit margin for confidence.

Valuation table team's views on margins
2. Variation by company

- Historically, the margin has been set so that the resulting A/E ratios when using the loaded mortality as the expected basis, result in an A/E ratio less than 100% for a specified percentage of contributing companies to the study .
- This margin is to cover variation in experience from company to company around the industry mean.
- As a starting point, we analyzed the underlying contributing company experience relative to the mean or aggregate A/E from the 2002-2009 studies.

Valuation table team's views on margins
2. Variation by company, cont'd

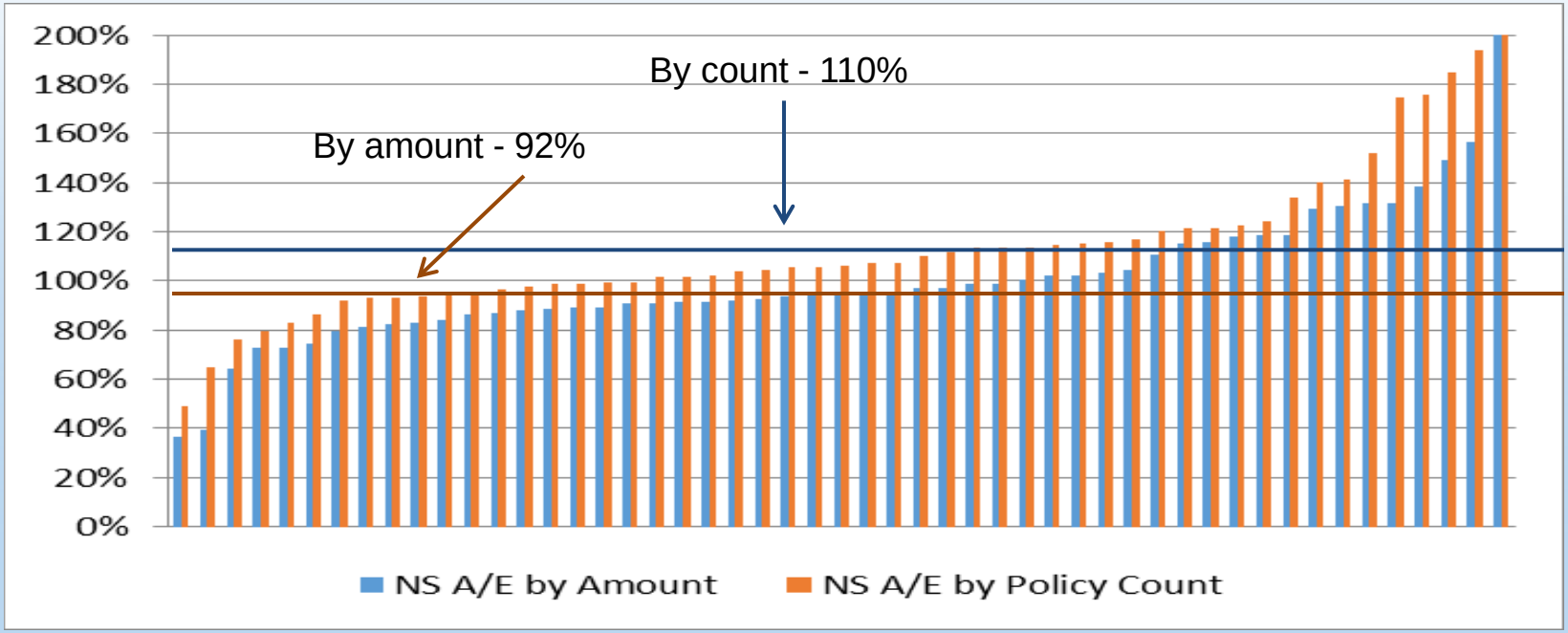
Actual to Expected (A/E) comparison

- Smoker and Non-smoker
  - Companies with less than 100 deaths in total or 35 deaths per year were removed.
  - For non-smoker, one significant outlier (~40σ) was removed.
- A/E by company and by year
  - Expectation basis is 2008 VBT
  - A/E adjusted so overall observation average equals 1.
  - Actual overall A/E is not necessarily 1 based on adjustment due to varying amount of exposure for each observation.

Valuation table team's views on margins
2. *Variation by company, cont'd*

Actual to Expected (A/E) comparison, cont'd

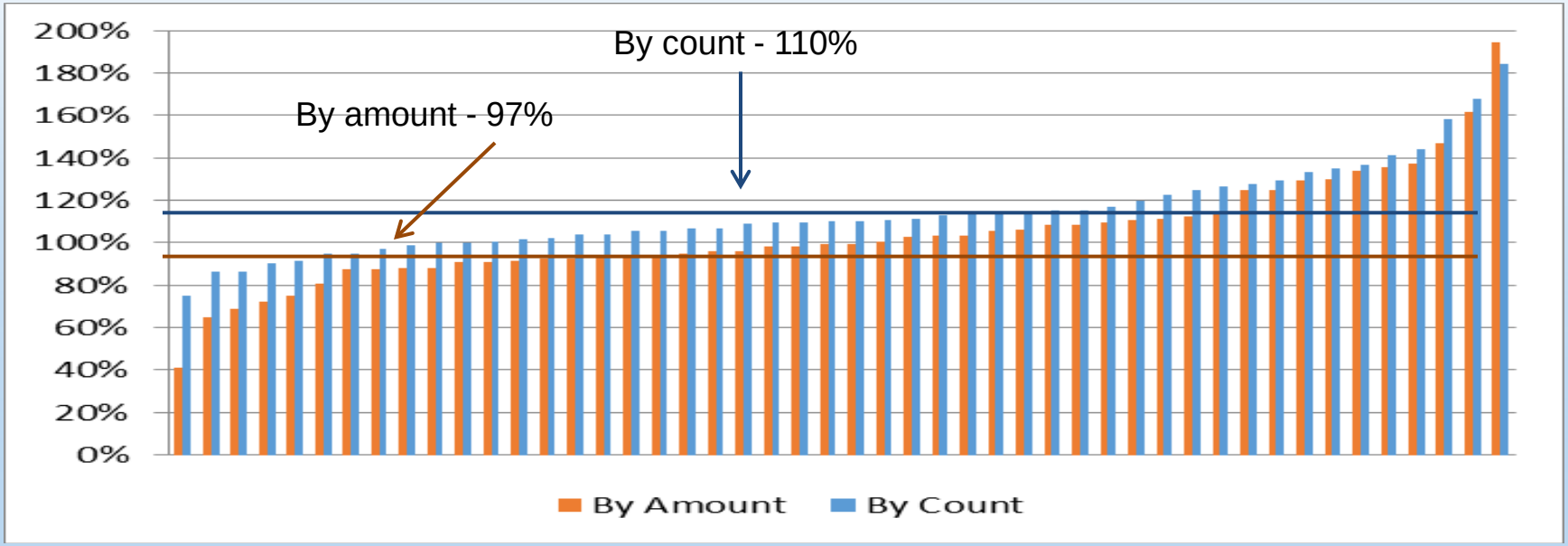
A/E Ratios for contributing companies – non-smoker risks



Valuation table team's views on margins
2. Variation by company, cont'd

Actual to Expected (A/E) comparison, cont'd

A/E Ratios for contributing companies –Smoker risks

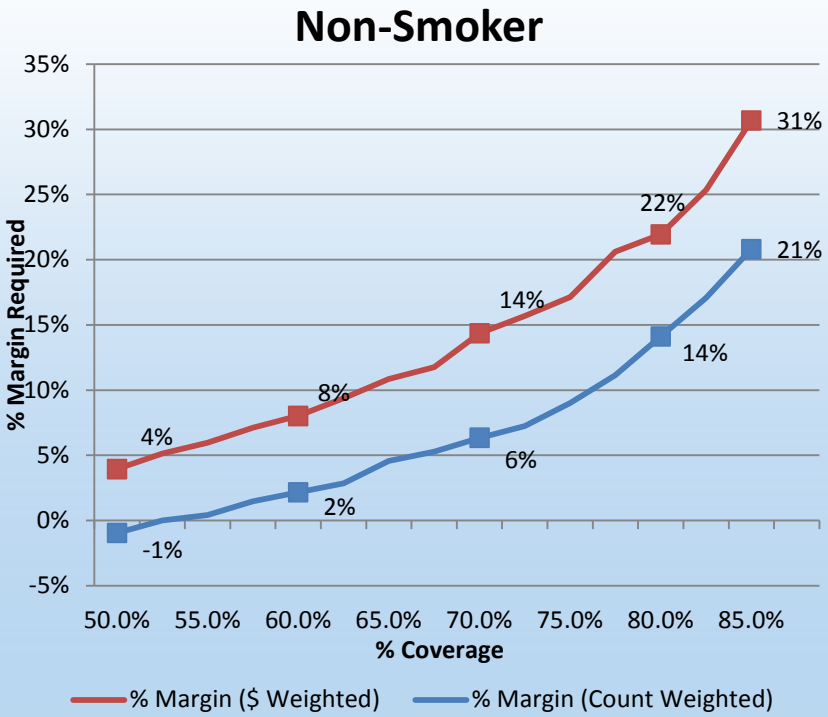


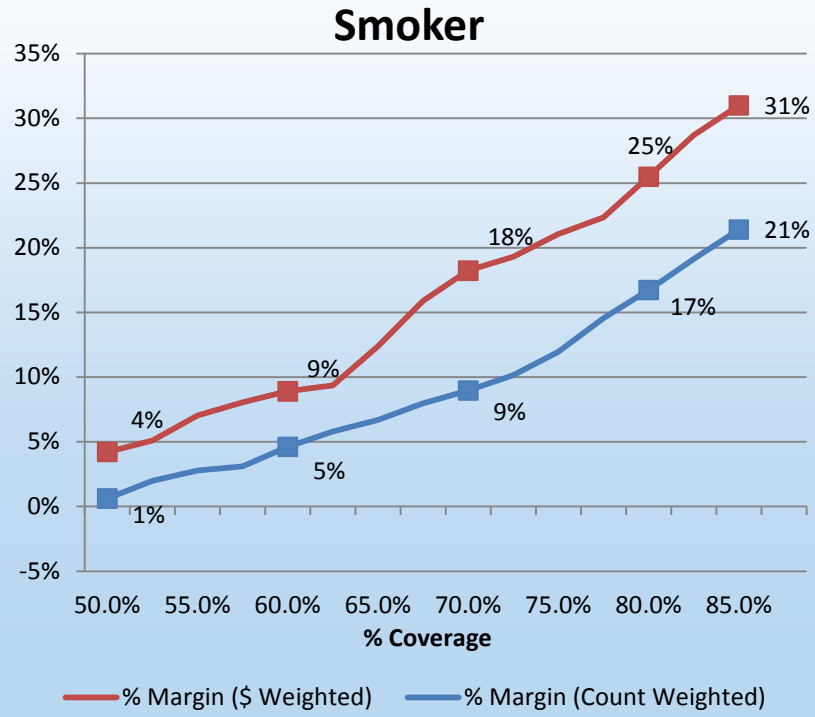
Valuation table team's views on margins

2. *Variation by company, cont'd*

Approximate margin required for a given coverage level

The required margin levels to cover specified percentages of the contributing companies to the 2002-2009 studies are shown in the tables below:





1. Based on A/E using 2008 VBT as a base, adjusted so aggregate A/E = 100%.
2. Percent margin required may change slightly once table is completed.

Valuation table team's views on margins
2. Variation by company, cont'd

- The Valuation Table Team suggests that the margin requirements for the 2014 CSO, in terms of the percentage of company experience covered by the resulting loaded mortality, be no more than, and possibly less than those in place for the 2001 CSO table, which covered between 70%-80% of the contributing companies' experience.

- A final decision on the margin needed in the 2014 CSO to cover company variation cannot be made until analysis has been done on overall reserve impacts from VM-20.

Valuation table team's views on margins
3. Random fluctuations

- Random fluctuations are more likely to be material for small blocks of business.
- It is not practical to have valuation mortality tables with loadings that vary by the size of the block of business.
- RBC factors for mortality are larger for smaller volumes.
- For these reasons, when the 2001 CSO was developed, that table was considered appropriate for capital and surplus to cover random fluctuation
- Since the same arguments apply today, we propose having no margin for random fluctuation in the 2014 CSO tables.

Valuation table team's views on margins
4. Unknown variation

- The Valuation Table Team (VTT) believes that it is appropriate for catastrophic events be covered by surplus, not reserves.
- This leaves unknown trends and other unknowns to be covered
  - Note that the absence of future mortality improvement in the VBT can be considered a margin vs. anticipated experience.
  - PBR methodology will reflect changes in experience as they become known.
  - For these reasons, we also do not believe that the 2014 CSO needs an explicit margin to cover unknown trends or other unknowns.

CSO margin comparisons

CSO TableA	Underlying Experience	% of Companies Covered by Margin	Structure of Margin	# Risk Classes NS/SM	Uses***
80 CSO*	1970-1975	Over 50%	$\frac{0.35 - 0.00025x + 0.000009x^2}{e_x}$	1 NS/1 SM	S, T, N, B, C
2001 CSO**	1990-1995	70% - 79%	$\frac{0.0056 - 0.00016(x+t) + 0.00008(x+t)^2}{e_{[x]+t}}$	1 NS/1 SM	S, T, N, B, C
2001 CSO Preferred Structure	1990-1995	Same as 2001 CSO	Same as 2001 CSO	3 NS/ 2 SM	S, T, N, B, C
2014 CSO	2002 - 2009	TBD	Similar structure, different parameters is proposed as a start	3 NS/ 2 SM + S/NS/Agg	TBD

* Margins were calculated for the unismoker ultimate rates and then used for both SM & NS ultimate rates.

** The formula margin for attained age 100 was graded to 0 at attained age 120.

*** S=SAP Reserves, T= Tax Reserves, N=Nonforfeiture, B=7702/7702A, C=UL COI Rate Caps

CSO table structures and margin variation

CSO Table	NS/SM/ Composite (?)	Gender	Select Period	# Tables*	Aggregate = wtd Disaggregate?
80 CSO	Yes	M/F	0, 10 or 19 years	6	Yes
2001 CSO	Yes	M/F	25 Years	6	No**
2001 CSO Preferred Structure	3 NS/2 SM Composite	M/F	25 Years	10***	No**
2014 CSO	3 NS/2 SM Composite	M/F	25 Years – Male 20 Years – Female	10***	No**

* For a given issue age basis and select period and not including unisex tables.

** Yes for the VBT, but not for the CSO because loads are not linear and are calculated separately for each risk class.

***In addition to the six (6) M/F, SM/NS/Unismoker 2001 CSO tables.

Other considerations for margins for the 2014 CSO tables

Unlocked/reset.

- Can margins for the CSO tables be lower in a PBR environment since mortality assumptions for the Deterministic and Stochastic reserves will be reviewed and revised to reflect emerging experience?

Volume of data.

- More companies contributed to underlying study and the volume of the experience was much greater than the 1990-1995 experience underlying the 2001 VBT/CSO. Do we need the same level of margin today as historical levels?

Implicit margin.

- The lack of a future mortality improvement assumption in the reserves is, in and of itself, an implicit margin.

Other considerations for margins for the 2014 CSO tables

Minimum reserve floor.

- Net premium reserves, as defined by VM-20, are minimum reserves. As such:
  - They need to be calculated and evaluated for reasonableness over a wide range of products and in conjunction with plausible deterministic and stochastic reserves before finalizing margins for the 2014 CSO;
  - The reserve strain at issue should not be unreasonable;
  - The progression of reserves should be smooth; and
  - Reserves calculated using the CSO tables should not be less than reserves calculated using the unloaded VBT.
- The cash surrender value also is a minimum floor on the reserves.
- Since there is a minimum reserve floor, does the margin load need to be as high under PBR due to the existence of the deterministic and stochastic reserves for policies not meeting the exclusion tests?

PBR Margin Development

2014 PBR margins

- Margins currently within VM-20 to be used in developing the Prudent Estimate Mortality Assumption need to be revised.
  - Developed to support the underlying data within the 2008 VBT.
  - Margin at 0% credibility equivalent to margin for CSO table (i.e., 70%-80% coverage of contributing company experience).
- With more contributing companies and a new underlying table, the margins need to be revisited.

2014 PBR margins

- Believe the methodology to determine those margins is sound.
- Based on approach discussed in abstract, "A Credibility Approach to Mortality Risk" by Mary Hardy and Harry Panjer*
  - Utilizes the Bühlmann-Straub credibility method.
- Developing these margins will take considerable time and resource.
- Margins not necessary if move to aggregate margin approach.

* Source: ASTIN BULLETIN, Vol. 28, No. 2, 1998, pp. 269-283

2014 PBR margins

- Steps and resources needed:
  - Determine company by company credibility under
    (a) Limited Fluctuation method; and
    (b) Bühlmann-Straub method.
  - Develop margin table for VM-20.
  - Analyze loading company by company to ensure reasonable relationship to unloaded mortality and 2014 CSO mortality.
  - Examine mortality consistency requirements for 0% credibility.
  - Produce written report.
  - NAIC and industry presentations.
  - Additional time and resources for amending VM-20, revising practice notes and Q&A documents, if applicable, and testing change in deterministic reserves.

Underlying experience - Adjustments to data

- Resource requirements:

	Estimated Hours	
Margin development	**SOA Staff**	**AAA/SOA Volunteers**
PBR Margins	375	420
2014 CSO	290	1,160
Total Hours	665	1,580

- Significant effort involved in development of both the CSO and PBR margins.
- Pursuing work on PBR margins unnecessarily will be a drain on research resources, both SOA staff and volunteers As a result, SOA Research staff and volunteers may not be available for other projects (e.g., policyholder behavior study).

2014 PBR margins- Questions for LATF

1. How advanced is the thinking around the aggregate margin approach?
2. Given that individual margins for mortality will not be necessary if the aggregate margin approach is pursued *and* given the limited research resources available, should the Individual Life Experience Committee pursue development of PBR margins?