SOCIETY OF ACTUARIES

2015 Universal Life with Secondary Guarantees Survey

Survey of Assumptions for Policyholder Behavior in the Tail

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Survey of Assumptions for Policyholder Behavior in the Tail

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With contributions from the Policyholder in the Tail Working Group

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Survey Highlights

In 2015, the Policyholder Behavior in the Tail (PBITT) Working Group distributed its annual survey to insurers and asked for information on assumptions used in their modeling of Universal Life with Secondary Guarantees. The goal of the survey was to gain further insight into the ranges of companies' assumptions in the tail of a stochastic risk based capital calculation.

There were a total of 20 respondents in 2015. While the identities of the responding companies for a particular response remain anonymous to the Policyholder Behavior in the Tail (PBITT) committee, companies were given a chance to identify themselves as a participating company. The committee would like to thank these and all anonymous companies for their contribution.

Allstate

John Hancock

Kansas City Life Insurance Company

Legal & General America

Liberty Mutual

Lincoln Financial Group

MetLife

Mutual of Omaha

New York Life Insurance Company

Principal Financial Group

Protective Life

Prudential Insurance Company of America

RiverSource Life Insurance Company

Transamerica Life Companies

Voya Financial

Western & Southern Financial Group

Overview

- The latest survey reflects a different response group from those in the prior survey. Some of the changes described below reflect different respondents, not necessarily a change by any given company. Staff in the SOA research department was able to confirm that 11 of these companies were the same as in the prior year.

- Most companies continue to view the investment returns in tail scenarios (cited by 88% of respondents) and lapse assumptions (82%) to be their most critical risk assumptions when analyzing policyholder behavior in the tail for secondary guarantees (Figure 42).

Tail Scenarios

- Overall, 47% of companies use stochastic scenarios to set or analyze capital levels. It is less common for companies with a small block of business to use stochastic scenarios. Of the companies that do use stochastic scenarios, only 11% reported projecting 100 or fewer scenarios while 56% project 1,000 or more (Figure 4).

- All companies project for at least 51 years and nearly half (44%) project over 75 years (Figure 5).

- The scenarios used are summarized in Figure 6 through Figure 17.

Lapse Assumptions

- Lapse rates in the tail continue to vary widely amongst insurers. Assumed lapse rates do not show substantial variation by issue age for most individual insurers, but are lower for the highest issue ages (60-69 and 70+). Only select age groups are shown in Figure 19 and Figure 21.

- Median lapse rates for 2015 are similar to those in past surveys (Figure 20 and Figure 22).

- The percentage of companies that reported using dynamic lapse assumptions is similar to prior years. Dynamic lapses were used by 47% of companies this year (Figure 18).

- Of those that specifically use dynamic lapse assumptions, over three-fourths (7 of 9) state that they set lapses to zero if the guarantee is in-the-money and no further premium is required. This is a slightly higher proportion than shown in prior surveys.

- Companies were asked how many policies on a block of business that experienced the tail scenario would be kept in force by the secondary guarantee. After 31 years, the average response was 54% of policies and median response was 48% of policies.

- The 2015 survey saw a smaller percentage of companies that measure lapses by distribution system (14%; 2 of 14). However, both of those companies vary their lapse assumptions by distribution system which is a similar rate to prior years.

- Just over half (10 of 18) of companies vary lapse assumptions by premium. This is in line with recent surveys (Figure 25). Several responses mentioned higher lapse rates for level premium patterns and/or lower lapse rates for single premiums.

- Company experience was cited by 100% of companies as the sources of base lapse assumptions. "Industry Study" and "Actuarial Best Estimate" were commonly cited but have been declining over time. Consultant advice had a response rate of 22%, similar to past years (Figure 26).

- This year's survey saw a wider range of responses to the number of years of experience companies use in their lapse studies. The most common response is still "5-7 years" (Figure 28).

- Actuarial best estimate continues to be the most common source of dynamic assumption at 78%, although that is down from 100% in 2014. More reported using industry studies and consultant advice while fewer reported using company experience as compared to prior surveys (Figure 30).

Mortality Assumptions

- There was a significant shift in the reference table used for mortality in 2014 and it continued in 2015. In 2015, 72% of companies cited 2008 VBT as their reference table, up from 17% in 2013's survey. On the other hand, only 11% cited 2001 VBT as compared to 48% in 2013 (Figure 31).

- Median mortality rates are comparable although slightly lower than the 2008 VBT. However, companies showed a wide range of assumptions, especially after age 100 (Figure 32 through Figure 37).

- Future mortality improvement is modeled by 72% of responding companies, a similar rate as in the last three years. Improvements vary by a variety of factors including gender, smoking status, age and policy duration (Figure 41).

Acknowledgements

Background

In 2015, the Policyholder Behavior in the Tail (PBITT) Working Group distributed a survey to insurers and asked for information on assumptions used in their modeling of Universal Life with Secondary Guarantees. The goal of the survey was to gain insight into companies' assumptions in the tail of a stochastic capital calculation. This survey had 20 usable responses, down from 21 in 2014, 25 in 2013, 26 in 2012, and 32 in 2011. However, the volume of business represented in this year's survey was significantly higher because a higher proportion of the respondents had large blocks of UL with secondary guarantee business. Not every company answered every question. To assess the credibility of results, most charts indicate how many companies responded to the question.

It is the intention of the PBITT Working Group to continue to conduct this survey. It is our hope that with the publication of these and future survey results, we will increase the awareness of expected industry experience for all companies to consider when setting assumptions or when extrapolating to the tail. Others may wish to consider the relative financial impact of the various assumptions shown. Individual companies may also want to use the results to help design stress tests and experience studies.

While the exact relationships of new versus prior respondents vary by individual question, at the level of the total survey we were able to confirm 11 respondents from both 2014 and 2015 out of 21 total responses in 2014. Therefore, some of the changes described below reflect different respondents, not necessarily a change by any given company. Figure 2 shows the change in the distribution by size over the last four surveys.

Parameters of Stochastic Capital Calculation

Insurers were asked in Question 2 of the survey to indicate whether or not they analyze capital levels for UL with Secondary Guarantees using stochastic scenarios, as well as how many scenarios are used and the length of the projection. Figure 1 shows that 47% of insurers used stochastic scenarios to set or analyze capital levels, continuing a generally upward trend in affirmative responses. Figure 3 looks at stochastic scenario use by company size. Of those reporting company size and stochastic scenario usage, the smaller companies typically do not use stochastic modeling to set capital levels, and the largest companies were evenly split between those that do and those that do not.

Fifty-six percent (5 of 9) of the 2015 respondents using stochastic scenarios indicated that they use 1,000 or more scenarios as shown in Figure 4. There was a sharp drop in the number of companies using "100 or fewer" which could reflect a trend or a different set of respondents, in particular companies with larger blocks who may have the resources to run more scenarios. Figure 5 shows the distribution of number of years modeled. This year no company reported modeling fewer than 51 years.
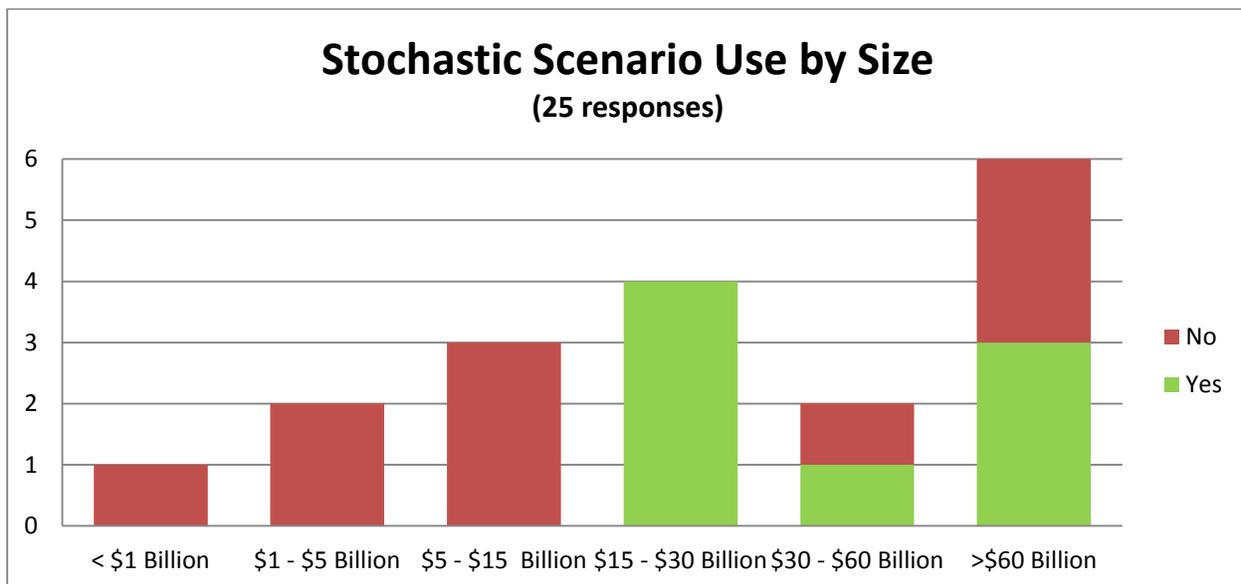

Figure 1

Number of Companies by Total Face Amount of Universal Life Policies with Secondary Guarantees

Figure 2

Stochastic Scenario Use by Size
(25 responses)

Figure 3

How many scenarios are used?

Figure 4

How many years are projected?
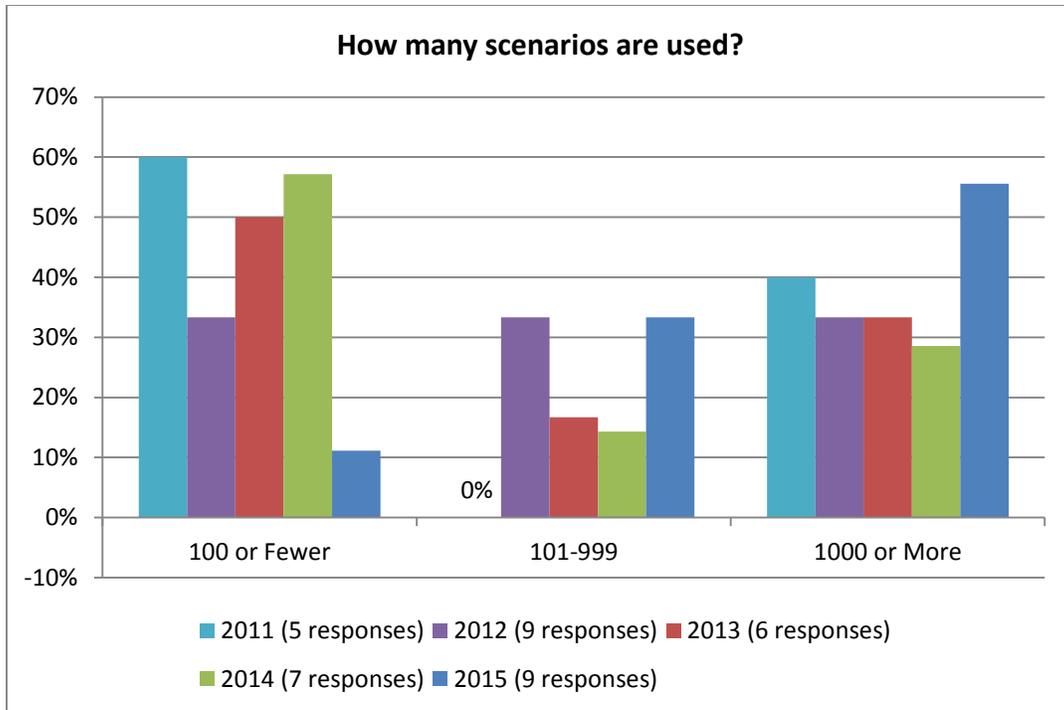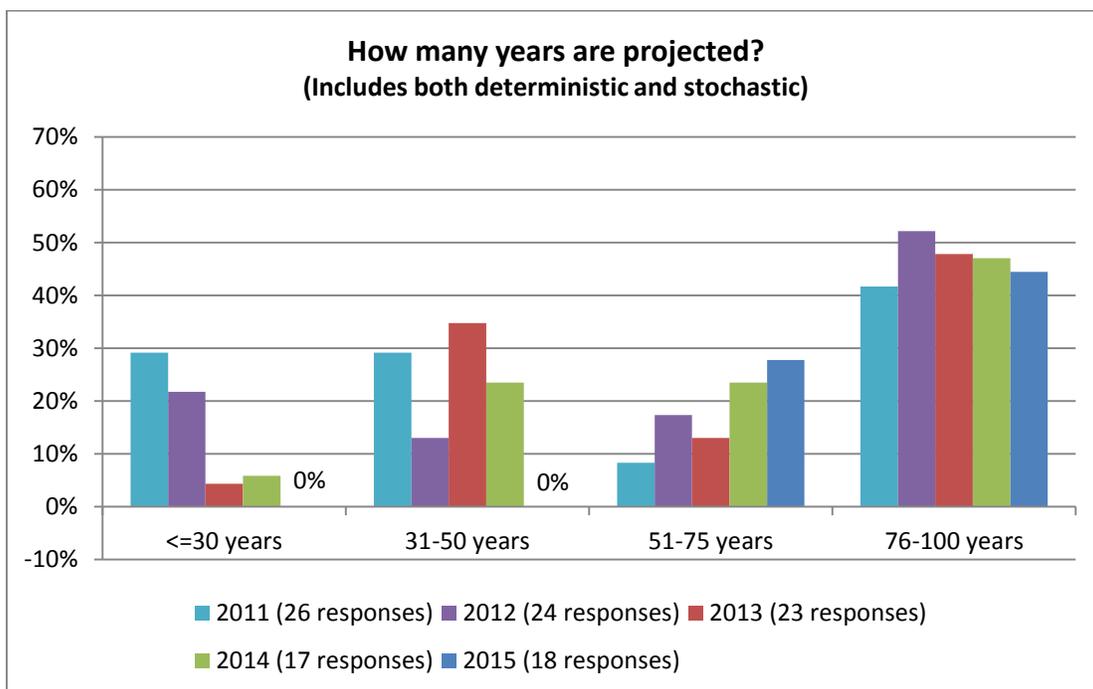**(Includes both deterministic and stochastic)**
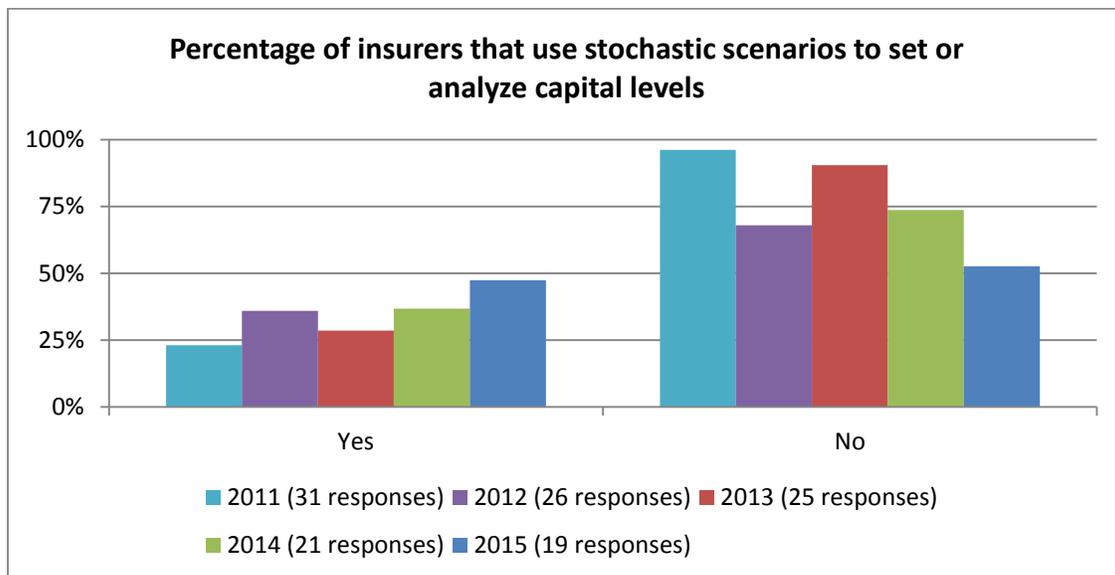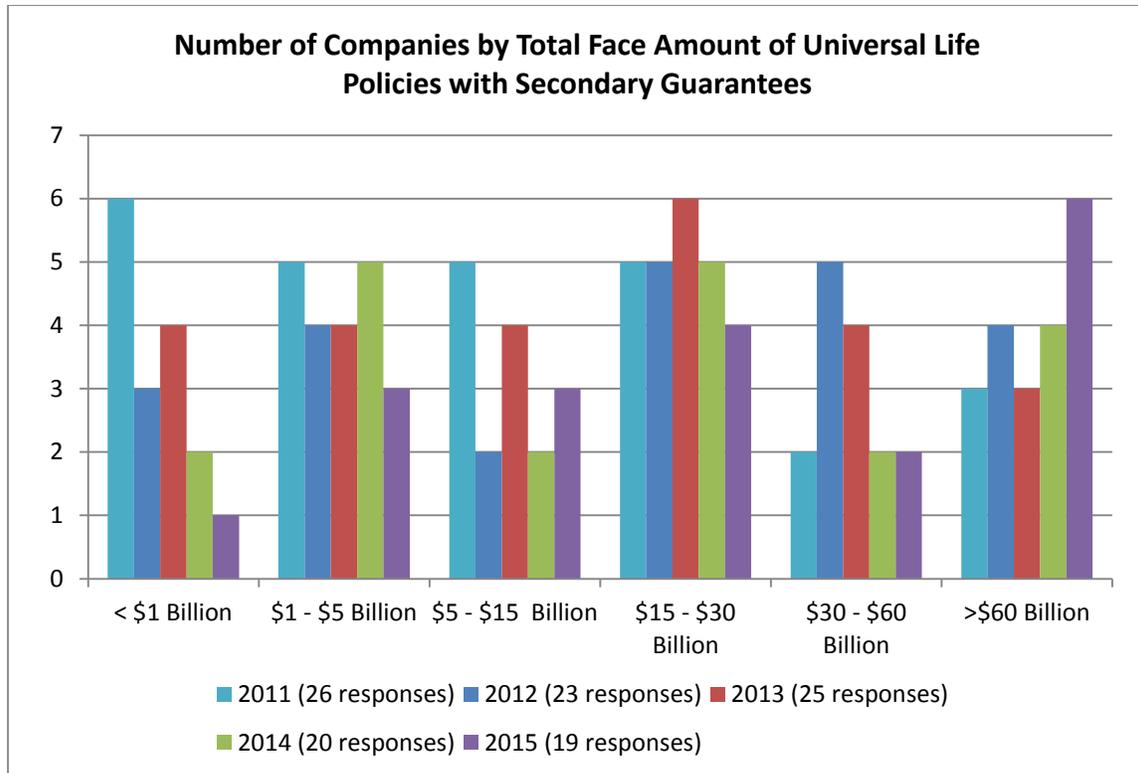
Figure 5

Tail Scenario

The tail scenario is defined as the scenario which gives the largest present value of the death benefits paid in all years where no COI is collected. (This differs from the tail scenario definition used in the committee's VA survey.) Insurers were asked to list 1 year, 7 year, and 30 year interest rates in the tail scenario (whether a stochastic scenario or a deterministic scenario depending on the respondent's methodology). Responses varied widely across insurers regarding the description of the tail scenario. The charts on the following pages show each insurer's tail scenario for the three maturities, separated between those that report using a stochastic methodology and those that report not using a stochastic methodology, which we then label "deterministic" methodology. Sometimes a company reports the use of stochastic methodology, yet provides a tail interest rate path that appeared deterministic. While the reasons are not known, one possibility is that their deterministic method is informed by earlier stochastic modeling which is the basis of their chosen scenario.

Of the nine companies that reported using stochastic modeling, seven provided requested interest rate scenarios and six provided rates across the entire yield curve. Five of the ten companies that do not use stochastic modeling to analyze capital also provided their deterministic interest rate scenarios including four that provided the entire yield curve.

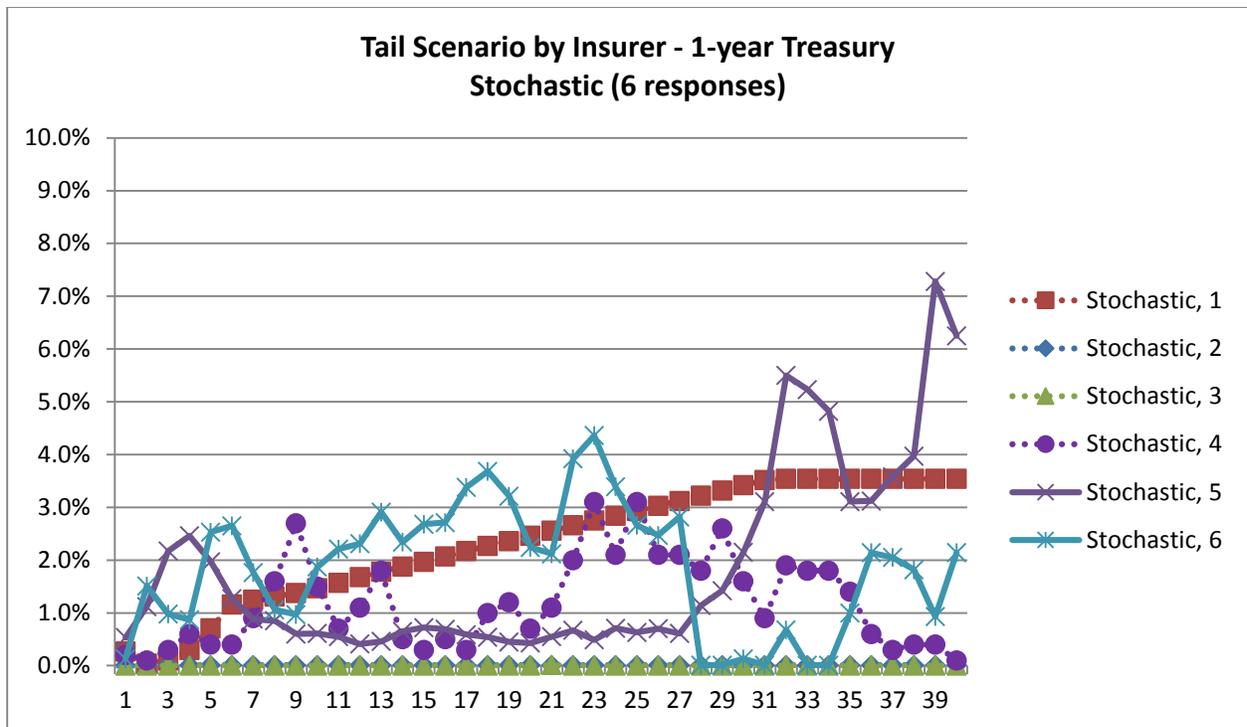The companies are comparable across the figures (i.e., Stochastic, 2 in Figure 6 is the same company as Stochastic, 2 in Figure 8 and Figure 10.)
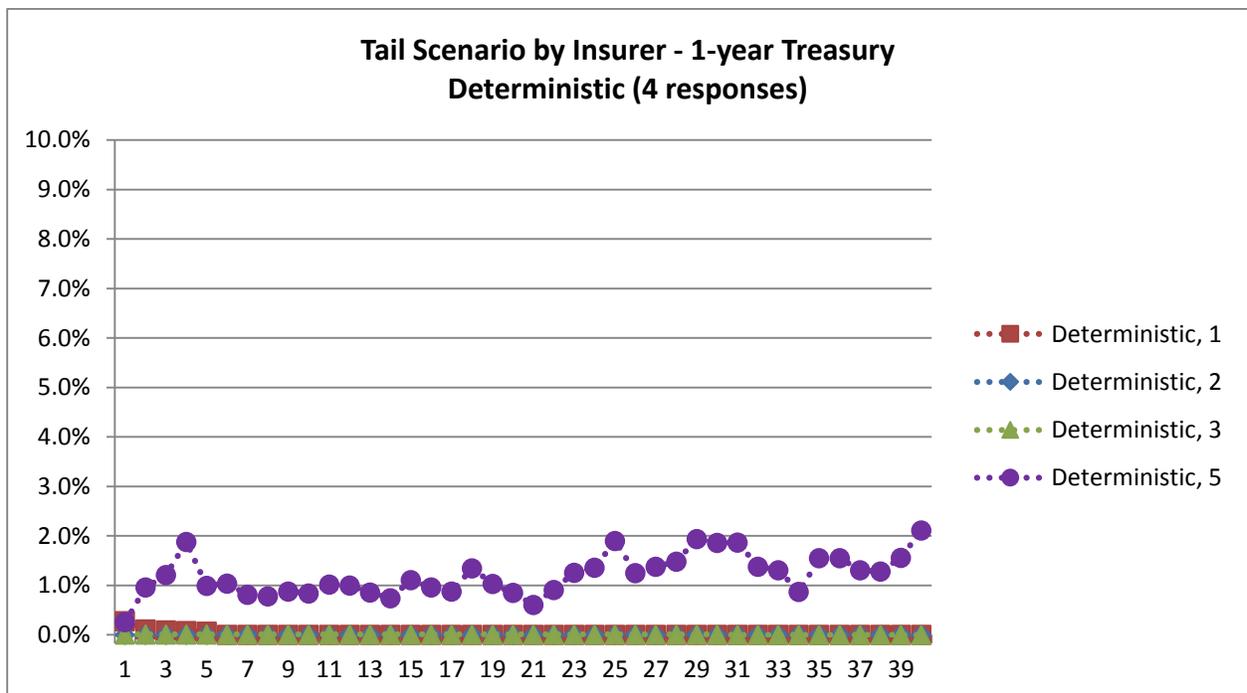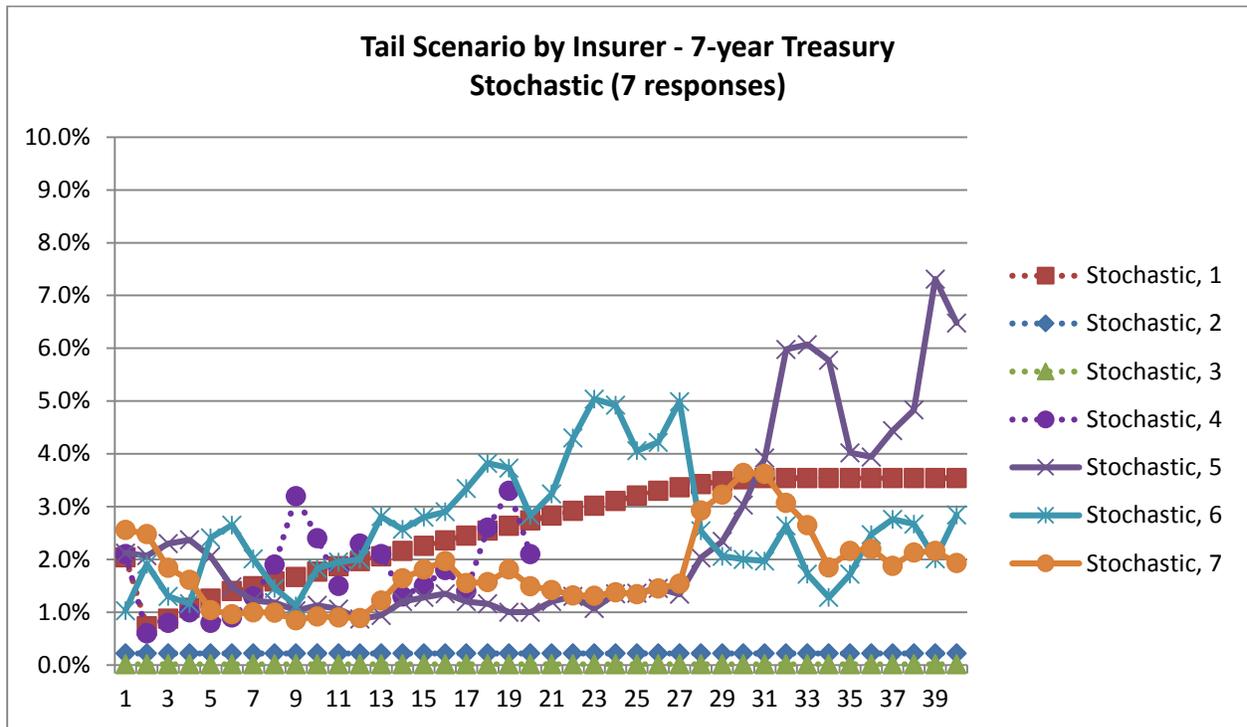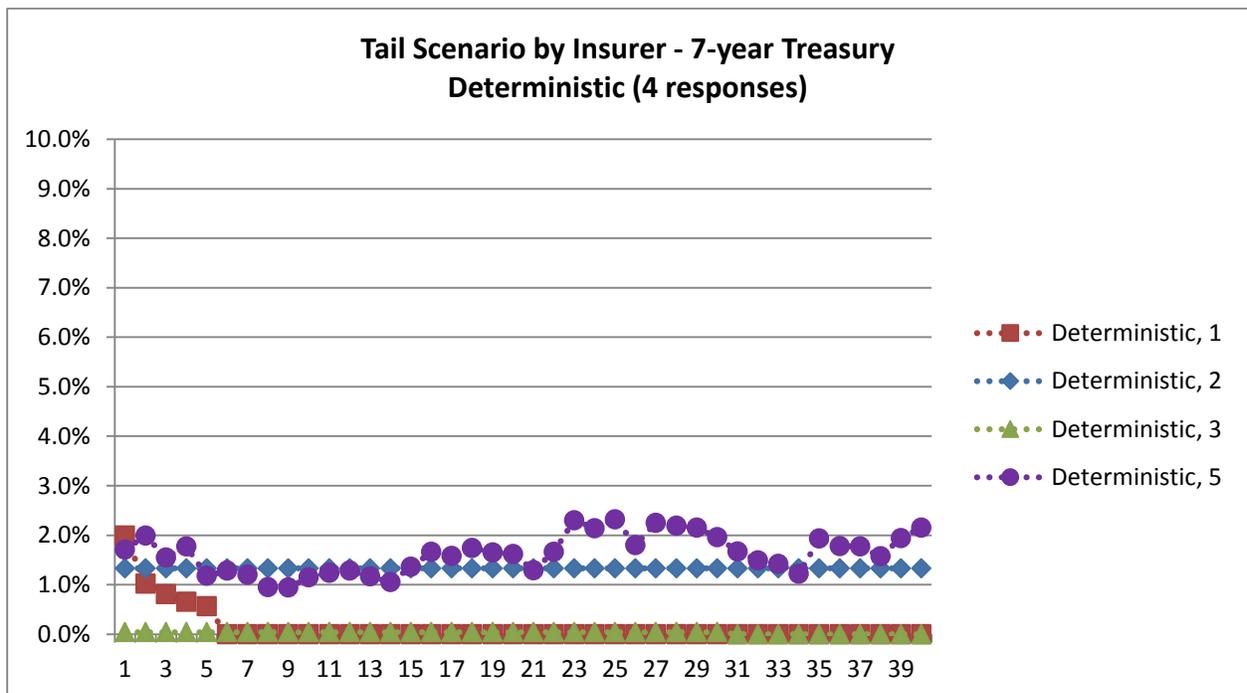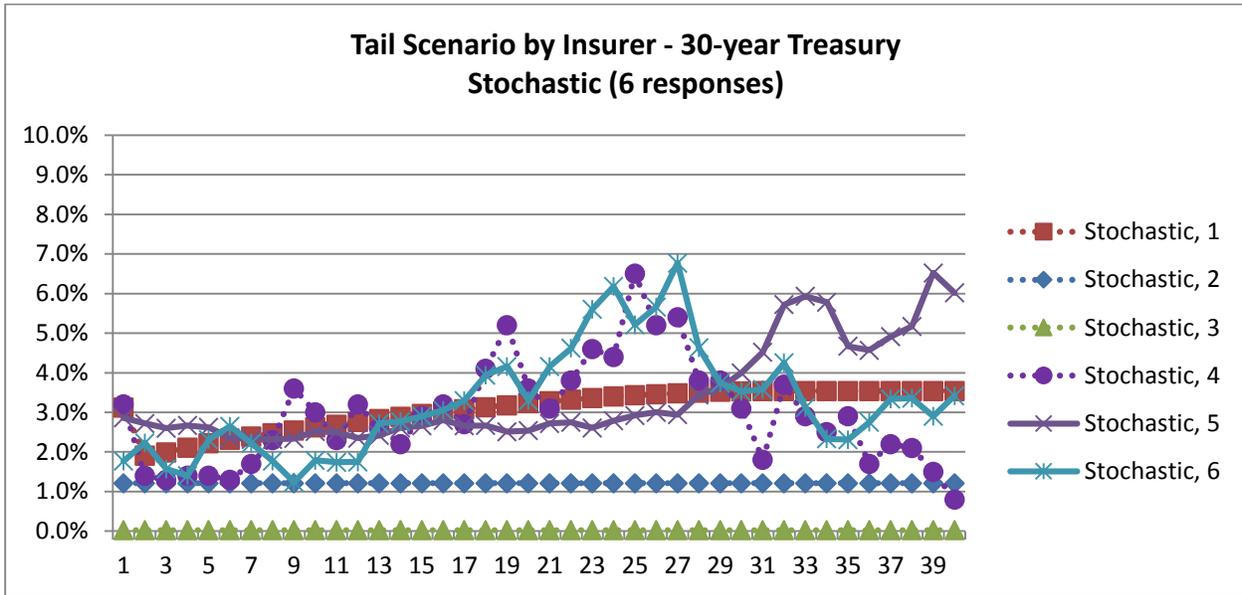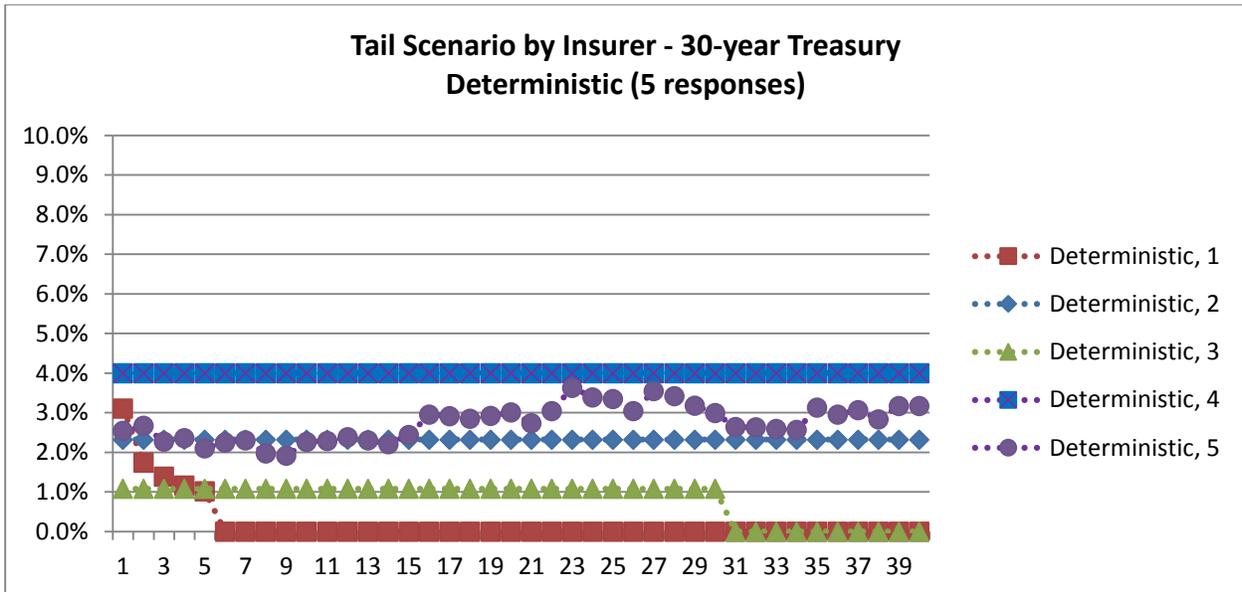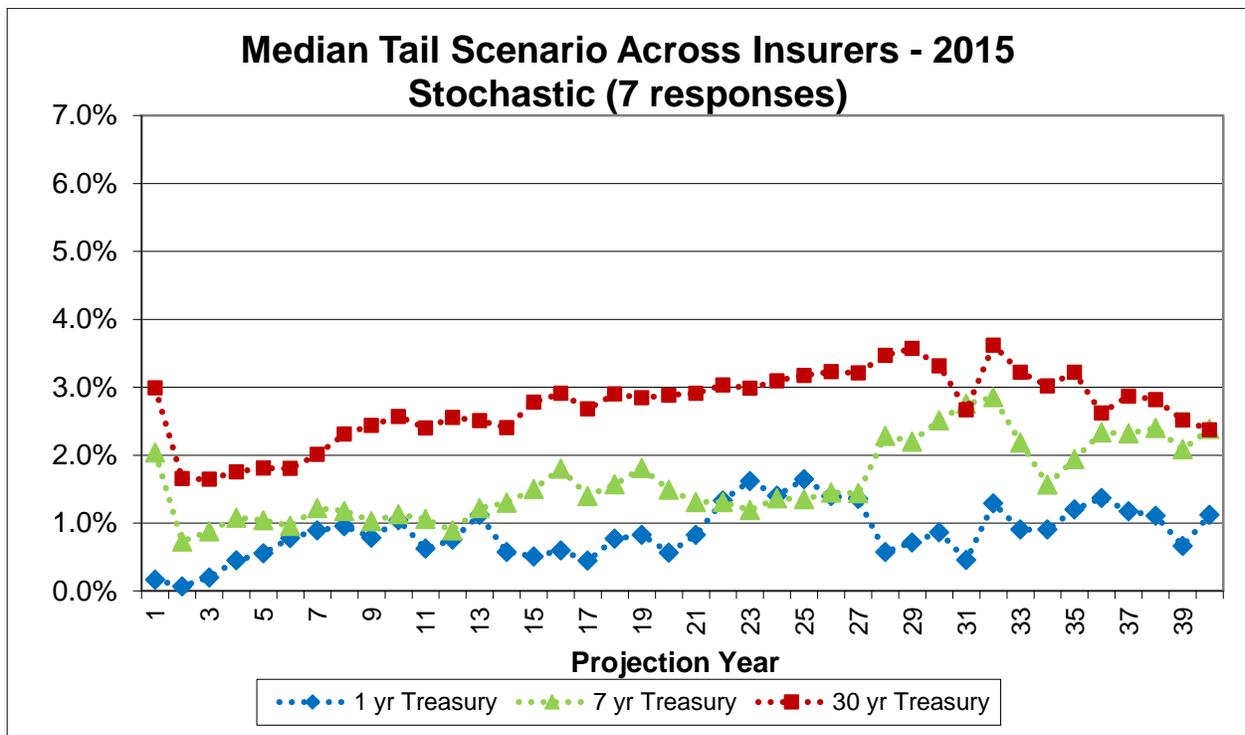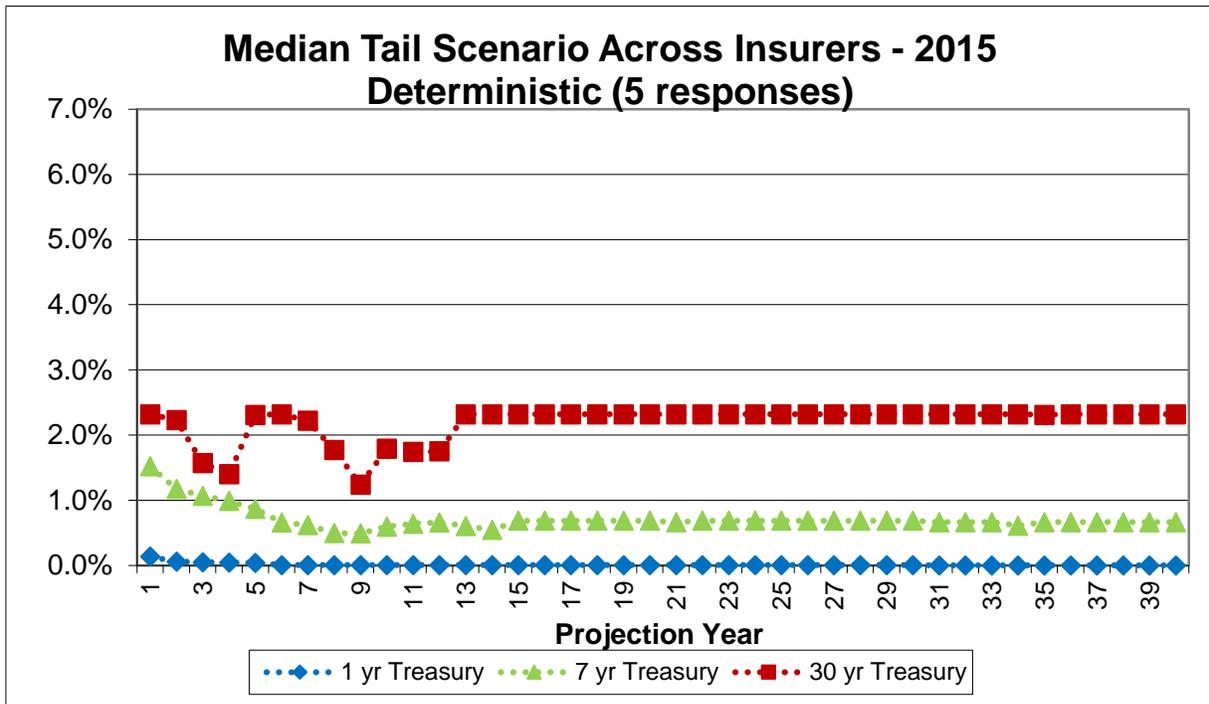
Figure 6

Figure 7

Figure 8

Figure 9

Figure 10

Figure 11

The following graphs of tail scenarios show the median reported value across insurers for each of three maturities (1, 7 and 30 Year Treasuries). The first pair of graphs separate stochastic from deterministic for 2015, followed by their combination. Thereafter, combinations are shown for each projected year from recent survey results. Overall, there is a trend toward lower median tail scenarios.

It should be noted that these lines do not represent any one single company's response, but rather the median of the rates across all companies' responses at each projection year duration.
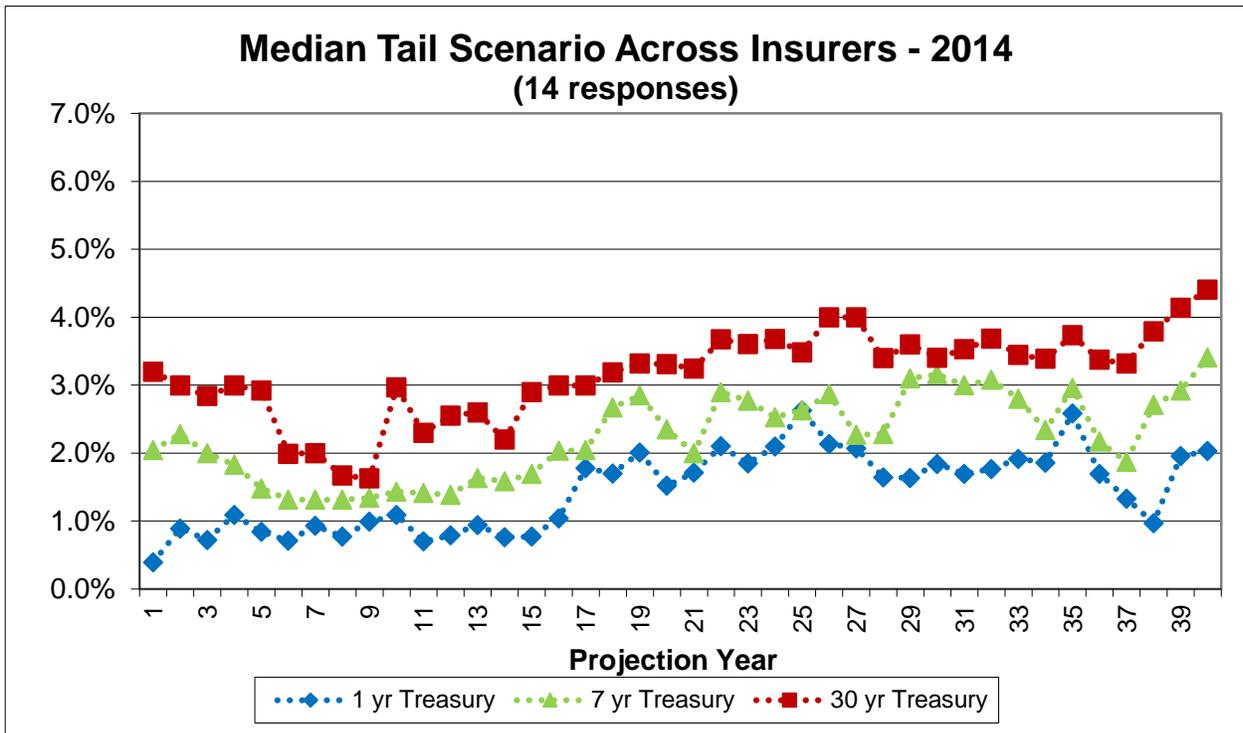
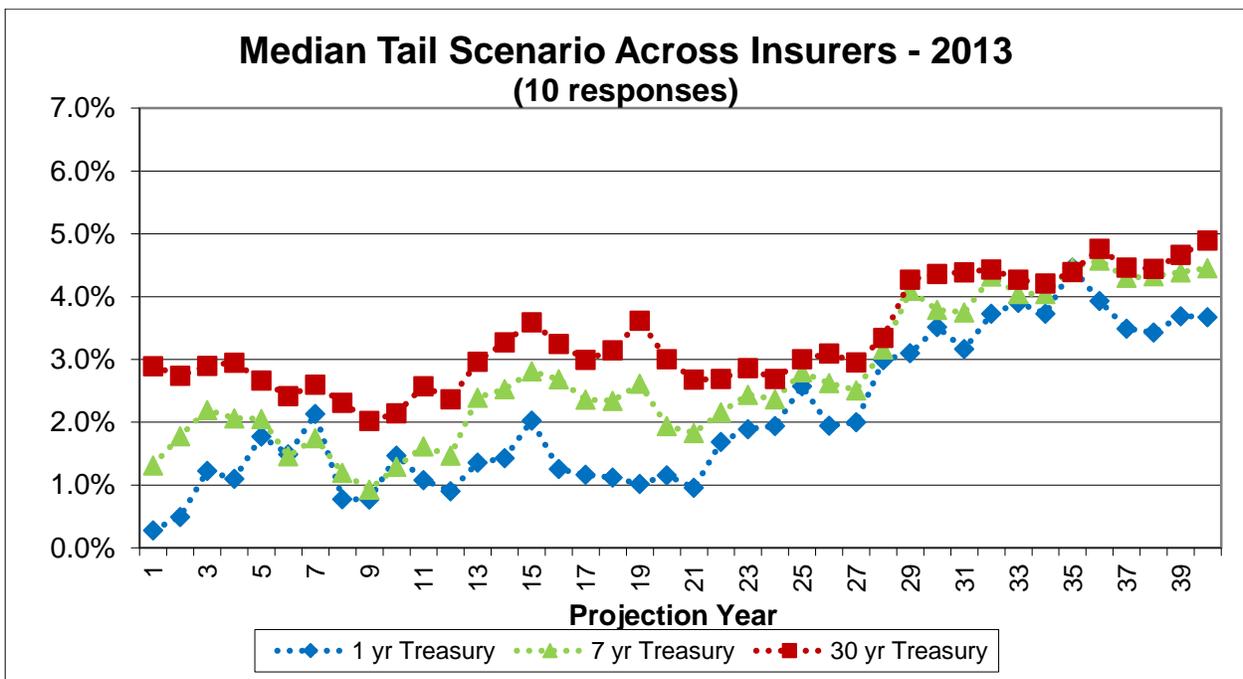

Figure 12

Figure 13
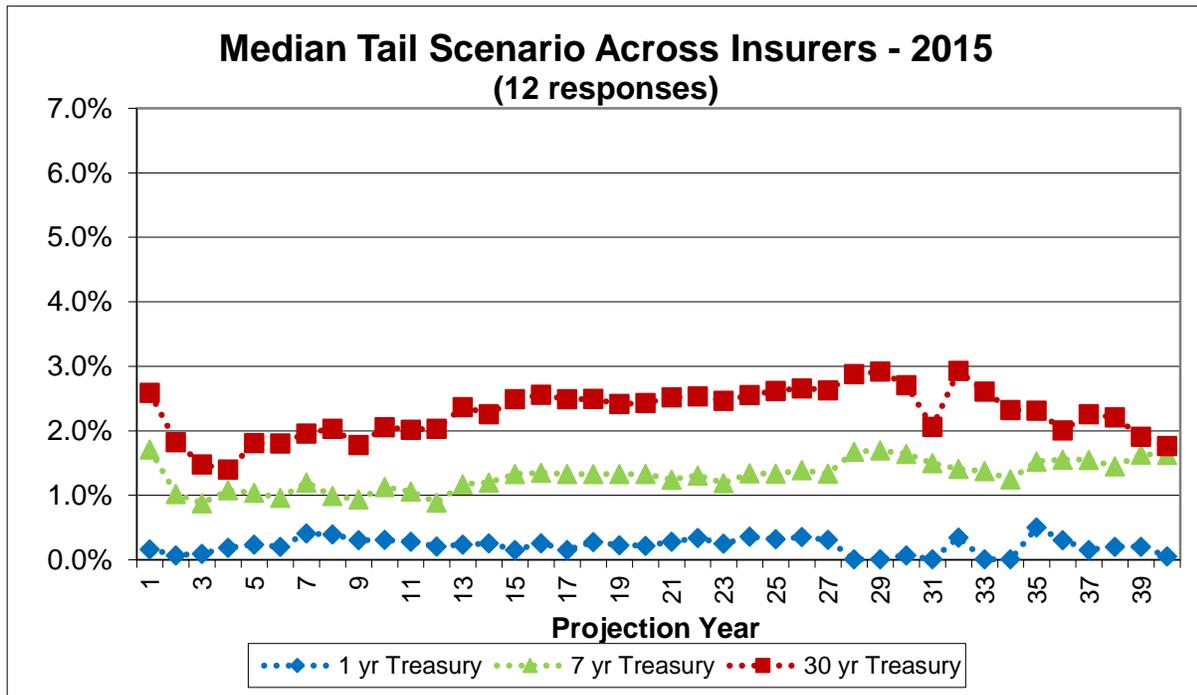
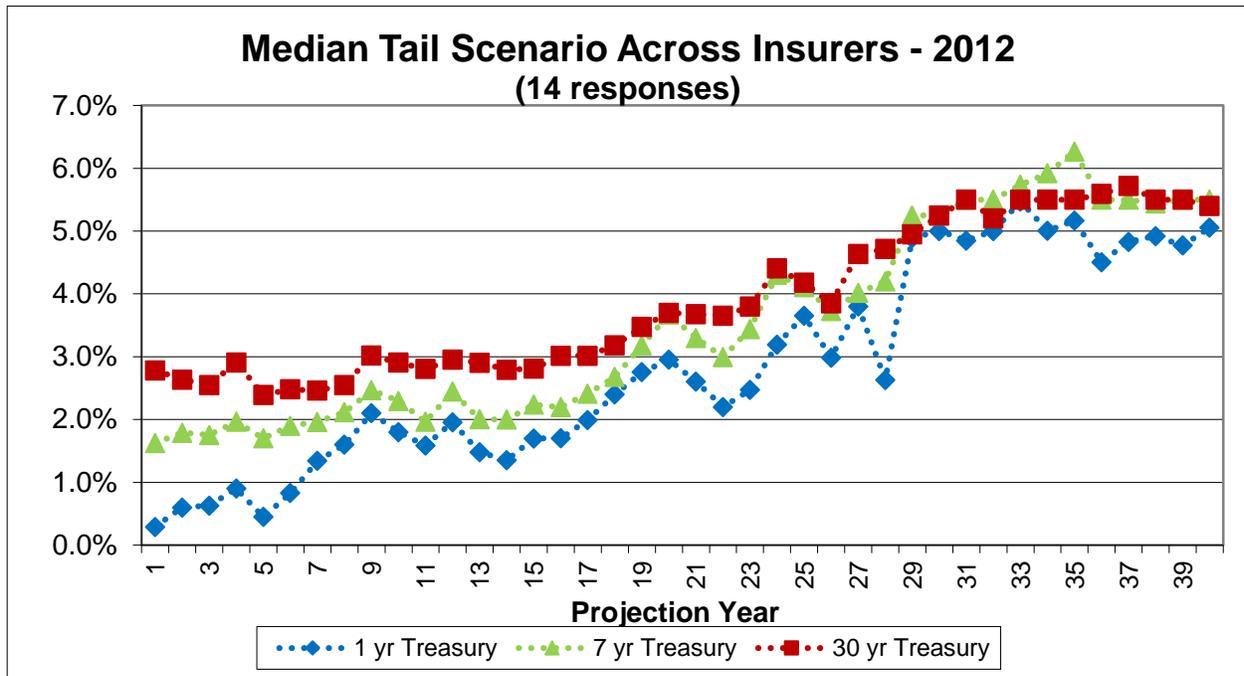Figure 14

Figure 15

Figure 16

Figure 17

Lapse Assumptions

Question 3 asked about lapse assumptions. The following chart shows the percentage of insurers who use dynamic lapse functions for policies with secondary guarantees. The number of insurers using dynamic lapse functions was slightly higher this year (47% of responses; 9 of 19) but similar to the prior four years. Of those that do use dynamic lapse functions, 78% (7 of 9) specifically said they set the lapse rate to 0% for years where the guarantee is in-the-money and there is no additional premium required. This is up from 63% and 64% in the last two surveys. Another factor cited in the dynamic lapse function is the relationship of the current account credited rate to the competitor rate.

Do you use dynamic lapses when modeling Universal Life with secondary guarantees?
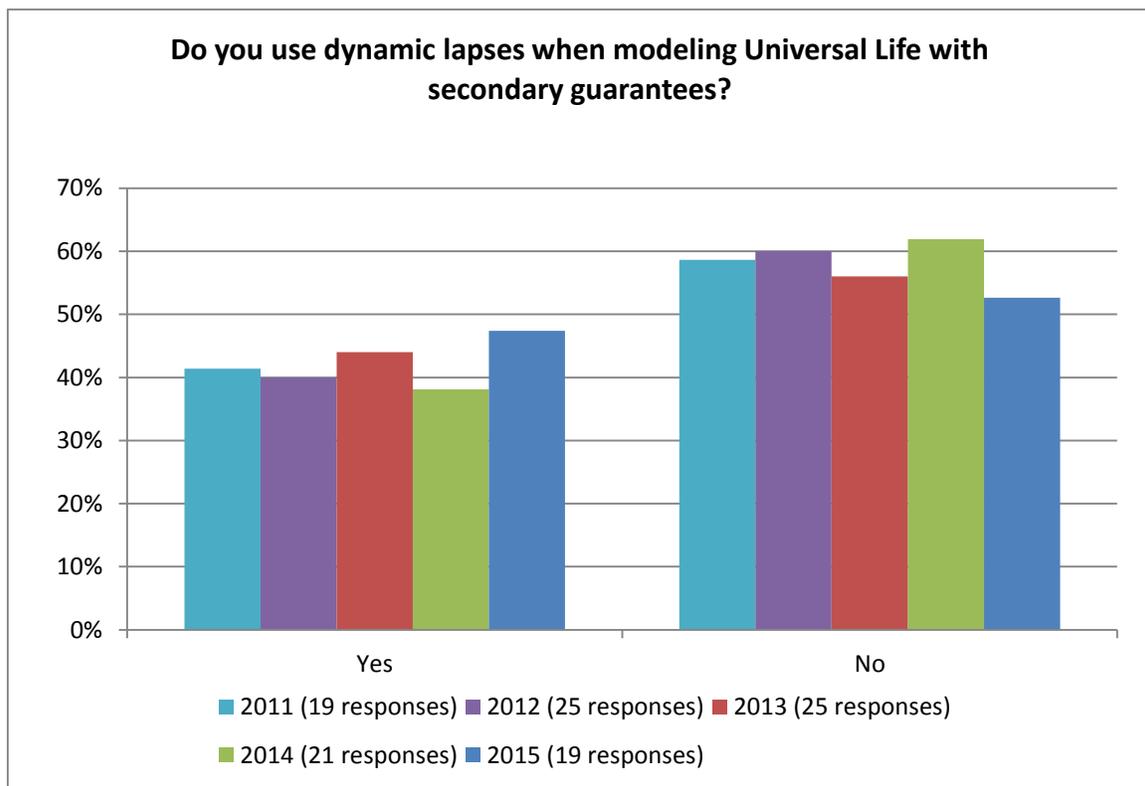

Figure 18

A follow-up question in the 2014 and 2015 surveys asked those companies that had dynamic lapses whether lapses could be greater than zero if a secondary guarantee renders a policy to be paid-up. In 2015, five of nine responders (56%) indicated that it could, which is similar to the

proportion in 2014 (43%; 3 of 7). Additional commentary indicated that this was generally only possible if the secondary guarantee was in effect and the policy still had a cash surrender value greater than zero.

In Question 4, companies were asked to list their lapse assumption in the tail scenario by duration and by various issue ages. The charts below show the highest, median, and lowest lapse rates used across duration. The graphs show the responses for issue ages 40-49 and 70-79. The 2015 median responses are in line with those from the past two years. The responses for other issue ages were very similar to those for age 40-49.
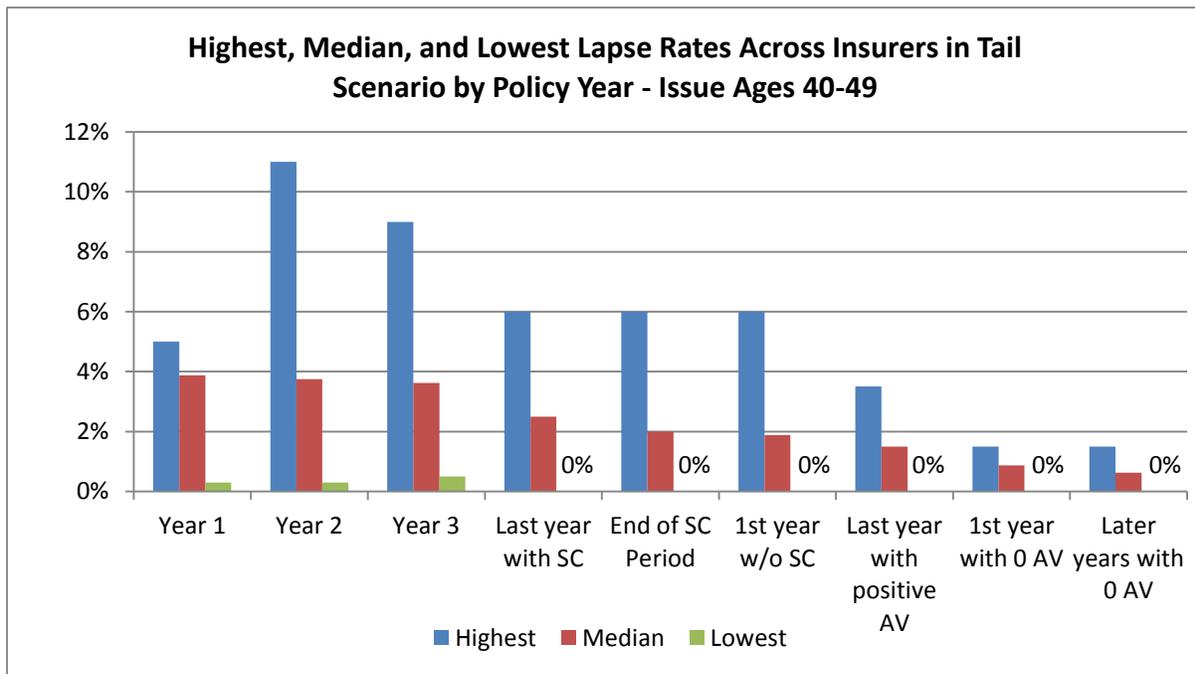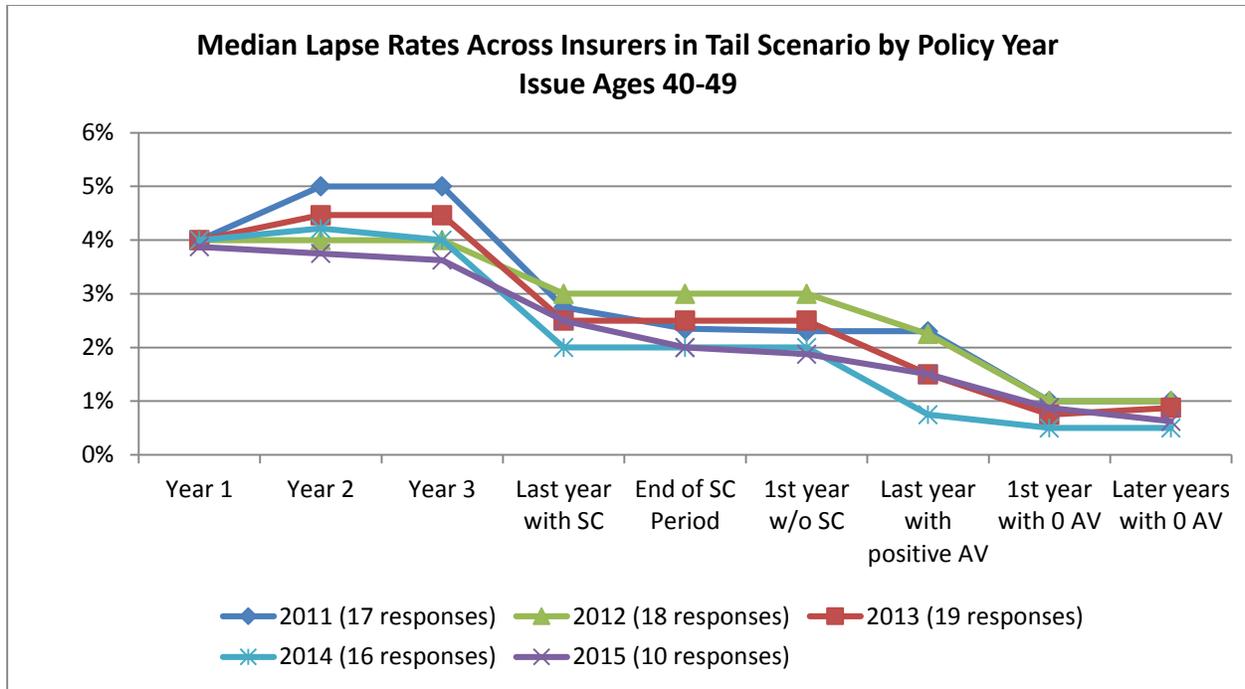

Figure 19

Median Lapse Rates Across Insurers in Tail Scenario by Policy Year Issue Ages 40-49

Figure 20

Highest, Median, and Lowest Lapse Rates Across Insurers in Tail Scenario by Policy Year - Issue Ages 70-79

Figure 21

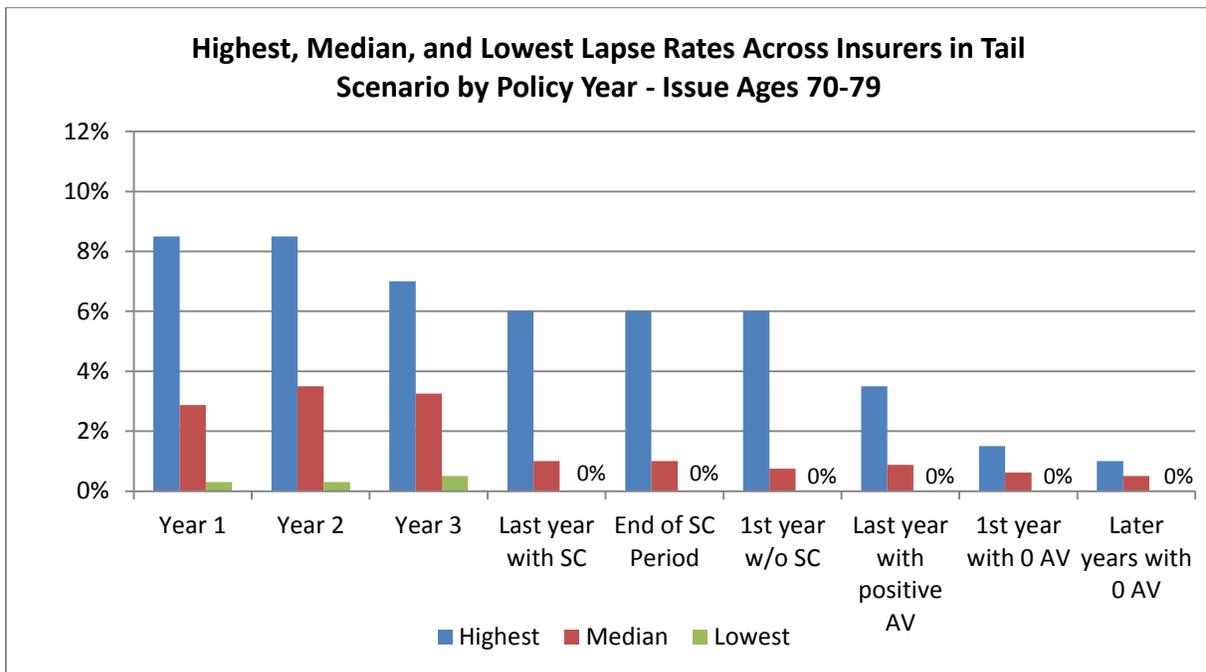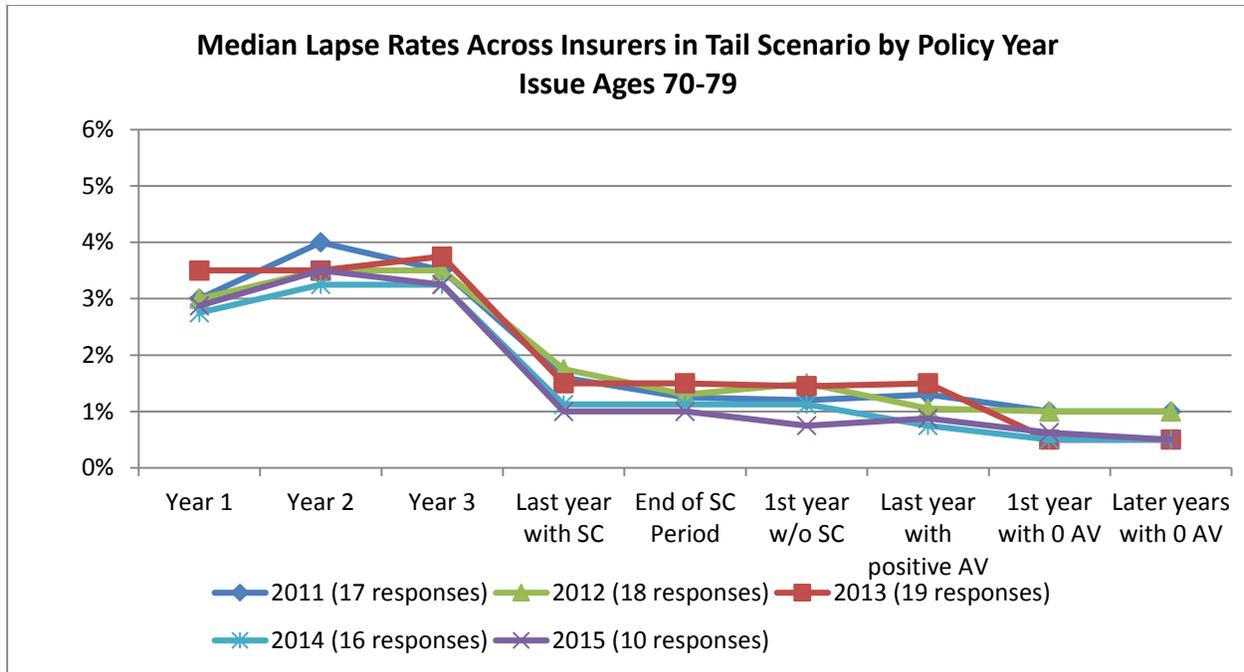**Median Lapse Rates Across Insurers in Tail Scenario by Policy Year
Issue Ages 70-79**

Figure 22

Next, in Question 5, companies were asked, out of 10,000 newly issued policies that experienced the tail scenario, how many would first have a zero cash surrender value but be kept in force by the secondary guarantee at a given duration for issue ages 50-59. The results were then converted to a cumulative basis in Figure 23. The results of the 2015 survey were significantly higher than in 2014 but similar to 2013.
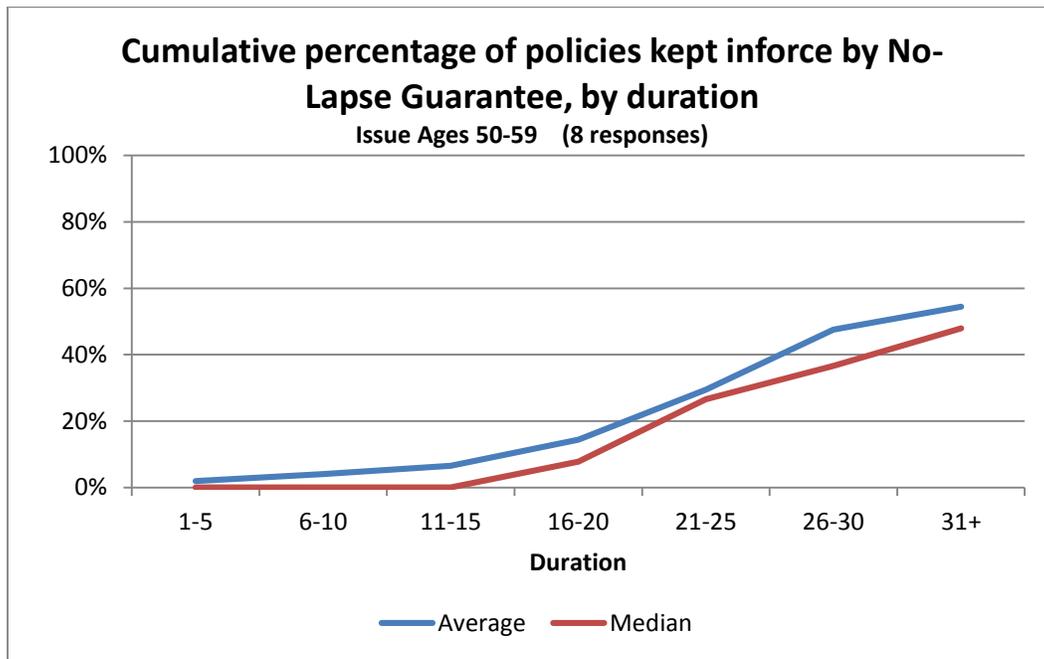
Cumulative percentage of policies kept inforce by No-Lapse Guarantee, by duration

Issue Ages 50-59   (8 responses)

Figure 23

The survey asked companies in Question 6 whether their lapse assumptions vary by distribution. Out of 18 respondents, 14 (78%) indicated that they sell through multiple distributions. Figure 24 indicates the distribution systems used by these respondents, with responses similar to prior surveys.
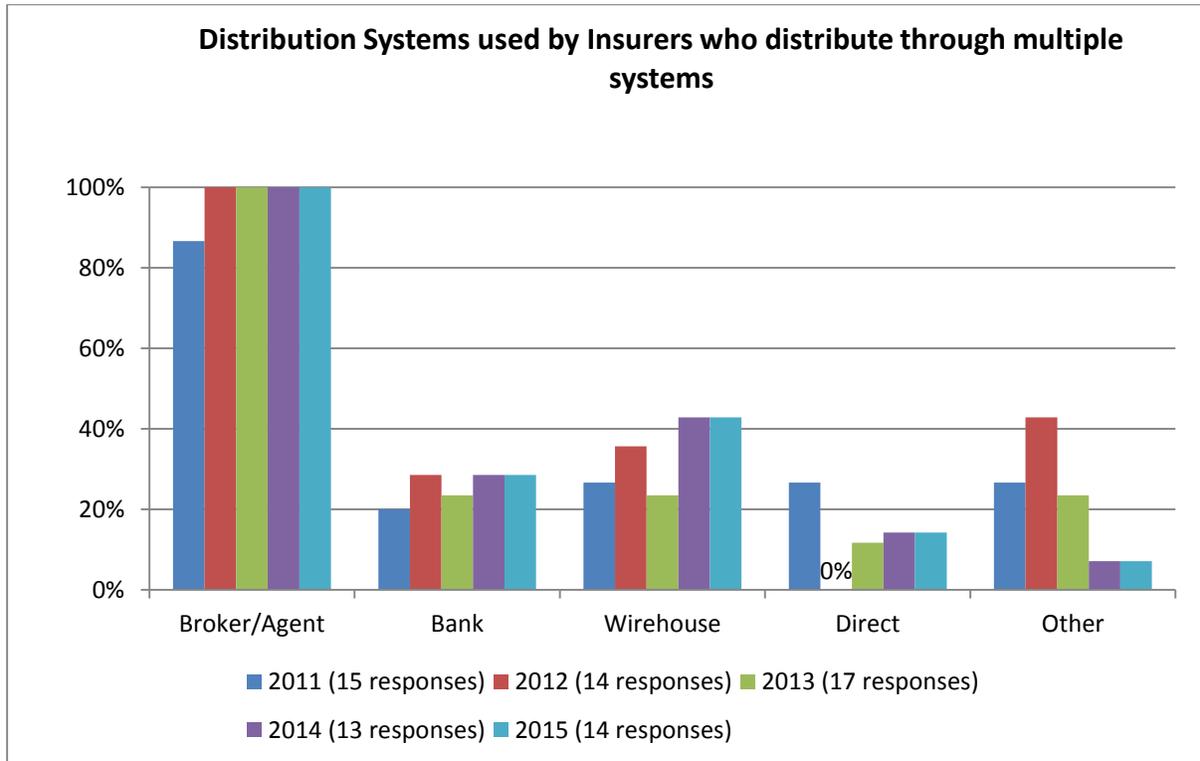
Distribution Systems used by Insurers who distribute through multiple systems

Figure 24

An additional question asked insurers if they measure lapses by distribution system. Of the 14 companies that responded, only 2 (14%) measure lapses by distribution system and both vary lapse assumptions by distribution system. Relative to recent surveys this is a lower proportion of companies that measure lapses by distribution system, although a similar response rate to using different lapse assumptions by distribution system.

Question 7 asked about lapses relative to premium assumptions. A little over half of the respondents (10 of 18; 56%) indicated that lapse rates vary by premium assumption, which is similar to past surveys (Figure 25). Where the lapse rates do vary by premium assumptions, they are typically bucketed by single pay, level pay, 10-pay, and paid up or else by the level of funding (high/medium/low) relative to, for example, planned premium.
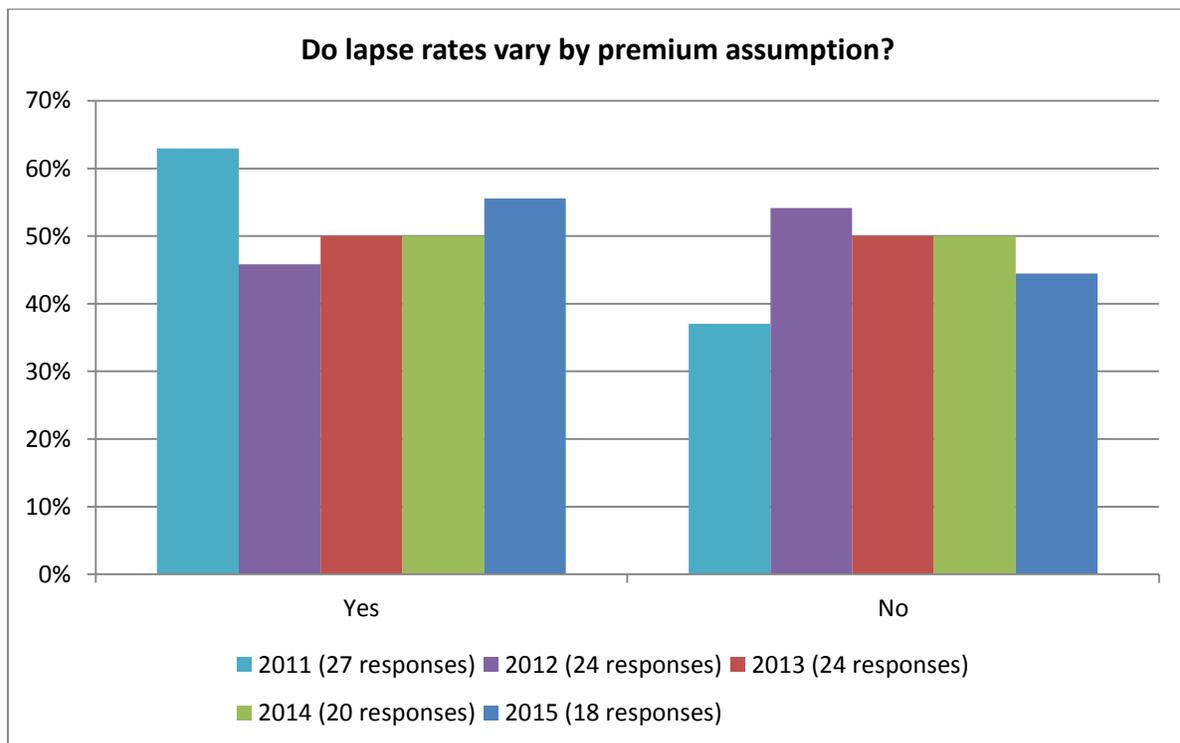

Figure 25

In Question 8, companies were asked about the source of their base lapse assumptions. Respondents could include more than one source, and all respondents included "Company experience" among their answers. "Actuarial best estimate" (67%) and "Industry study" (33%) were the next most commonly cited sources, but their frequencies have been declining in recent years. "Consultant advice" (22%) was fairly steady compared to recent surveys (Figure 26).
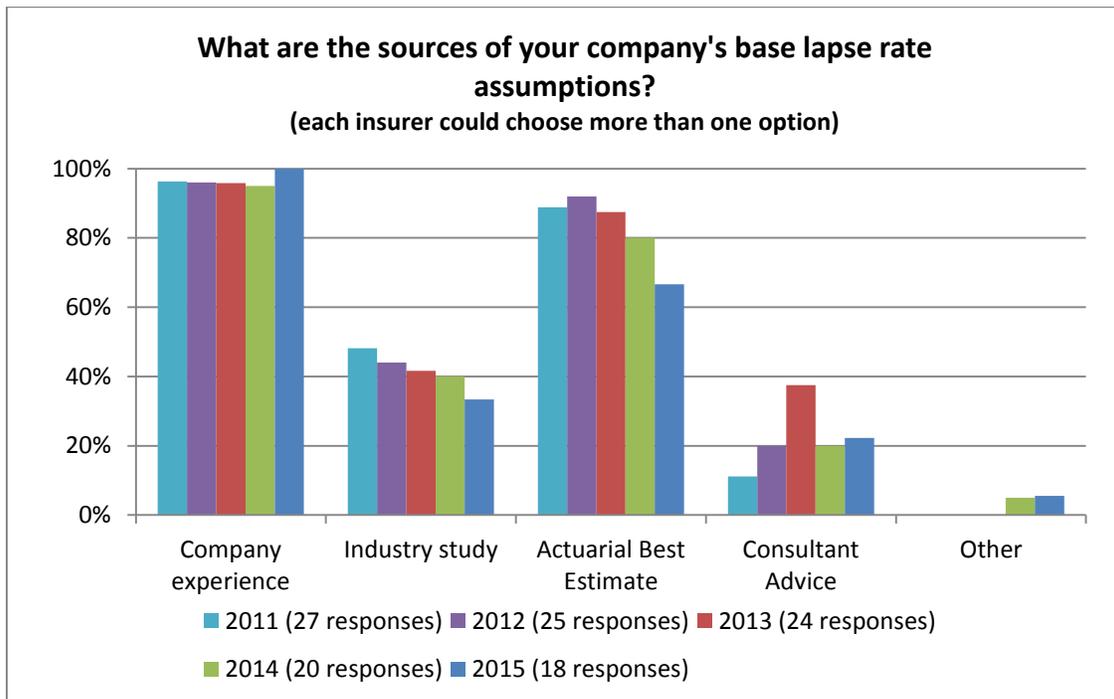

Figure 26

The survey then asked if companies perform lapse studies for UL policies with secondary guarantees, and if so, how frequently. Almost all companies (94%; 17 of 18) perform such lapse studies. The majority (65%) of those companies performing the studies do so annually, although "Quarterly" has become a more common response (Figure 27).
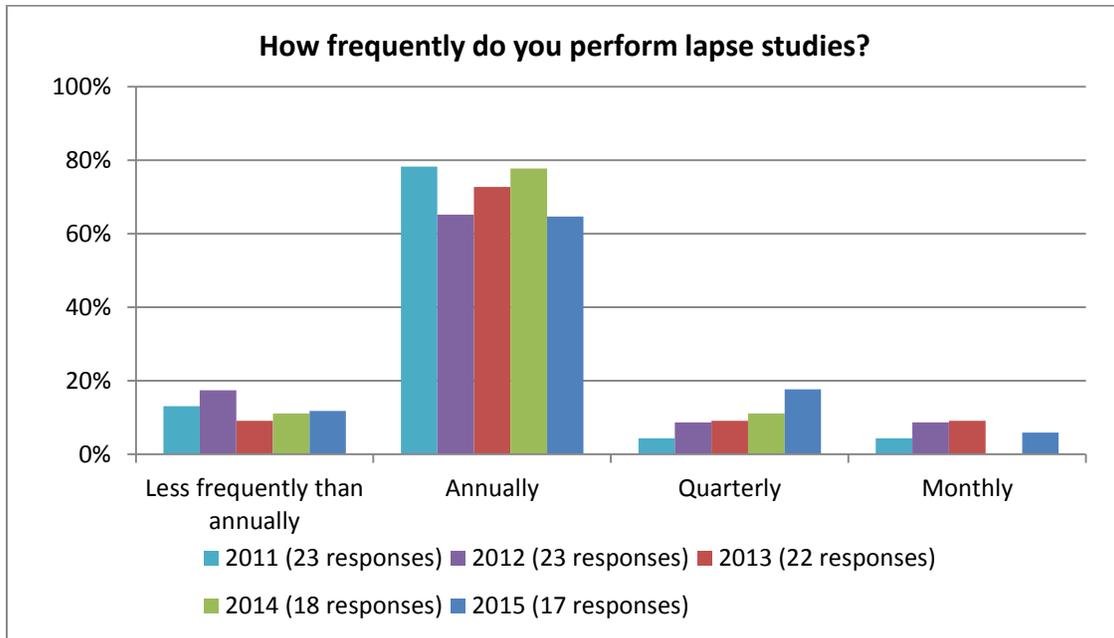

Figure 27

Companies were asked how many years of experience data were used in their latest study. There were a variety of responses, but the most common response continues to be "5-7 years".

How many years of experience data were used in your latest lapse study?
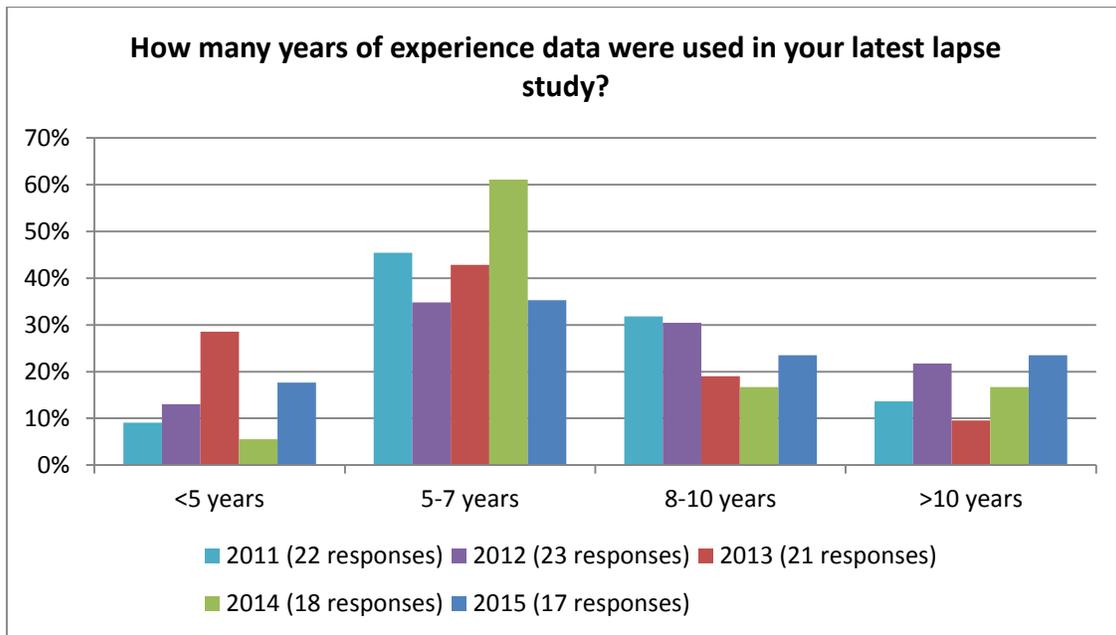
Figure 28

Companies were asked about their dynamic lapse assumptions specifically. Of the 18 respondents, nine (50%) vary their assumptions dynamically (Figure 29). Of those nine companies that vary assumptions dynamically, actuarial best estimate continues to be the most

common response. More reported using industry studies and consultant advice while fewer reported using company experience as compared to prior surveys (Figure 30).
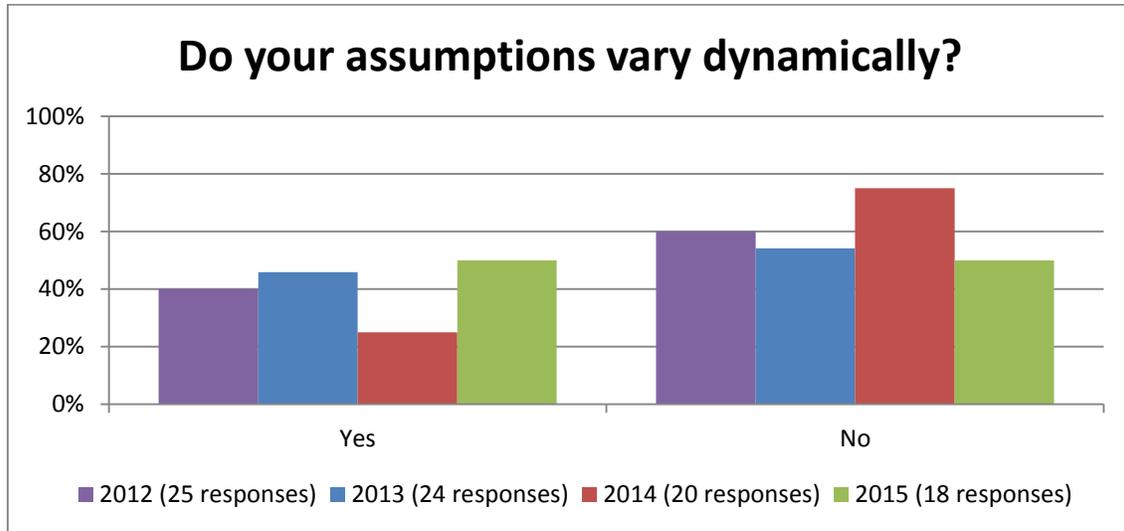

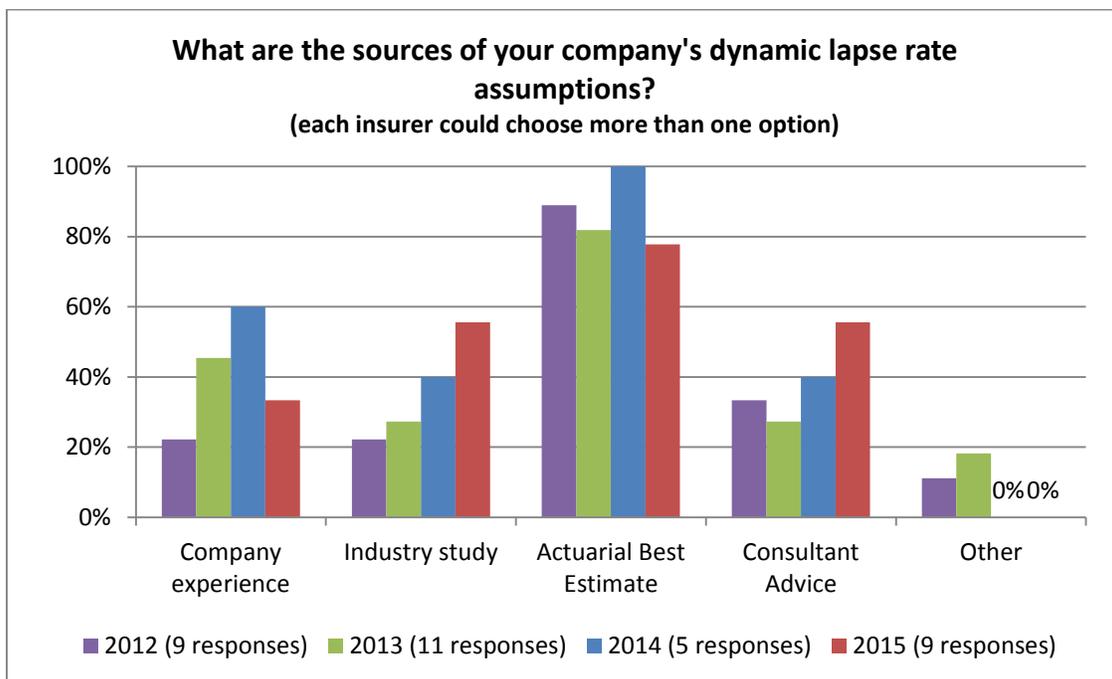**Do your assumptions vary dynamically?**

Figure 29

What are the sources of your company's dynamic lapse rate assumptions?
(each insurer could choose more than one option)

Figure 30

Mortality Assumptions

Companies were asked about their mortality assumptions in the tail in Question 9. Use of the 2008 VBT table increased sharply in 2014 and now over 70% of the companies reported using it as their reference table. The 2001 VBT and 75-80 Intercompany tables are much less common than in past surveys (Figure 31). Companies marking "Other" cited the 2015 VBT, tables derived from company experience, and tables derived from consultant or reinsurer experience.
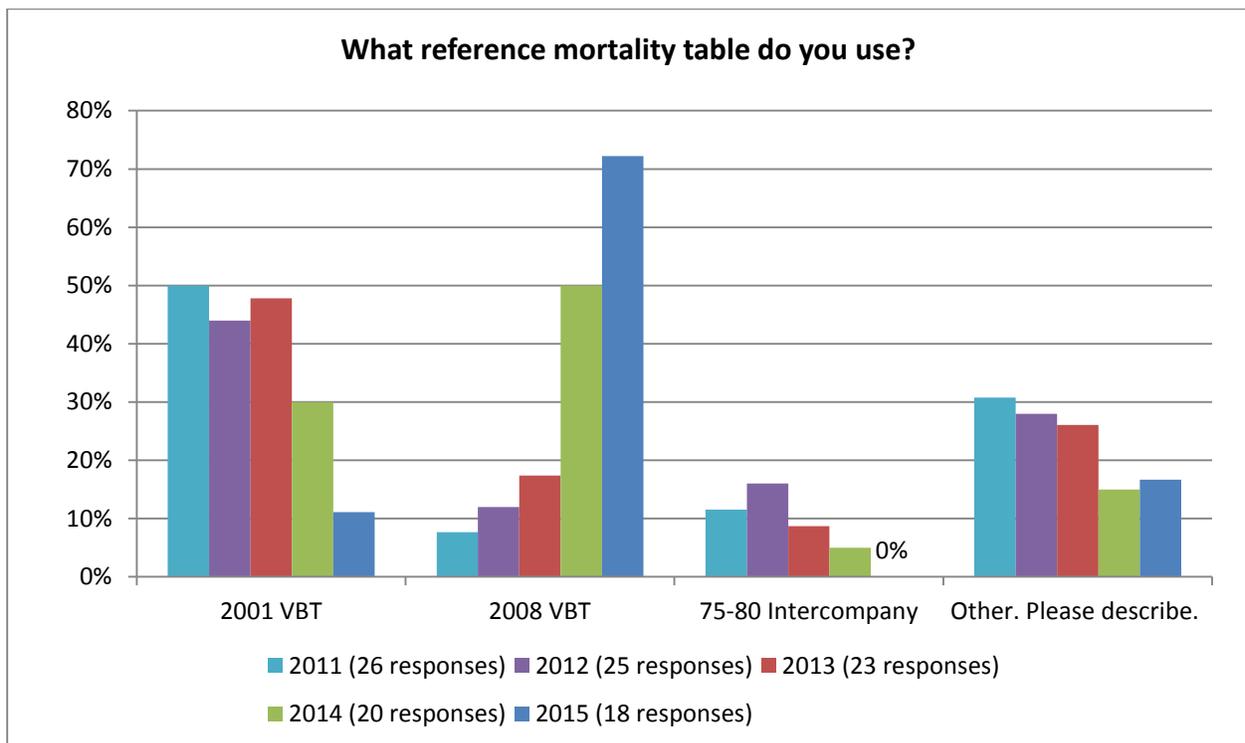

Figure 31

Eleven companies provided ultimate mortality rates per 1,000 assumed at higher attained ages for various underwriting classes for males and females. The minimum, maximum and median of those responses are summarized below, with the 2001 VBT and 2008 VBT rates (ultimate, sex and tobacco distinct, age nearest birthday) for comparison (Figure 32 through Figure 37). The median mortality rates tend to be similar to the 2008 VBT. Note that the minimum, maximum, and median responses do not necessarily represent the response of any given company, but are determined independently for each age.
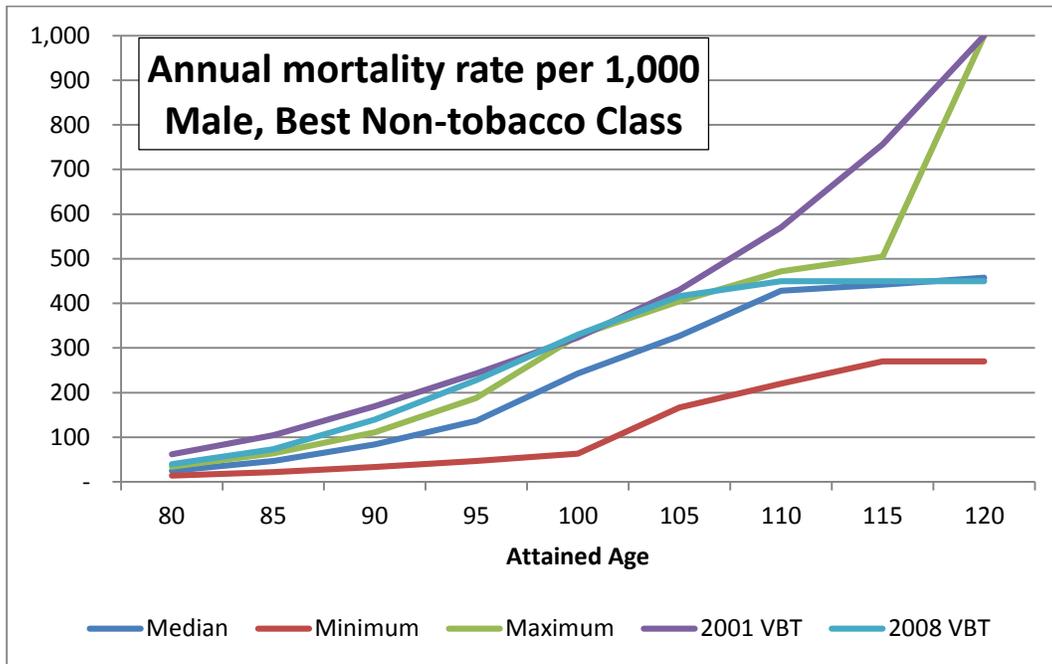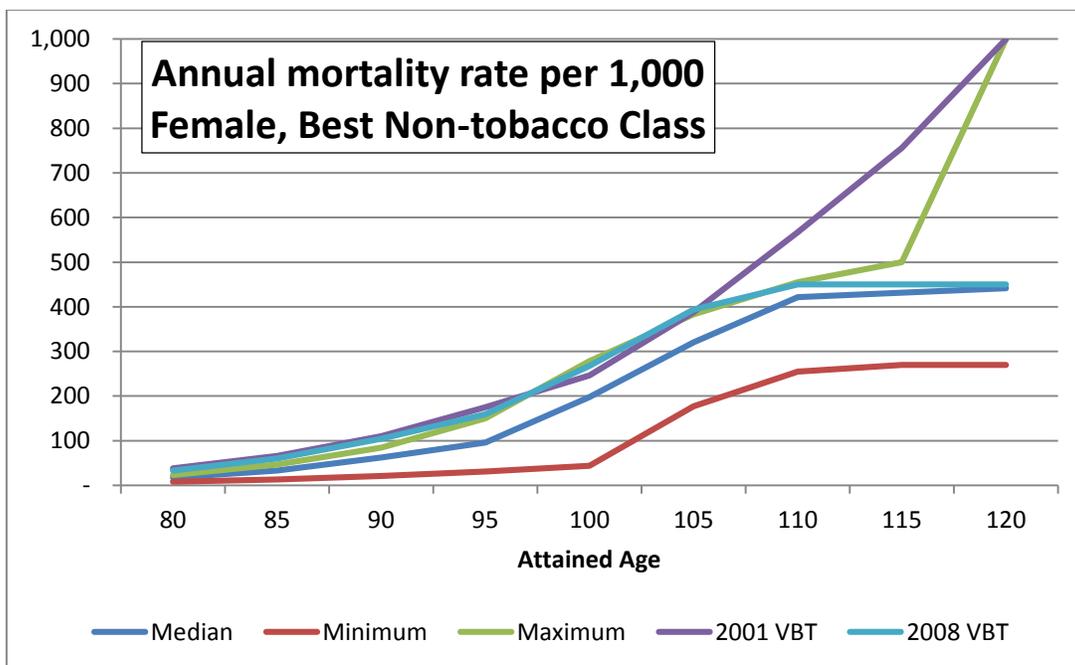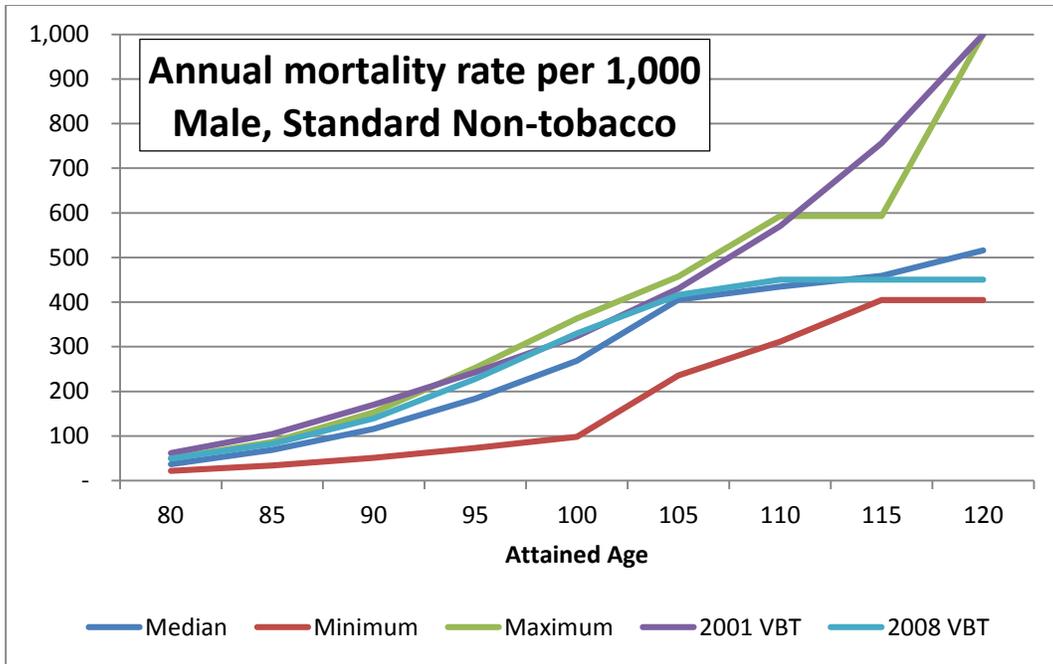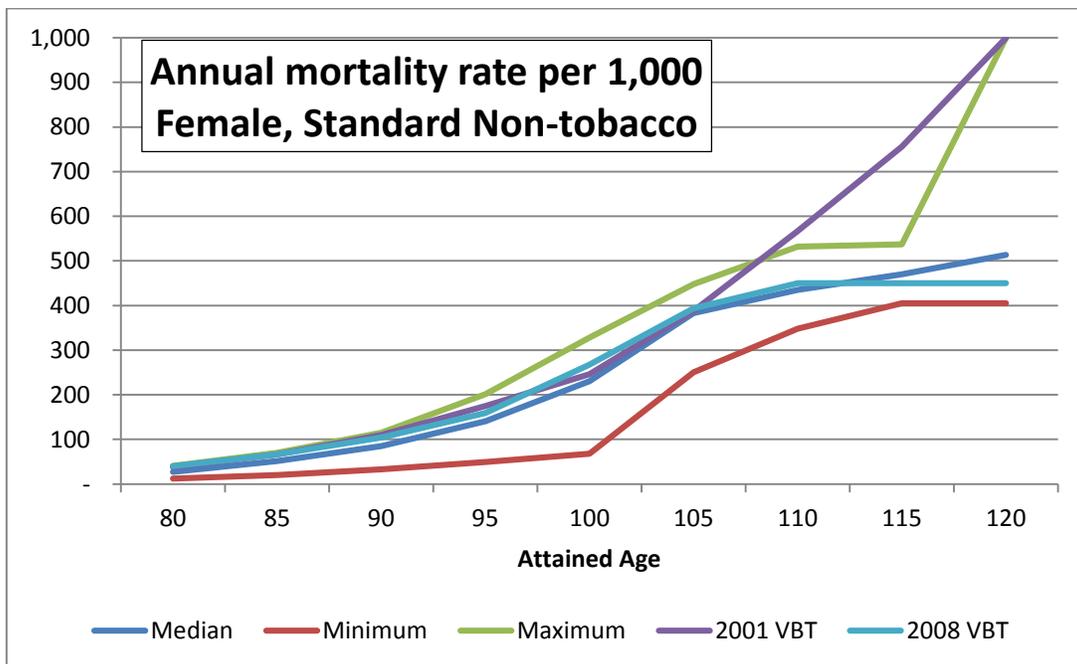
Figure 32

Figure 33

Figure 34

Figure 35

Annual mortality rate per 1,000 Male, Standard Tobacco

Figure 36
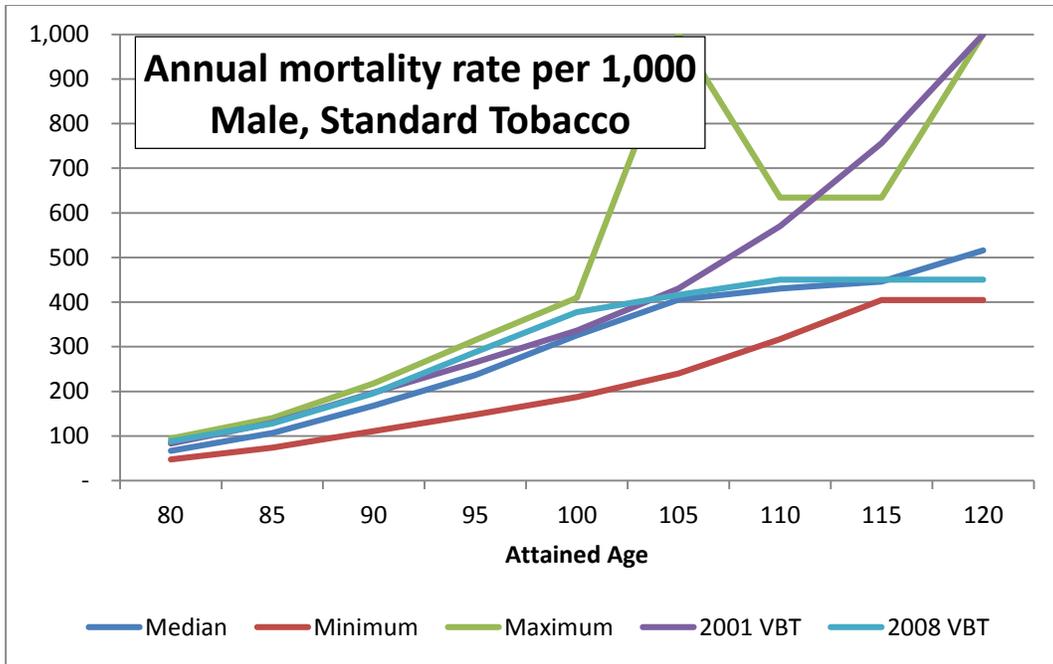

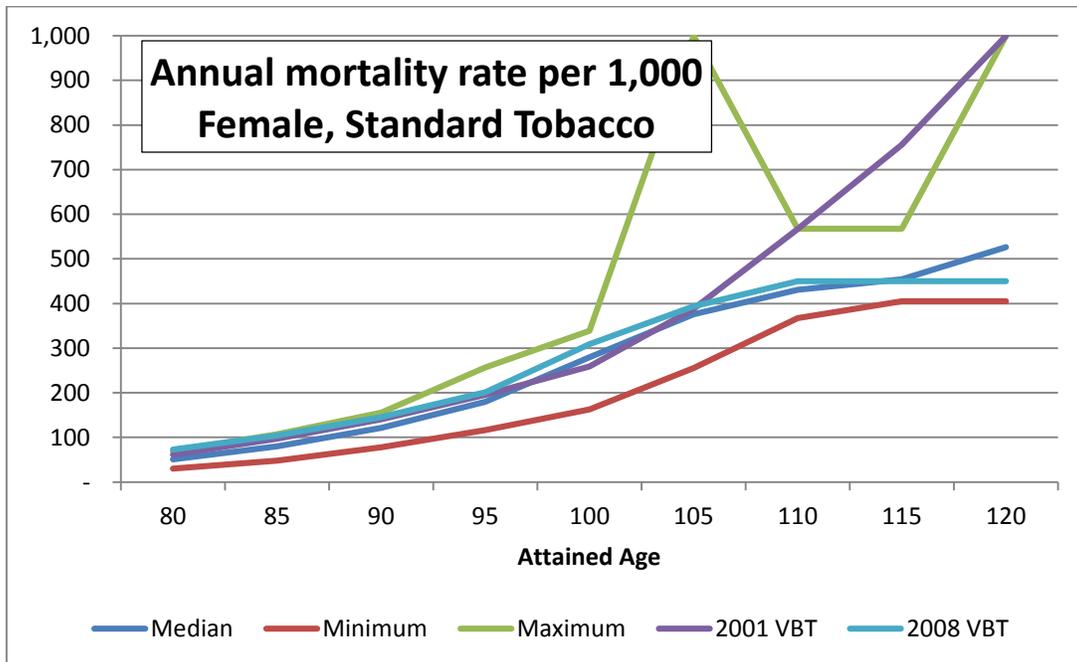**Annual mortality rate per 1,000 Female, Standard Tobacco**

Figure 37

Companies were asked again this year about the number of underwriting classes used. The majority of companies (59%; 10 of 17) responded with three non-tobacco classes and 6 of 17 (35%) responded with four (Figure 38). For tobacco classes, two continues to be the predominant response with 100% citing two this year (Figure 39).
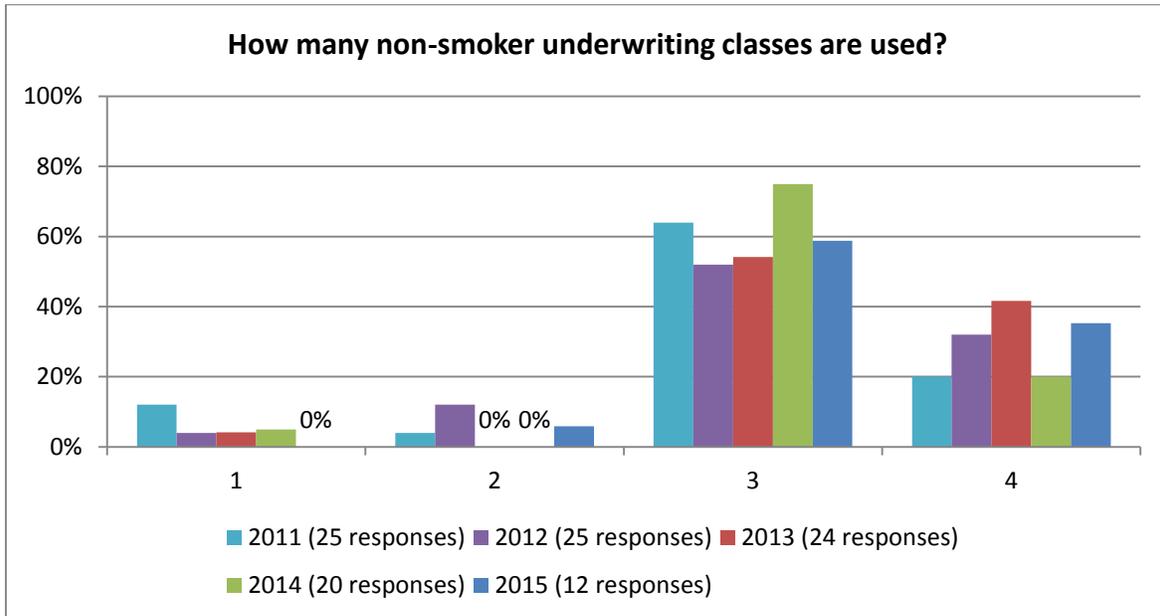
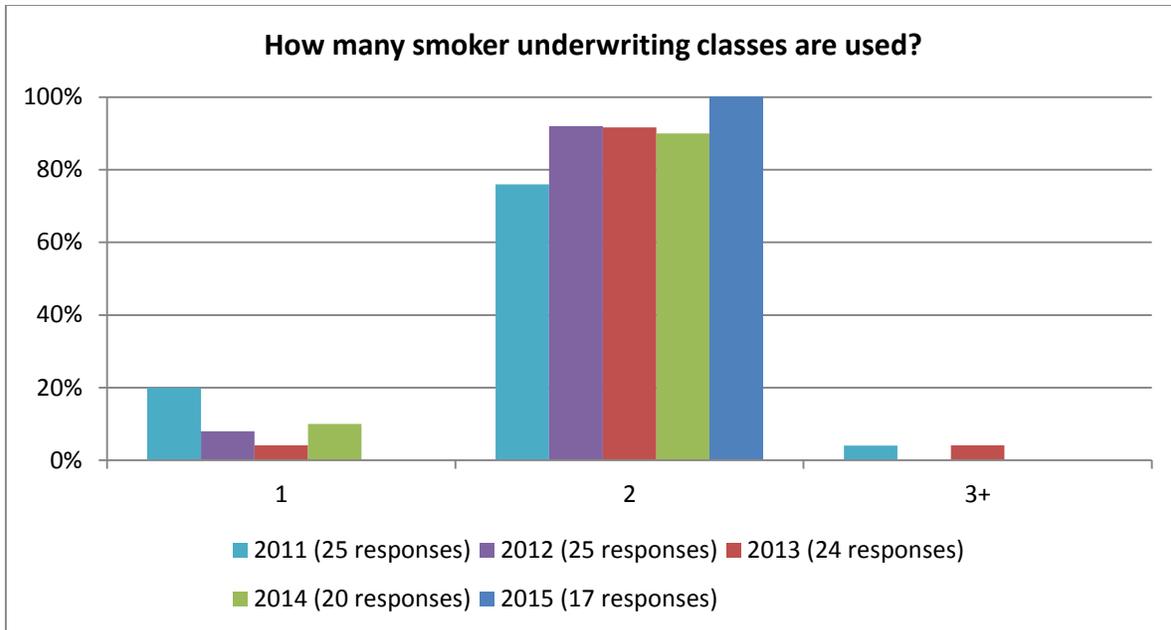**How many non-smoker underwriting classes are used?**

Figure 38

Figure 39

The percentage of respondents incorporating future mortality improvement into their models remains steady at 72% (13 of 18).
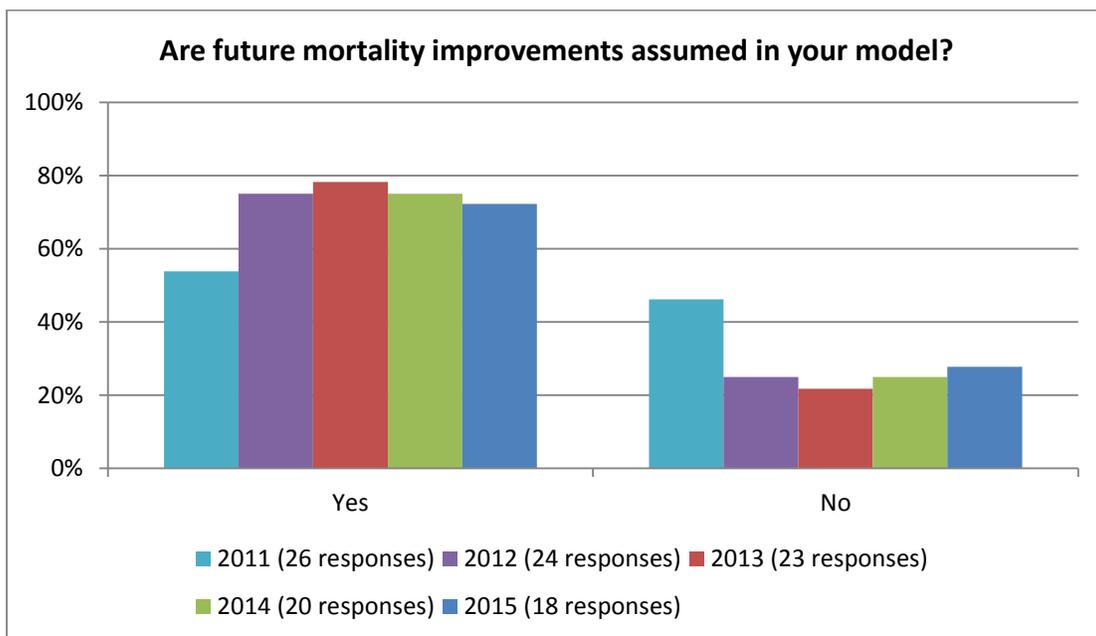

Figure 40

Most of the 13 companies modeling future mortality improvements had assumptions that were gender, age and/or duration distinct. There is also an upward trend toward using smoker status to vary future mortality improvement assumptions (Figure 41).
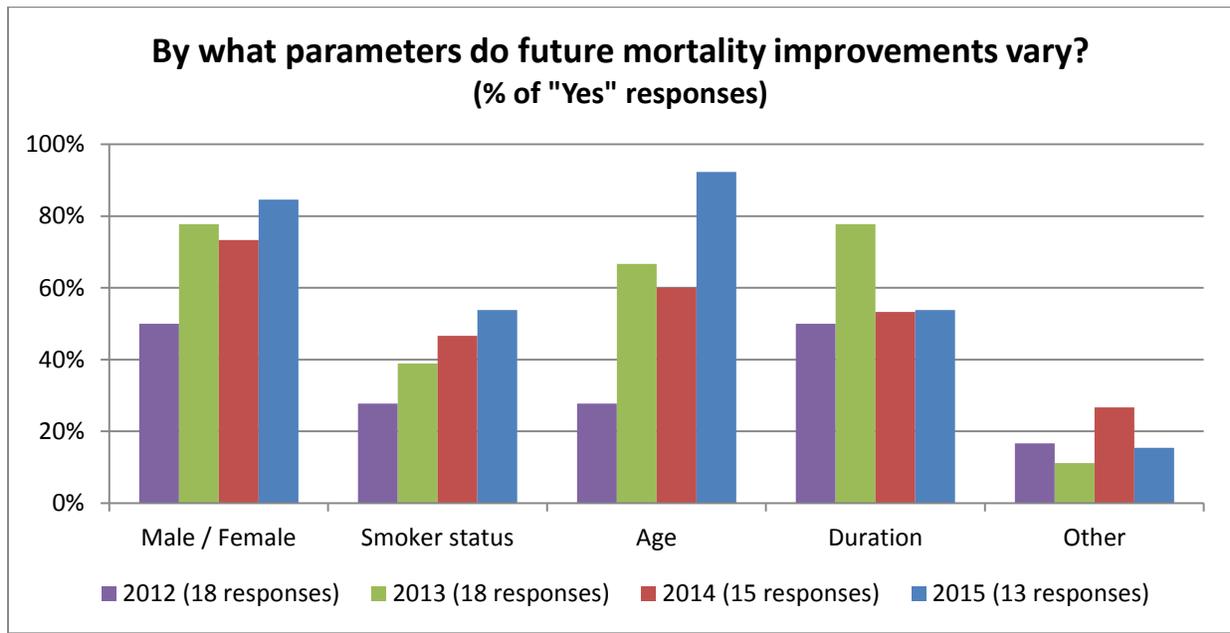

Figure 41

Twenty companies responded to a question about whether mortality assumptions change when the secondary guarantee is in-the-money. As in past surveys, respondents were unanimous in their stance that mortality assumptions do not vary by the in-the-moneyness of the secondary guarantee.

Critical Assumptions

The survey then asked for assumptions that the companies considered critical to analyzing experience in the tail. A company could indicate more than one response. Investment return and lapse assumptions continue to be cited as the most critical assumptions for analyzing experience in the tail. There is also a significant response that mortality and premium patterns are critical. It should be noted that 2012 was the first year that premium pattern and life settlement were specifically included as suggested answers to the question.
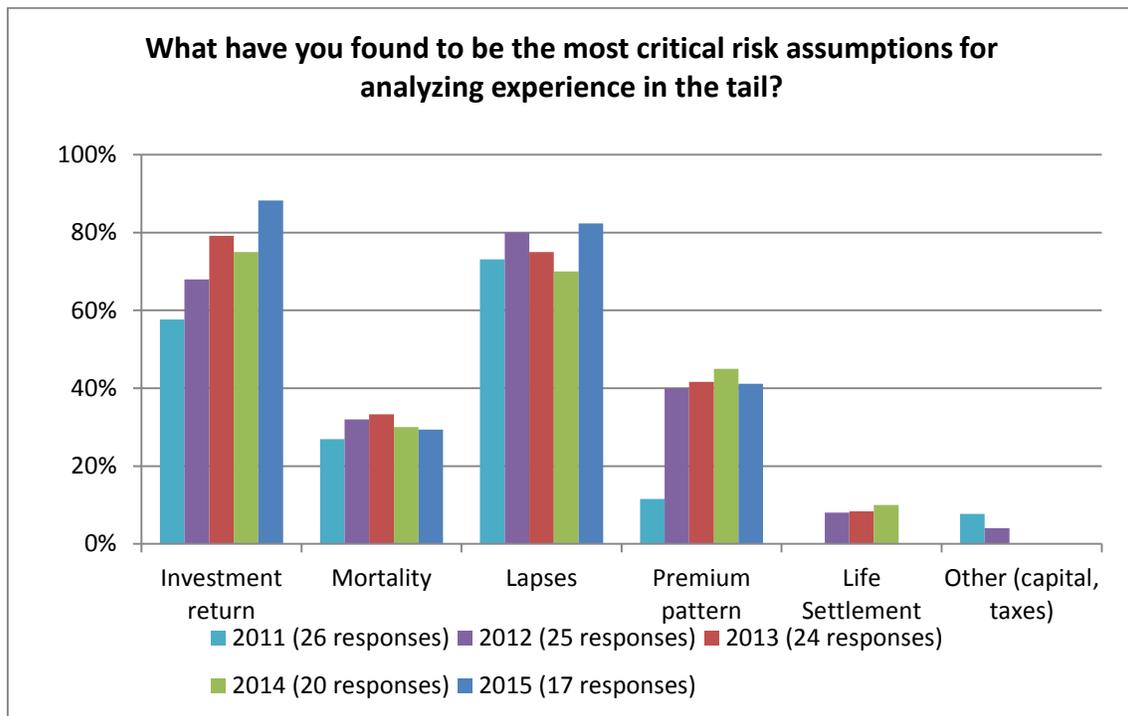
Figure 42