POLICYHOLDER BEHAVIOR IN THE TAIL
UL WITH SECONDARY GUARANTEE SURVEY
2011 RESULTS

Highlights of Survey

- The latest survey reflects a much larger response group than in the prior survey, so some of the changes described below reflect different respondents, not necessarily a change by any given company. While the exact relationships of new versus prior respondents vary by individual question, at the level of the total survey, there are 21 new respondents, 11 continuing respondents (to both surveys), and 10 prior respondents that did not participate in the latest survey.

- Most companies considered the lapsation assumption to be a critical risk; 19 out of 26 companies indicated that they felt this assumption was critical for analyzing experience in the tail. Investment return was felt to be a critical assumption by 15, and 7 considered the mortality assumptions to be critical.

- Median mortality rates at higher attained ages were very similar to the mortality rates from the 2001 VBT, but companies showed a wide range of assumptions.

- Fewer than 20% of respondents use stochastic modeling to set or analyze capital levels for UL with secondary guarantees, down significantly from about 38% in the 2009 version of this survey.

- A majority of respondents who reported using stochastic modeling to set capital levels used only 100 scenarios.

- The duration of projections used to set or analyze capital levels decreased markedly from the previous version of the survey. Previously over 70% of respondents indicated using 76+ years in the projection; currently less than 40% do so.

- A lower percentage of respondents reported using a dynamic lapse function for UL policies with a secondary guarantee. Of those that use such a function, a majority set lapses to zero if the guarantee is in-the-money and no further premium is required.

- In the tail scenarios, lapse rates vary widely amongst insurers, but for any one insurer assumed lapse rates do not show substantial variation by issue age, with the exception of being slightly lower for the highest issue ages (70+).

- Median lapse rates assumed increased from responses in the previous survey.

- Although 54% of companies sold through multiple distributions, only about 11% (3 out of 28) assumed that lapse rates varied by distribution.

- About 63% of companies vary lapse assumptions by premium pattern, generally assuming higher lapse rates for level premium patterns and lower lapse rates for single premiums.

- Company experience was cited as a source of lapse assumptions by over 96% of respondents. Actuarial best estimates were an additional source according to almost 89%.

- Mortality assumptions were typically based upon the 2001 VBT table (50% of responses).

- More than half of responding companies model future mortality improvement. Improvements typically vary by gender and are only applied for a limited duration.
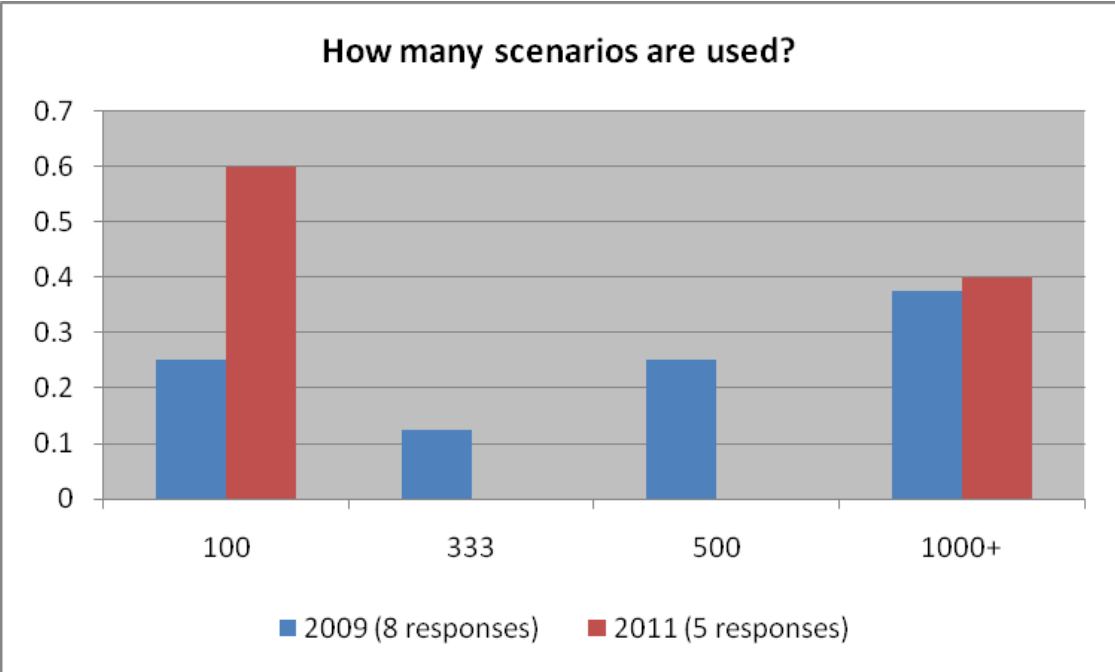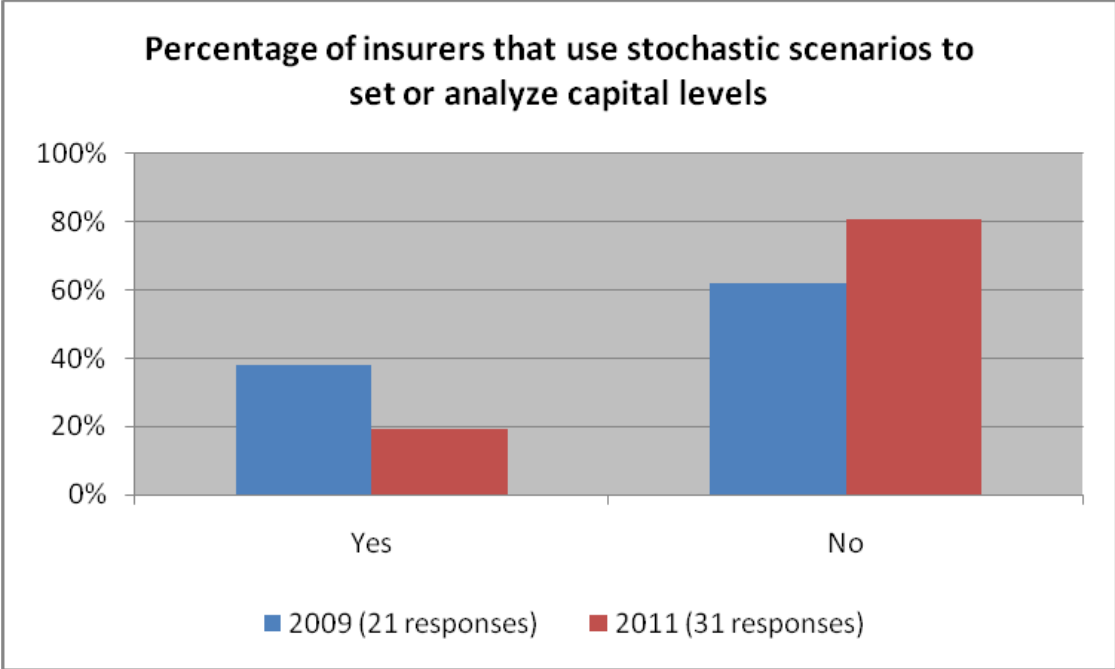
Acknowledgements

Background

In 2011, the Policyholder Behavior in the Tail (PBITT) committee distributed a survey to insurers and asked for feedback 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 32 responses; however, not every company answered every question. To illustrate the credibility of results, most charts indicate how many companies responded to the question.
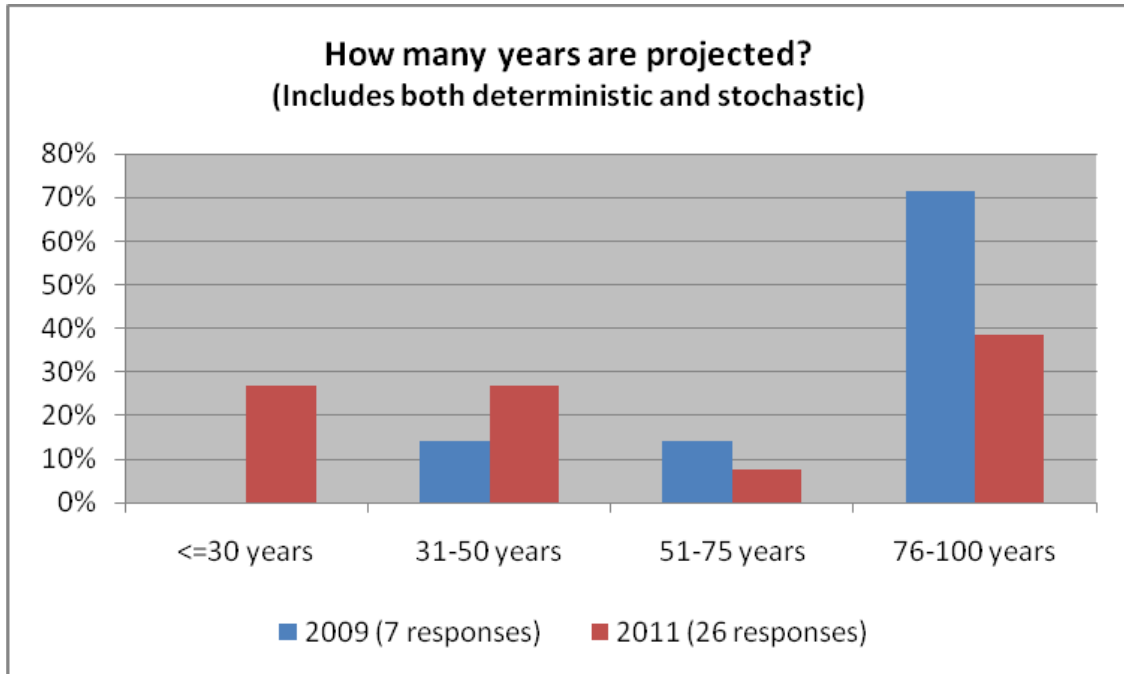
It is the intention of the PBITT committee to conduct this survey annually. It is our hope that with the publication of these and future survey results, we will increase the availability of industry experience for all companies to consider when setting assumptions or when extrapolating to the tail. Others 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.

The latest survey reflects a much larger response group than in the prior survey, so some of the changes described below reflect different respondents, not necessarily a change by any given company. While the exact relationships of new versus prior respondents vary by individual question, at the level of the total survey, there are 21 new respondents, 11 continuing respondents (to both surveys), and 10 prior respondents that did not participate in the latest survey.

Parameters of Stochastic Capital Calculation

Insurers were asked 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. The following graphs show the responses to these questions. About 19% of insurers used stochastic scenarios to set or analyze capital levels, down markedly from the previous survey in 2009 when 38% did so. Both the number of scenarios used and the length of the projection period declined from levels indicated in 2009.

Percentage of insurers that use stochastic scenarios to set or analyze capital levels

Yes / No

2009 (21 responses) / 2011 (31 responses)

How many scenarios are used?

100 / 333 / 500 / 1000+

2009 (8 responses) / 2011 (5 responses)

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

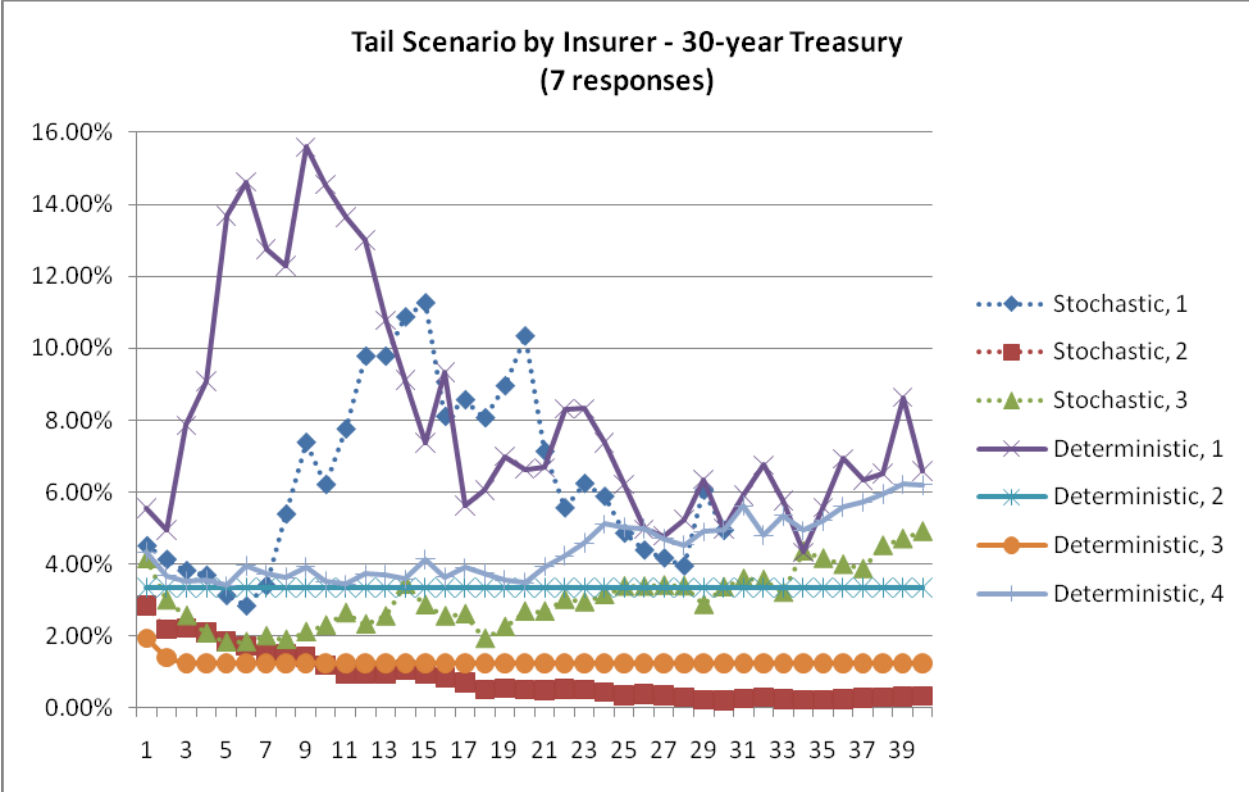Legend: 2009 (7 responses) ■ 2011 (26 responses)

Tail Scenario

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 if that is the respondent's methodology) that gives the largest present value loss, defined in the survey as the greatest amount of death benefits paid in years where no COI is collected. Responses varied widely across insurers regarding the description of the tail scenario. The charts below show each insurer's tail scenario for the three maturities.

Tail Scenario by Insurer - 1-year Treasury
(7 responses)

Tail Scenario by Insurer - 7-year Treasury
(8 responses)

Tail Scenario by Insurer - 30-year Treasury
(7 responses)
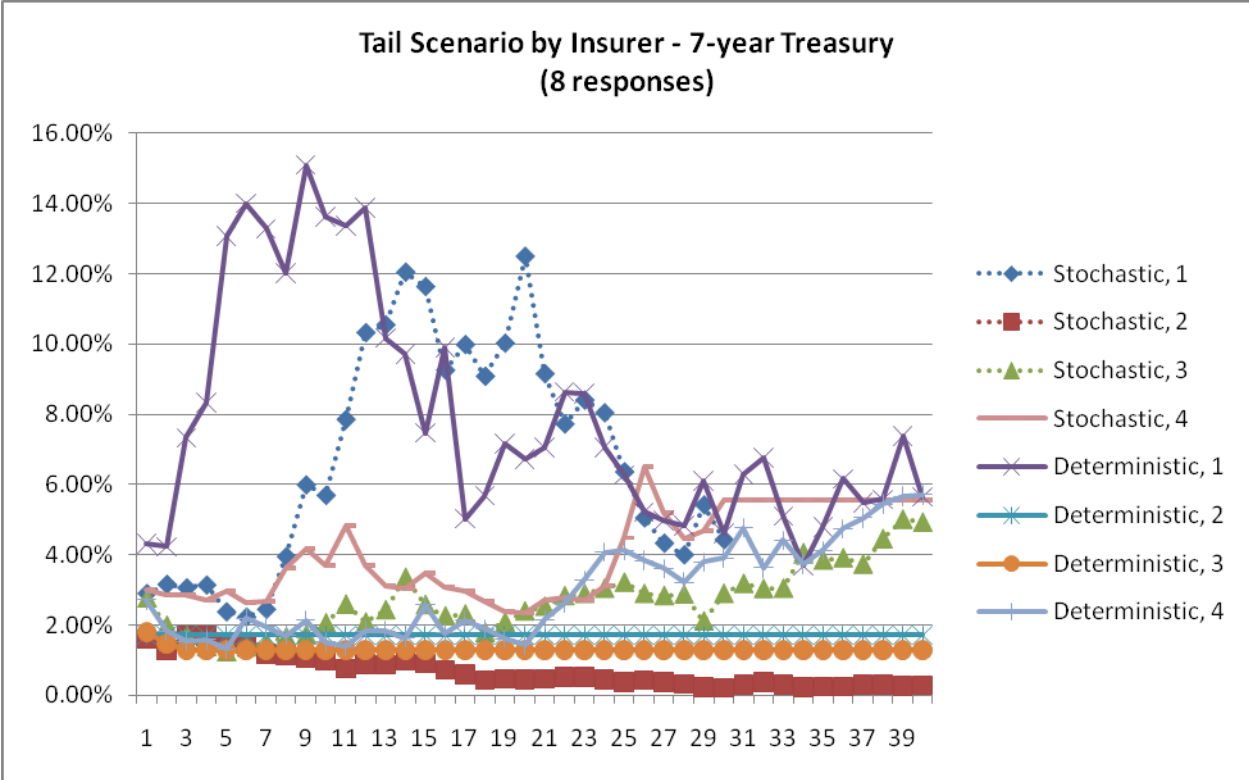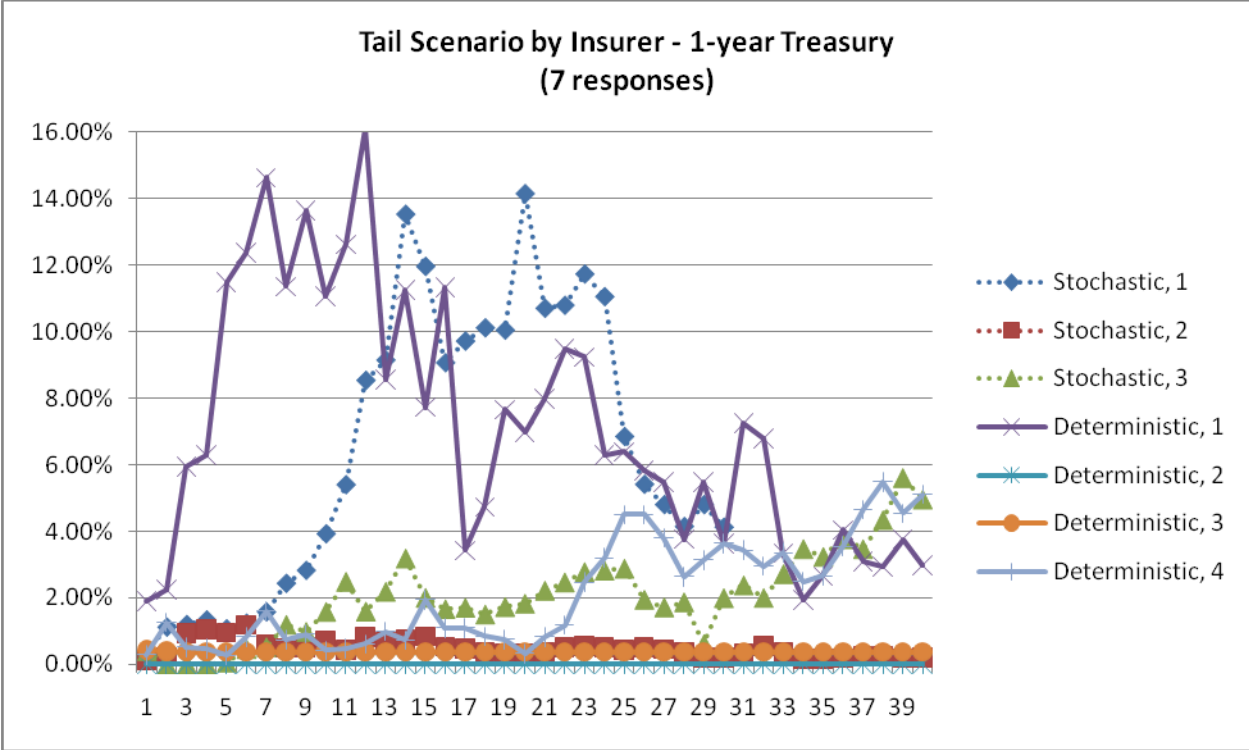
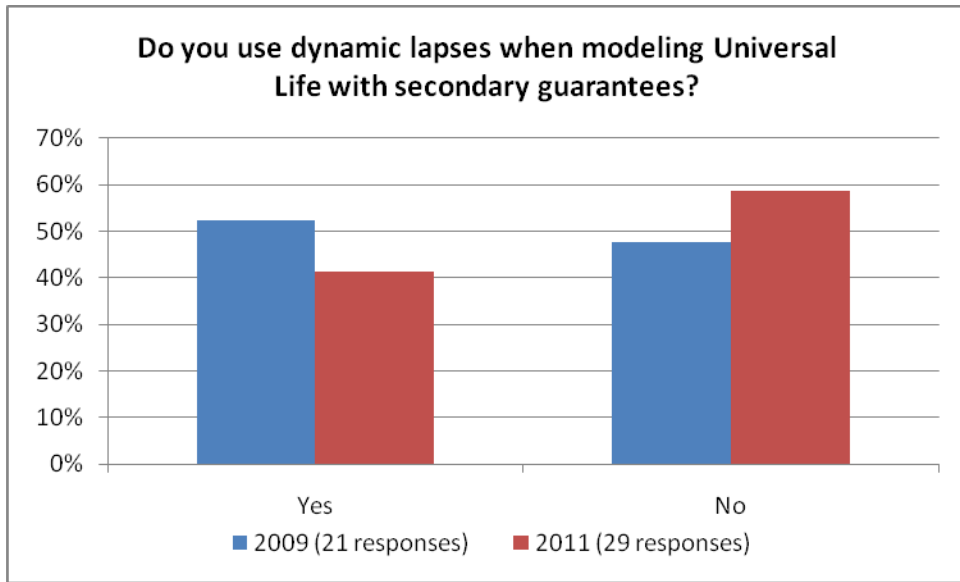The following graphs show the median reported value across insurers for each of the three maturities for each projected year from both the 2009 and 2011 survey results. It should be noted that these lines do not represent any one company's response, but rather the median of the rates at each duration, across all companies' responses. The 2009 median rates exhibited a distinct upward trend over the projection years. However, this same rate behavior was not seen in 2011 responses. In 2011, the rates are generally lower than those of 2009. The median 7-year and 30-year treasury rates are relatively flat with the 30-year rate exhibiting very little volatility. The median 1-year treasury rate still shows some upward trend, but not as much as the 2009 median rate.

Median Tail Scenario Across Insurers - 2009
(11 responses)

Median Tail Scenario Across Insurers - 2011
(7 responses)
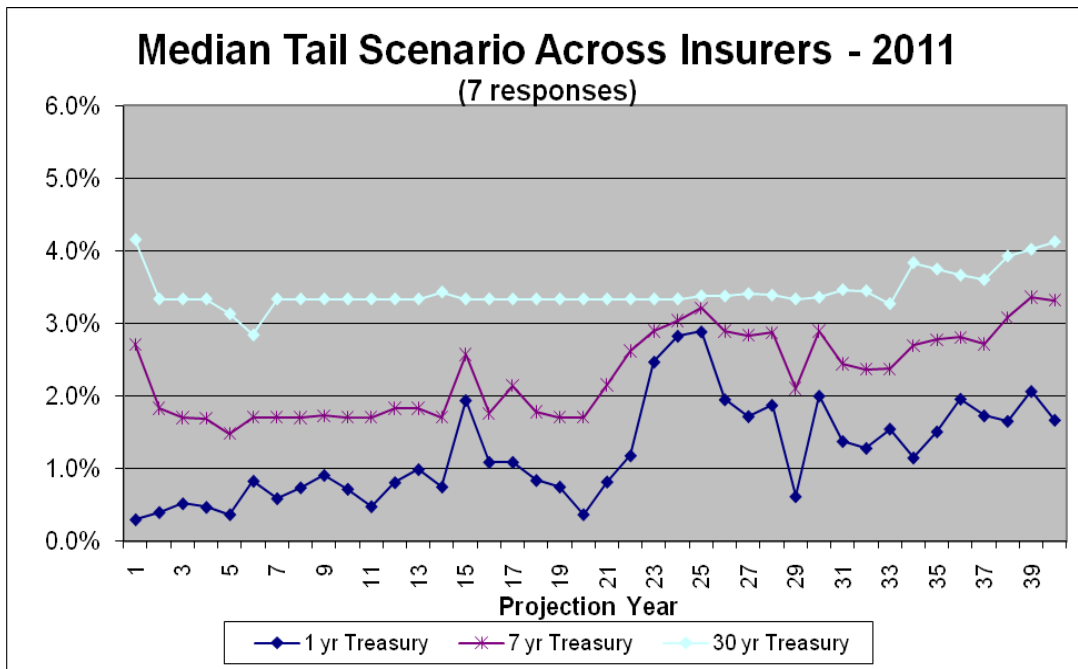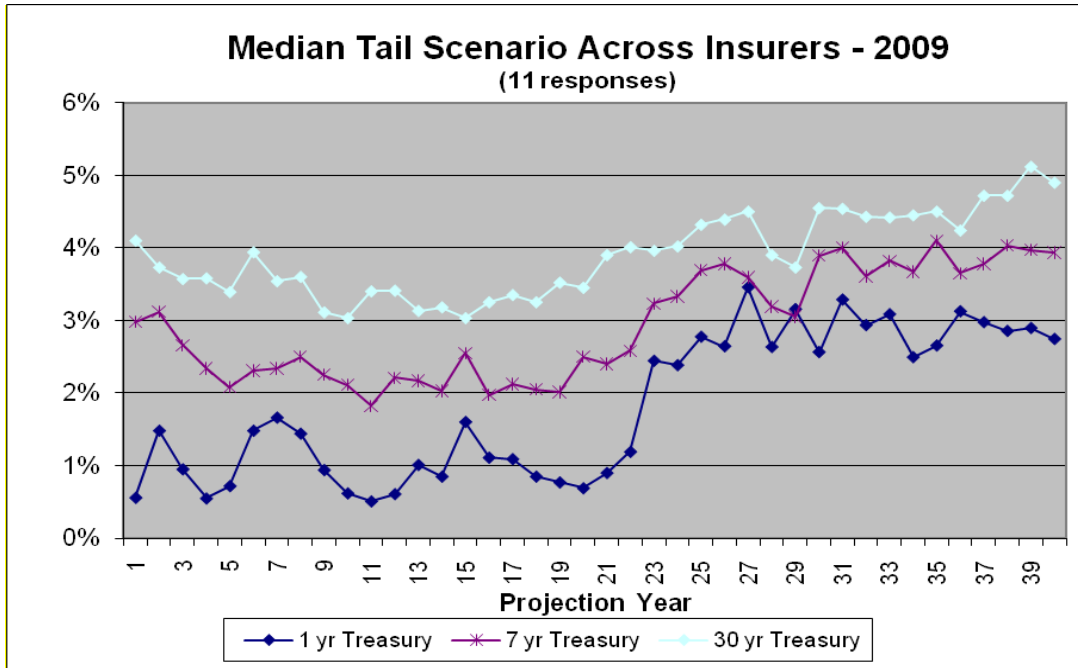
Lapse Assumptions

The following chart shows the percentage of insurers who use dynamic lapse functions for policies with secondary guarantees. The number of insurers who use dynamic lapse functions declined from 52% to 41% of responses. Of those that do so, 58% set the lapse rate to 0% for years where the guarantee is in-the-money and there is no additional premium required compared to 91% from the 2009 survey. Other factors considered in the dynamic lapse function included the relationship of the current account credited rate to the competitor rate and the relationship of the current credited rate to the guaranteed rate.

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

Legend: 2009 (21 responses), 2011 (29 responses)

Insurers 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 and 70. In 2011, responses for other issue ages were very similar to those for age 40. There were 17 responses in 2011 compared to 13 in 2009.

Highest, Median, and Lowest Lapse Rates Across Insurers in Tail Scenario by Policy Year - Issue Ages 40-49
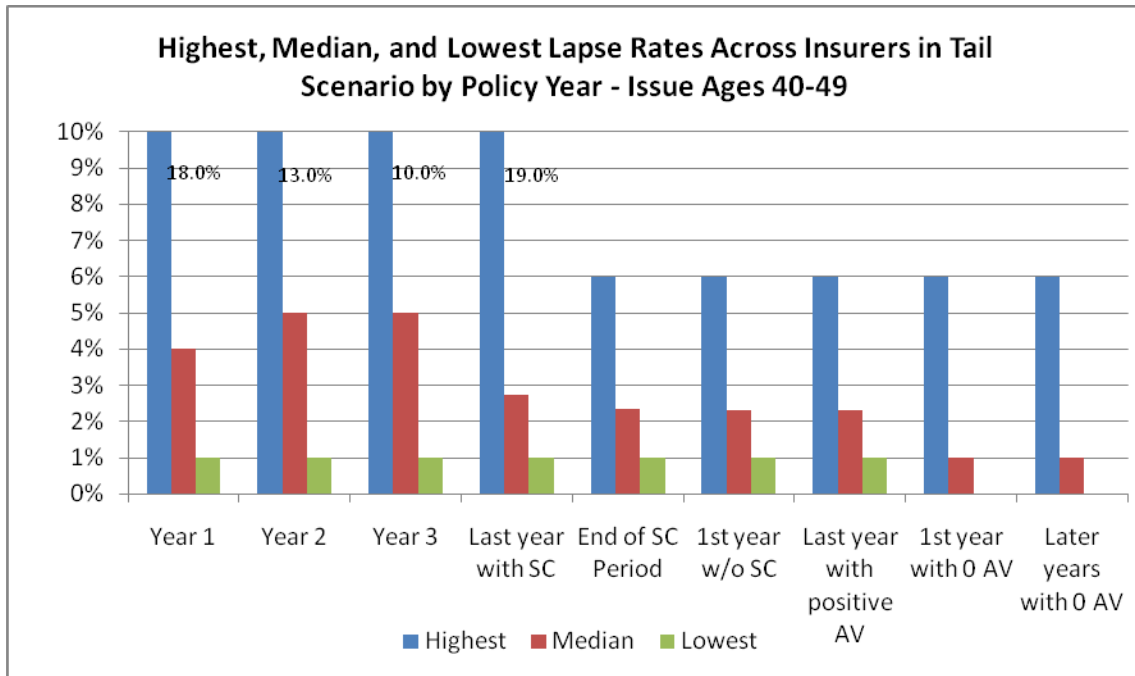
Median Lapse Rates Across Insurers in Tail Scenario by Policy Year - Issue Ages 40-49 - 2011 compared to 2009
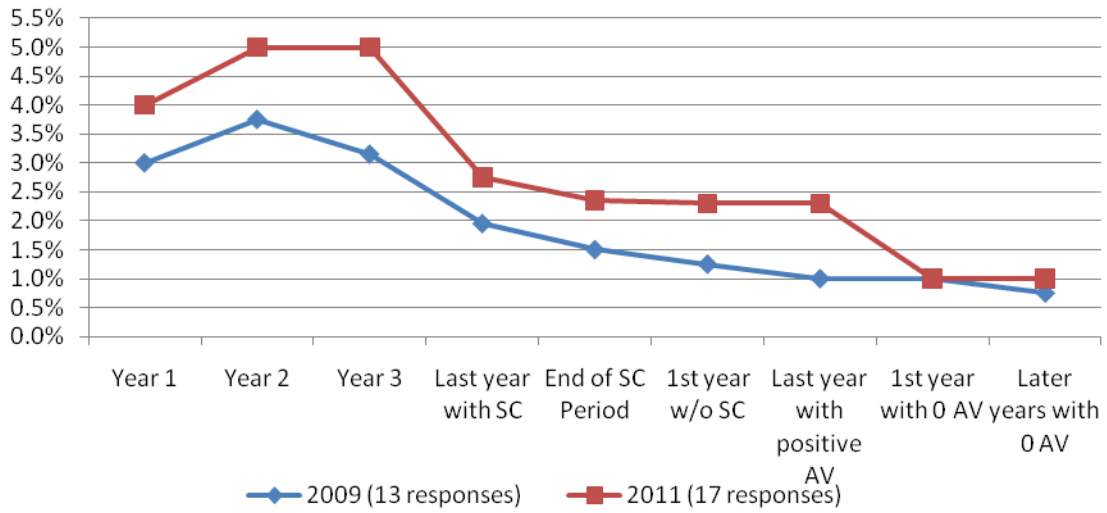
Legend: ◆ 2009 (13 responses) ■ 2011 (17 responses)

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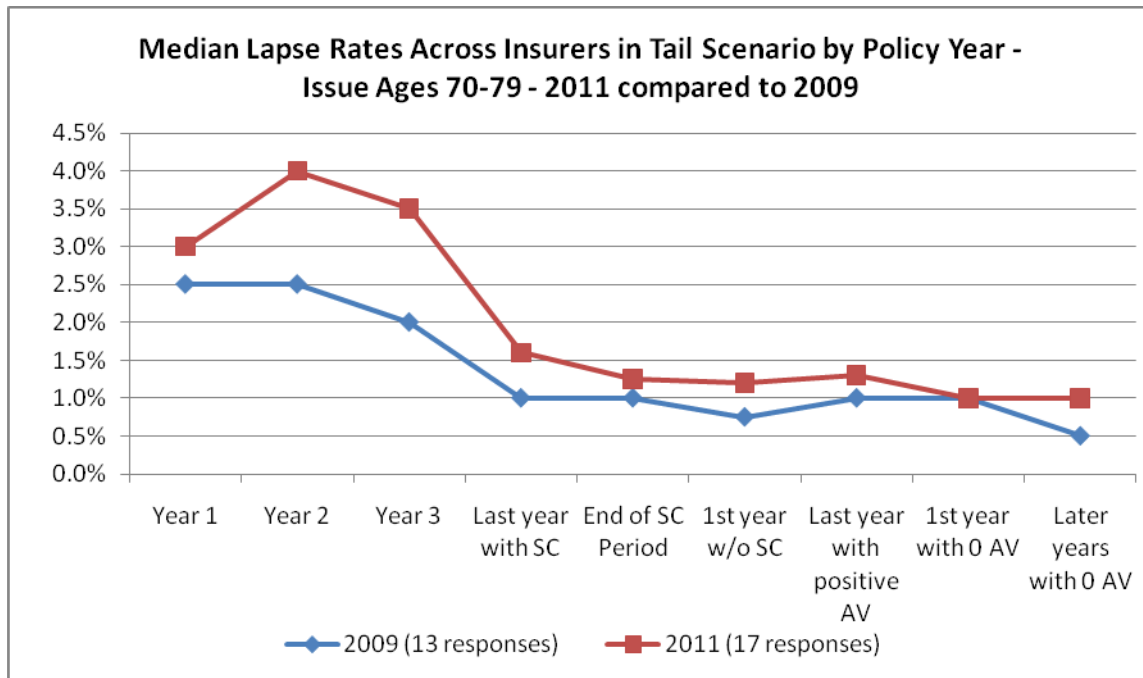

Legend: ■ Highest ■ Median ■ Lowest

Median Lapse Rates Across Insurers in Tail Scenario by Policy Year - Issue Ages 70-79 - 2011 compared to 2009
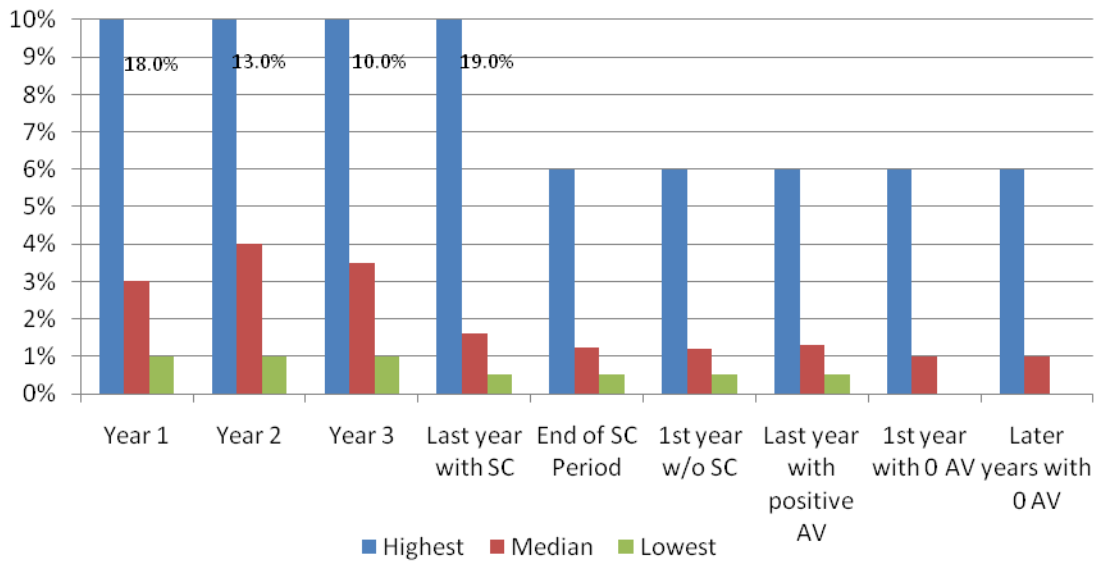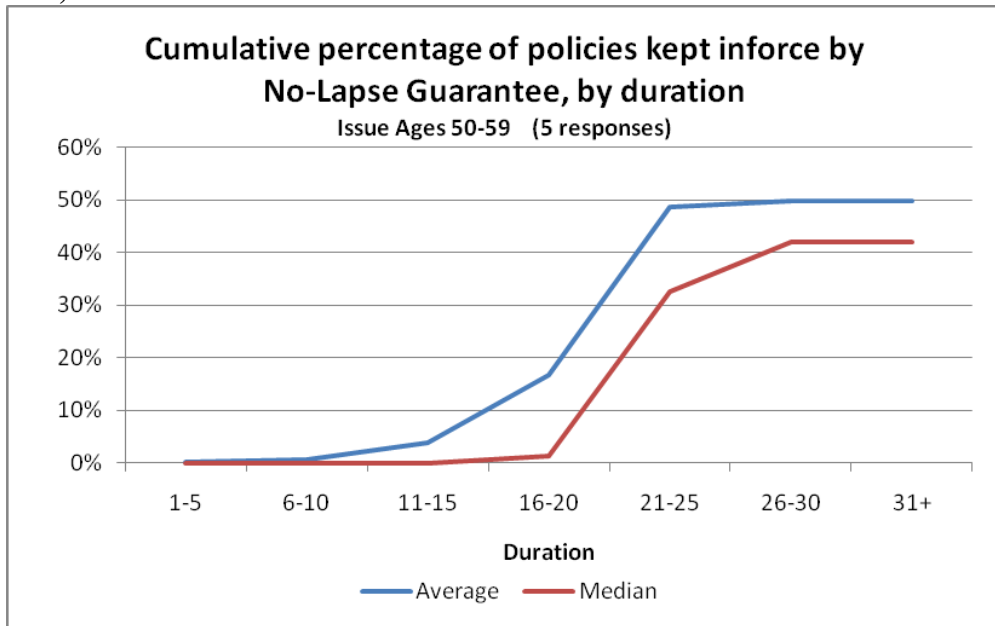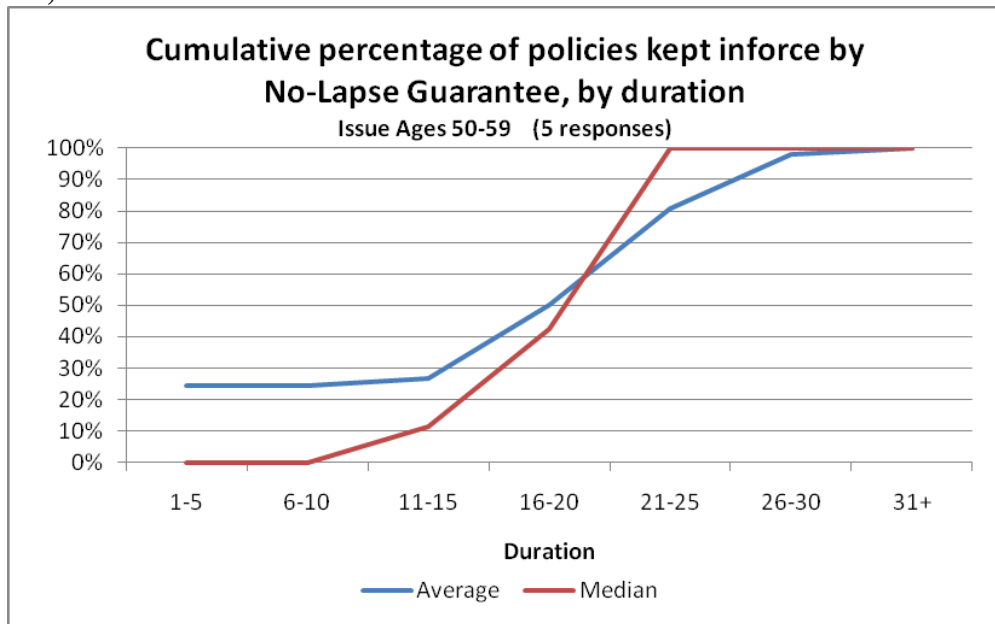
Insurers were asked if there were other occurrences or product features that would significantly affect the lapse rate assumptions and patterns. Several respondents indicated that lapse patterns would be affected by premium patterns; specifically, multiple insurers indicated that lapse rates would be lower for policies without ongoing premium requirements and higher for those with such requirements.

Next the insurers were asked, out of 10,000 newly issued policies in the given issue age range, how many would first have a zero cash surrender value but be kept in force by the secondary guarantee at a given duration. Insurers were asked to focus on issue ages 50-59 if the requested data was not easily available for all issue ages. There were ten responses for this age range with the respondents answering in two different ways. The first way (5 responses) assumed 10,000 policies at the beginning and then the population was decremented over time. The second way (5 responses) assumed 10,000 policies at the end and then illustrated the effect of the no-lapse guarantee going back to the point of issue.

Start with 10,000 Policies

Cumulative percentage of policies kept inforce by No-Lapse Guarantee, by duration

Issue Ages 50-59   (5 responses)

A line chart with y-axis from 0% to 60% and x-axis Duration categories 1-5, 6-10, 11-15, 16-20, 21-25, 26-30, 31+. Two lines: Average (blue) and Median (red).

End with 10,000 Policies

Cumulative percentage of policies kept inforce by No-Lapse Guarantee, by duration

Issue Ages 50-59   (5 responses)

A line chart with y-axis from 0% to 100% and x-axis Duration categories 1-5, 6-10, 11-15, 16-20, 21-25, 26-30, 31+. Two lines: Average (blue) and Median (red).

The survey asked insurers if their lapses varied by distribution system or by premium assumption.

Out of 28 respondents, 15 (54%) indicated that they sold through multiple distributions. The following graph indicates the distribution systems used by these respondents.

Distribution Systems used by Insurers who distribute through multiple systems
(15 responses)
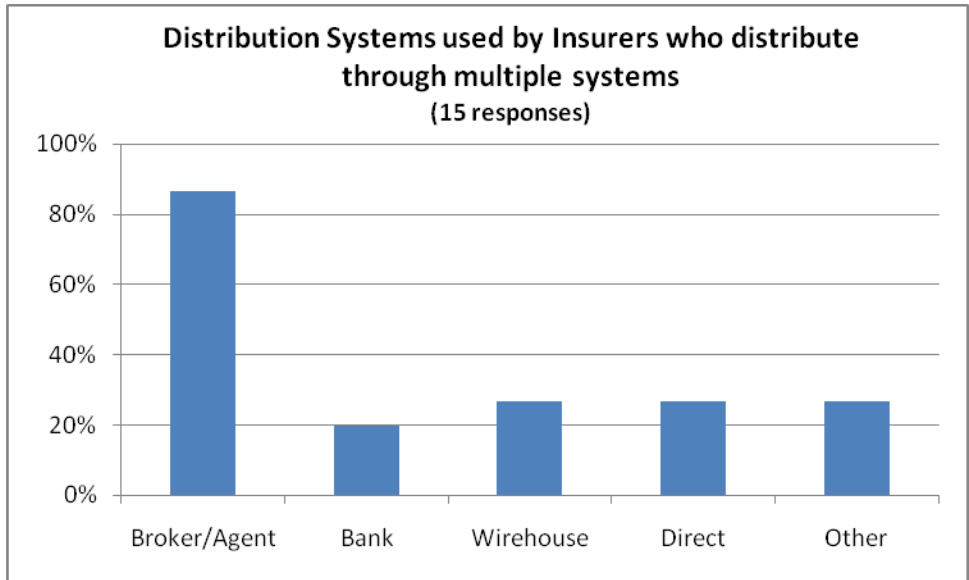
Of the 15 insurers who indicated that they sell through multiple distributions only 5 (33%) measure lapses by distribution system, and only 3 (20%) have lapse assumptions that vary by distribution system. For those that vary assumptions, lapses are assumed to be higher for direct sales than for sales through brokers or agents.

Do lapse rates vary by premium assumption?
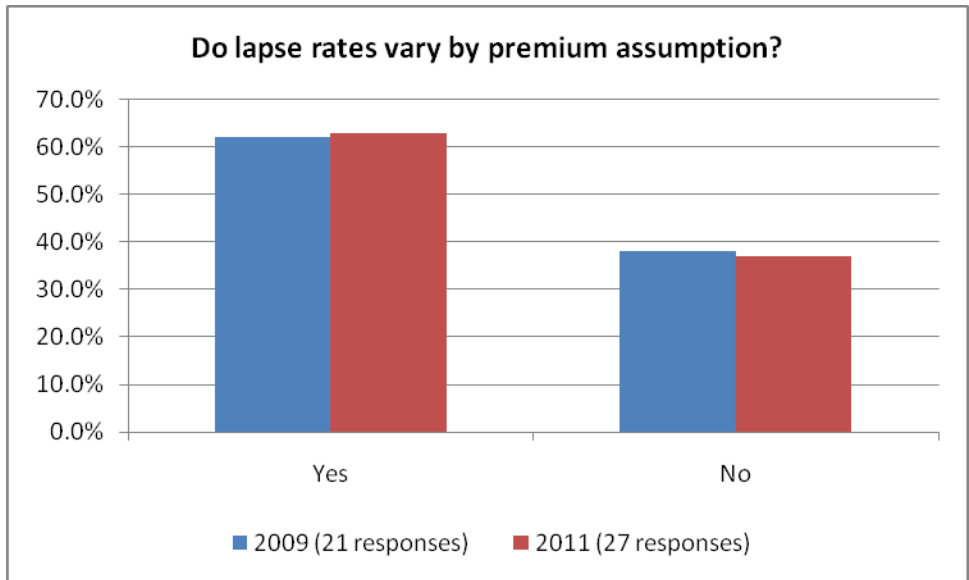
Seventeen respondents indicated that lapse rates vary by premium assumption, an affirmative rate nearly identical to 2009. Nearly all of these respondents indicated that lapse rates vary inversely with the ongoing premium requirement. Single pays have the lowest lapse rates and level minimum pays have the highest. Intermediate premium patterns have intermediate lapse rates and/or lapse rates that drop when the end of the premium paying period is reached and the policy is paid up.

Insurers were asked about the source of their lapse assumptions. Respondents could include more than one source, and 26 of 27 respondents included "Company study" among their answers. "Best estimate" and "Industry study" were the next most popular answers, selected by 89% and 48% of respondents respectively. The percentage of companies incorporating a "Best estimate" factor in their assumptions increased substantially from the previous survey.

What is the source of your company's lapse rate assumptions?
(each insurer could choose more than one option)
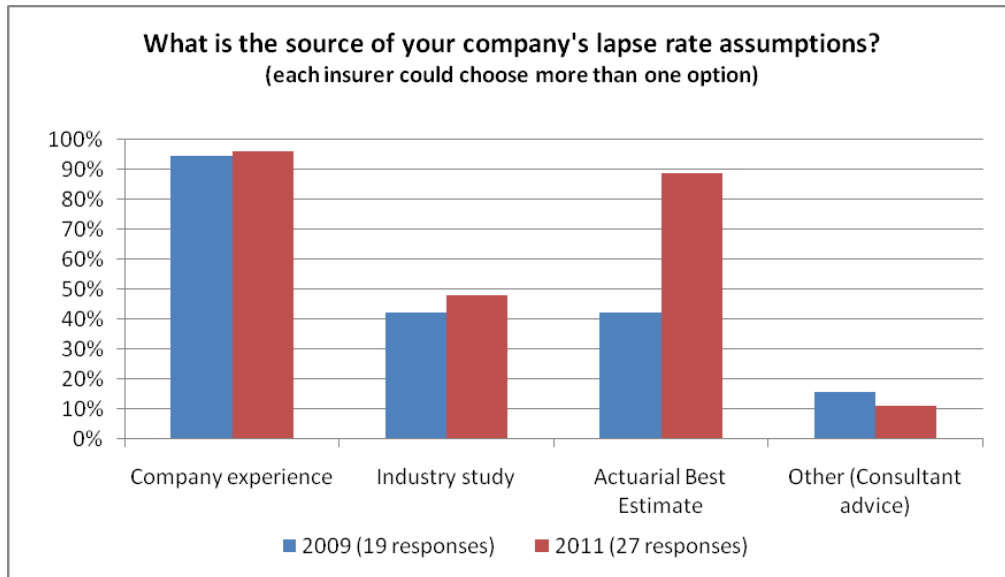
The survey then asked if companies perform lapse studies for UL policies with secondary guarantees, and if so, how frequently. The vast majority (96% - 25 out of 26) perform such lapse studies. The one company that indicated that they do not perform lapse studies went further, responding that they do not contemplate doing lapse studies in the future.

How frequently do you perform lapse studies?
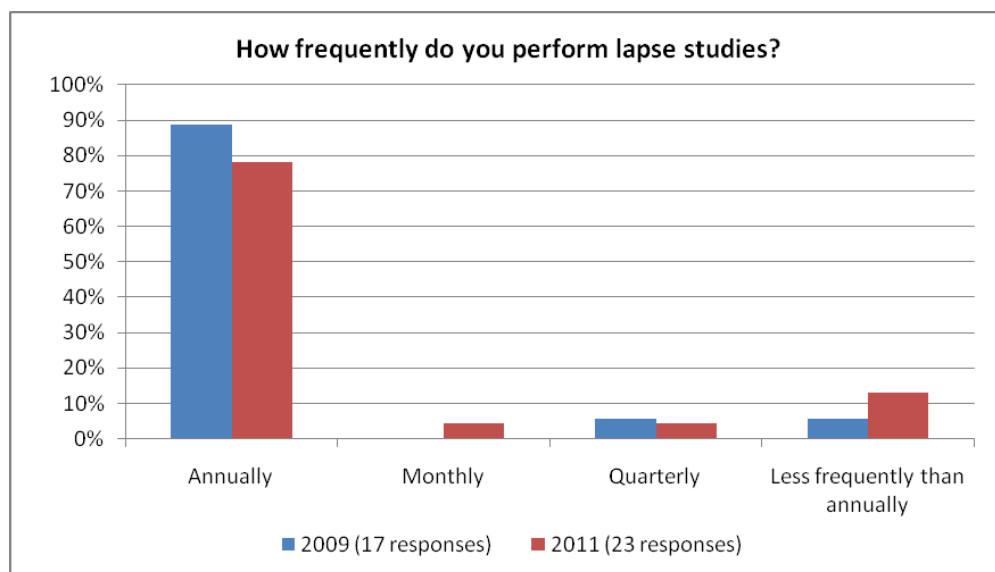
Companies were asked how many years of experience data were used in their latest study.

How many years of experience data were used in your latest lapse study?
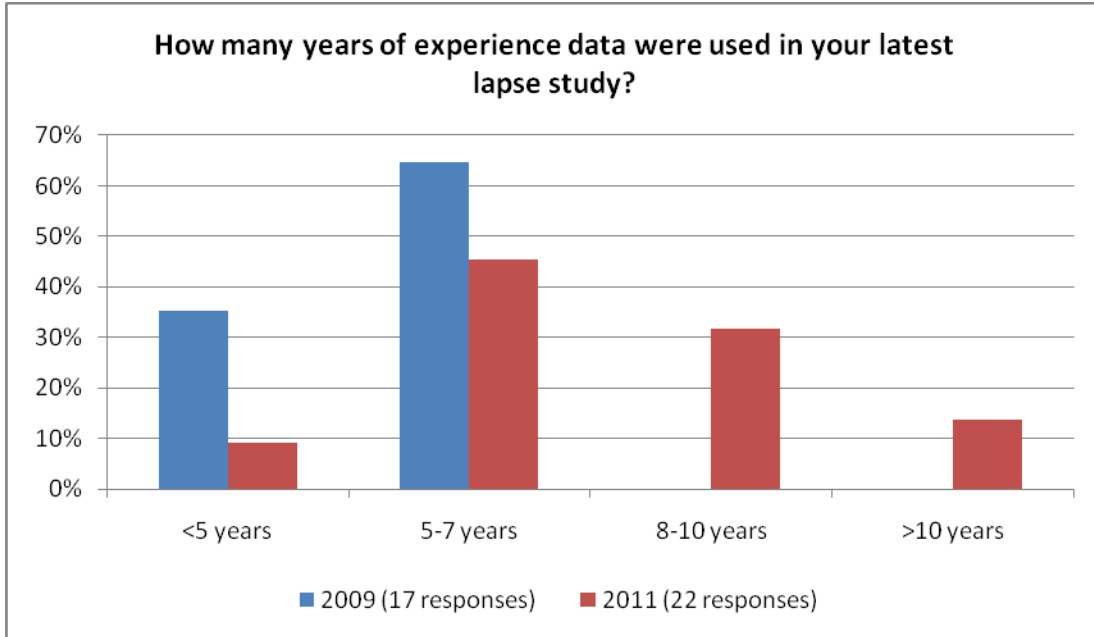
Companies were then asked about their mortality assumptions in the tail.

What reference mortality table do you use?
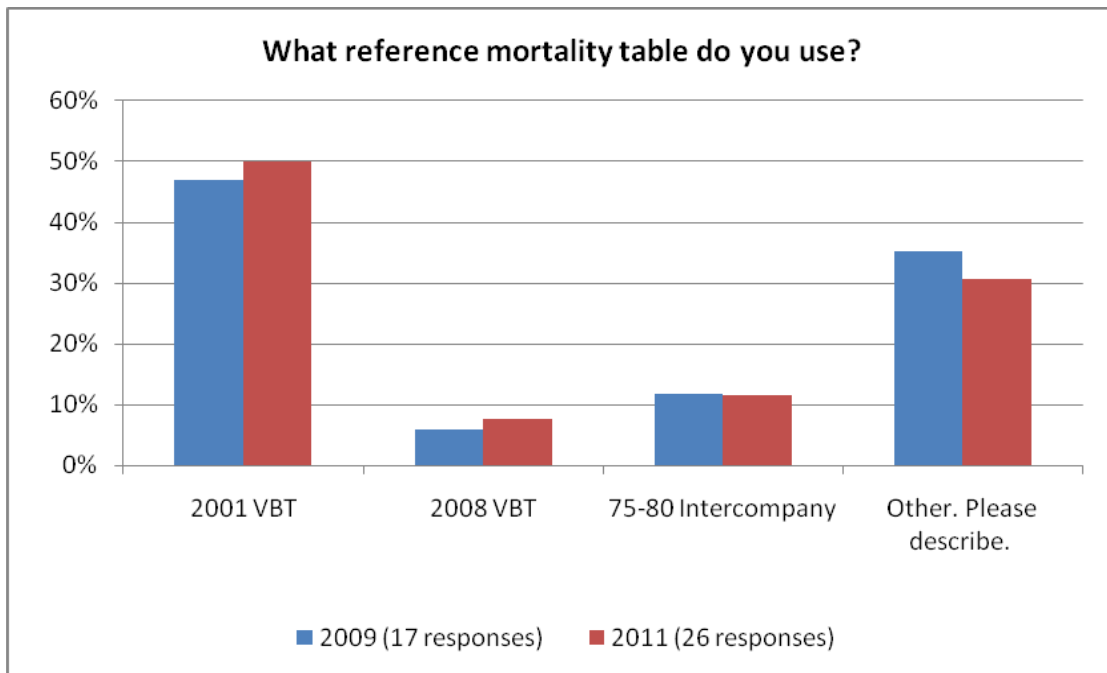
Amongst the eight companies that responded "Other", responses included the 2001 CSO, the 90-95 Select and Ultimate Table and, most frequently, tables derived from company experience.

Twelve companies provided ultimate mortality rates per 1,000 at higher attained ages for various underwriting classes for males and females. The minimum, maximum and median of those

twelve responses are summarized below, with the 2001 VBT rates (ultimate, sex and tobacco distinct, age nearest birthday) for comparison.

Annual mortality rate per 1,000
Male, Best Non-tobacco Class

Legend: Median, Minimum, Maximum, 2001 VBT

Annual mortality rate per 1,000
Male, Standard Non-tobacco Class

Legend: Median, Minimum, Maximum, 2001 VBT

Annual mortality rate per 1,000 Male, Standard Tobacco Class

Annual mortality rate per 1,000 Female, Best Non-tobacco Class

Annual mortality rate per 1,000 Female, Standard Non-tobacco Class

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

How many non-smoker underwriting classes are used?

How many smoker underwriting classes are used?

Assumed future mortality improvement became a slightly more common feature of models.

Are future mortality improvements assumed in your model?

Legend: 2009 (20 responses), 2011 (26 responses)
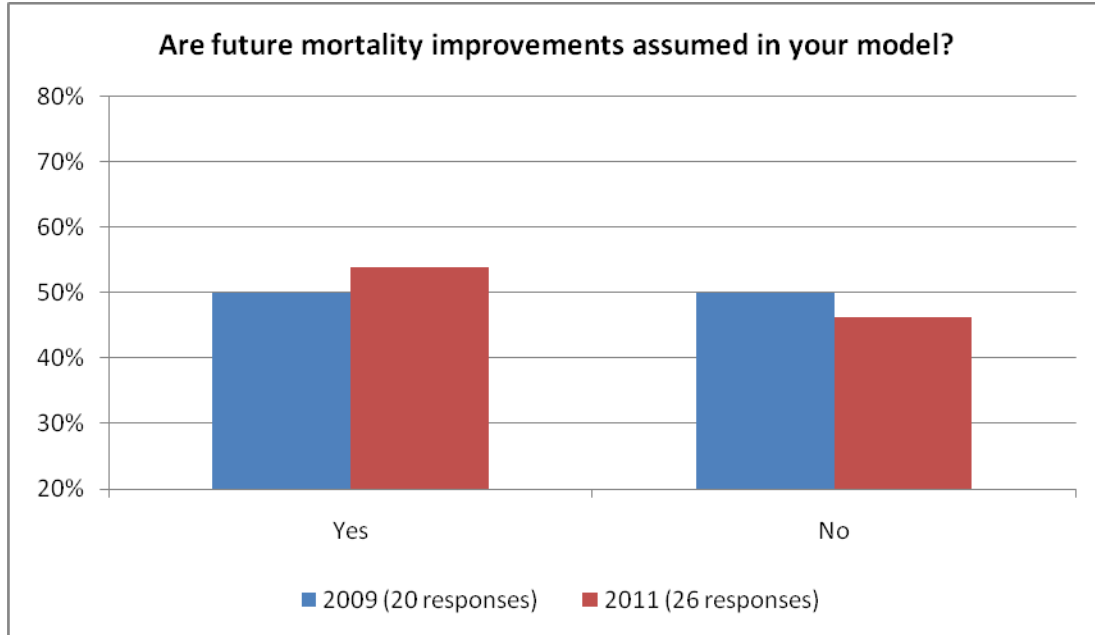
Twelve of the fourteen companies that indicated they included future mortality improvements provided some description of the nature of that improvement. Seven of twelve had improvement assumptions that were sex-distinct, generally with male mortality improving more than female mortality. The duration and annual amount of improvement for male mortality assumptions are summarized below.

Annual amount of mortality improvement for males (10 responses)

Legend: 2011

Duration (number of years) of mortality improvement for males (12 responses)
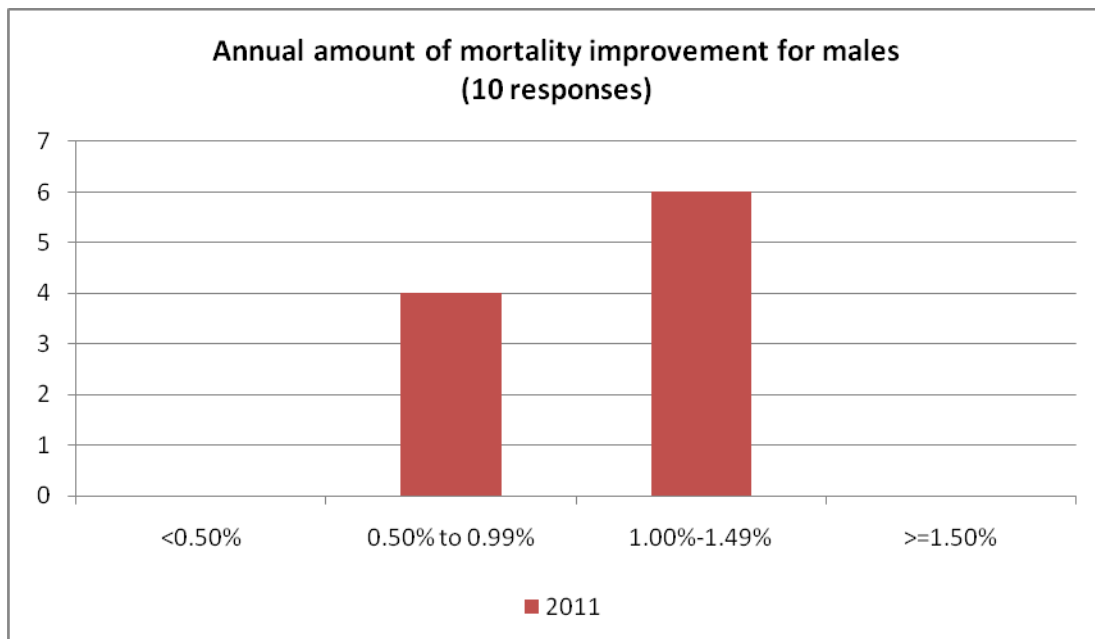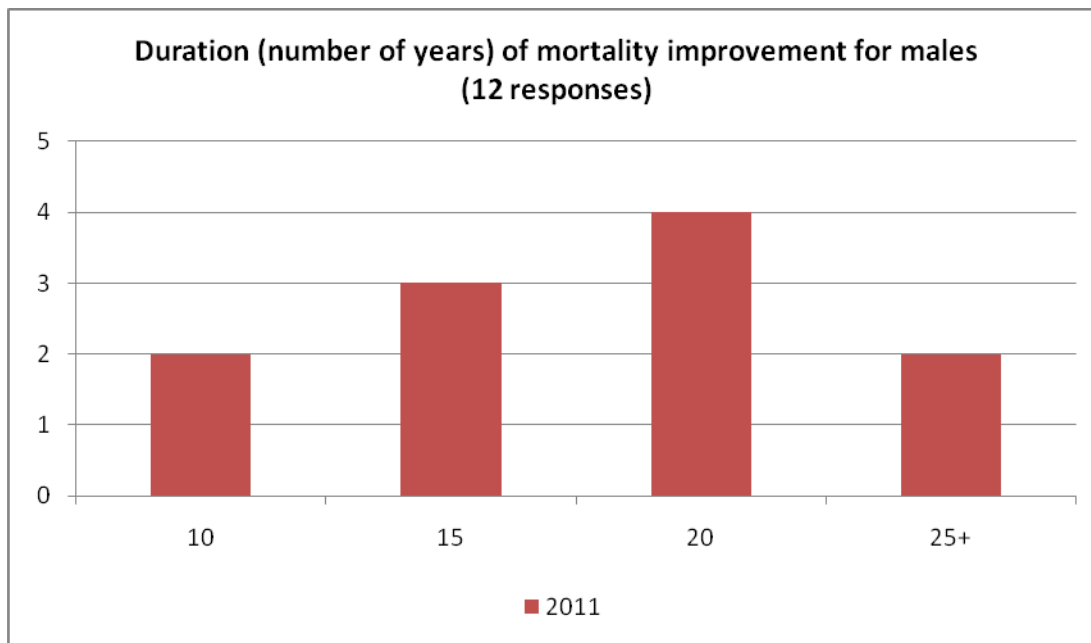
One company responded that mortality improvement was limited in duration without providing a specific number of years of improvement.

In addition to the mortality improvement features described above, the following general conclusions could be drawn from the responses provided:

- The rate of improvement assumed was level or decreasing over time
- If the assumption of mortality improvement varied by smoker class, the improvement rate was assumed to be smaller for smokers than for non-smokers
- Several respondents indicated that improvement rates varied by attained age. In these cases the improvement was generally at a smaller rate for higher attained ages.

Twenty-six companies responded to a question about whether mortality assumptions change when the secondary guarantee is in-the-money. For the second consecutive survey respondents were unanimous in their stance that mortality assumptions do not vary by the in-the-moneyness of the secondary guarantee.

The survey then asked for other assumptions that the companies considered critical to analyzing experience in the tail. A company could indicate more than one response.

What have you found to be the most critical risk assumptions for analyzing experience in the tail?
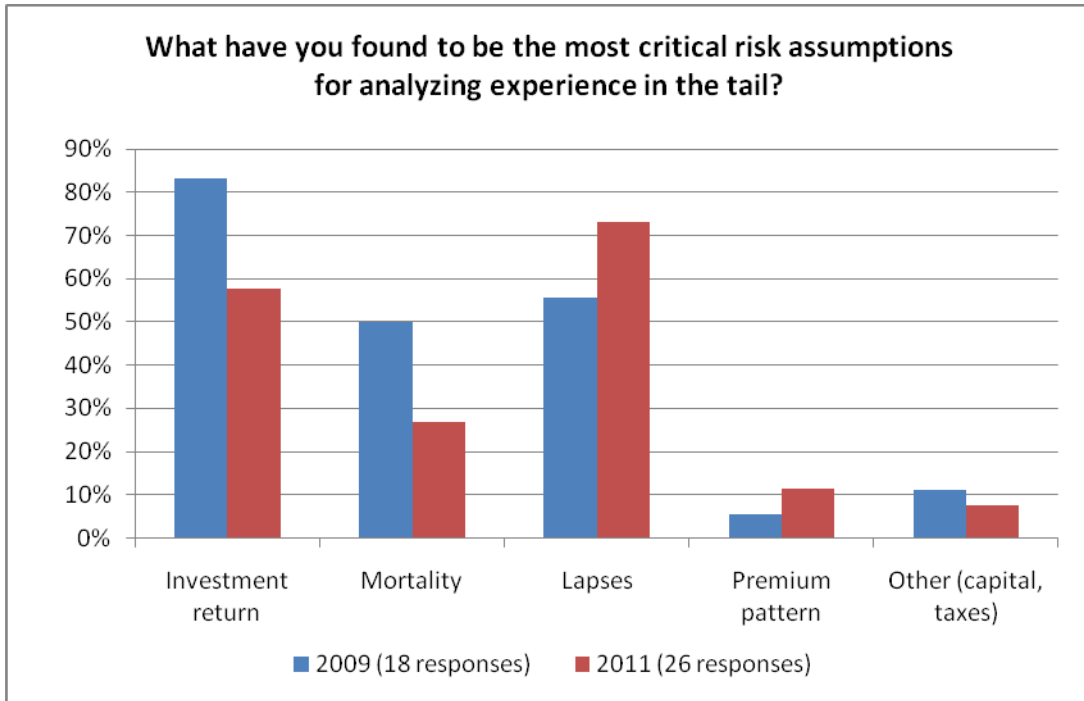
The responses indicated a shift in attention from investment return assumptions and mortality assumptions towards lapse assumptions.

Respondents Profile

Total Face Amount of Universal Life Policies with Secondary Guarantees
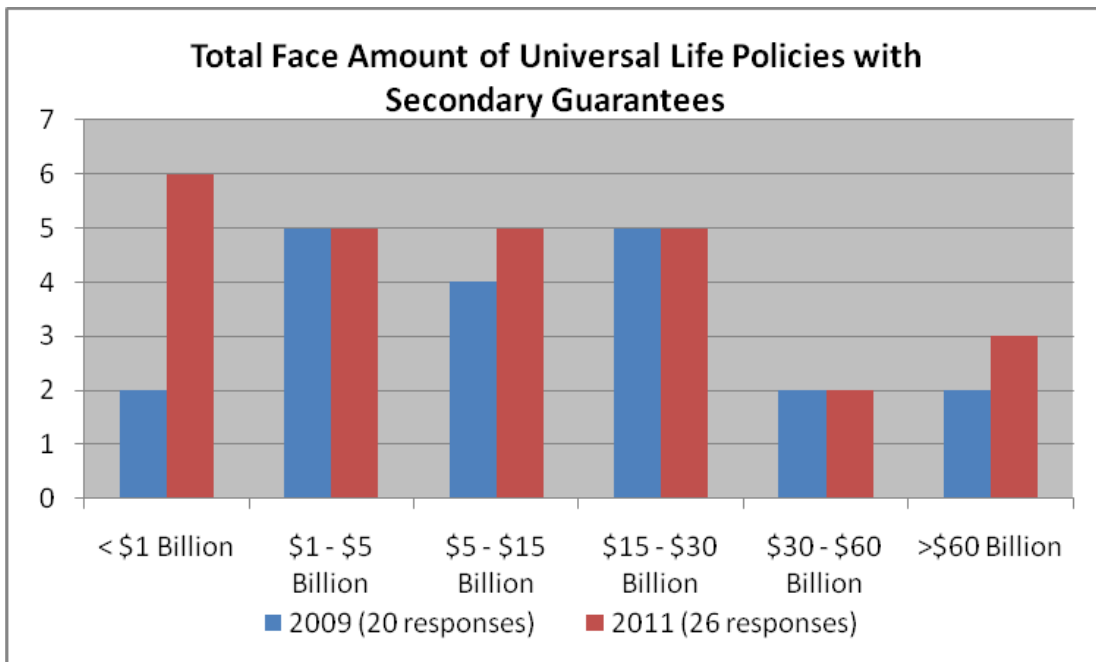
APPENDIX – COMPLETE SURVEY QUESTIONS

Default Question Block

Policyholder Behavior in the Tail
Universal Life with Secondary Guarantees Annual Survey

The Society of Actuaries is continuing to develop better estimates of policyholder behavior in the tail (PBITT) because there is an increasing need for actuaries to assist companies, regulators and others to evaluate required surplus. Our mission is to examine and ultimately give guidance to actuaries on how to set policyholder assumptions in extreme scenarios. We are not focused on more probable scenarios which reserves should cover.

This brief questionnaire, the third of its kind, is designed to confidentially gather the range of assumptions actuaries use in pricing, setting surplus targets, and risk management of secondary guarantees on general account universal life products. Previous results are available on the SOA website. Such "UL with Secondary Guarantee" products provide the policyholder with a guarantee that the death benefit will remain in force under specified circumstances even if the policy's account value is depleted.

Please report the assumptions used for policyholder behavior in the tail, whether or not data are available. Please respond even if you are unable to answer all questions. Partial responses are both acceptable and helpful.

Since efforts are being considered to place more reliance on actuarial judgment, surveys such as this one will help guide those efforts and provide useful background information. Obviously, a greater number of survey participants will enhance the value and usefulness of the survey results. As an added incentive for participants, the results will be provided to them in advance of their availability on the SOA website.

We greatly appreciate your time and efforts in helping us to attain our goal. It is our hope that the results of this annual survey will enhance the actuary's ability to set assumptions for these products in extreme scenarios and also enable better peer review.

We respect the proprietary nature of each company's models, and we can assure you the results will be reported anonymously and that your specific results will be held under the strictest confidence.

Please submit responses to the survey by **June 15, 2011.**

If there is any additional information that you would like to add, please feel free to email it to: bscott@soa.org.

Question 1: BACKGROUND

Secondary Guarantee Benefits on Universal Life Policies
List the approximate size of your company's current total UL book with secondary guarantees.

If a policy has both long-term and short-term guarantees, include the policy in the totals for the long-term guarantees of the appropriate design only.

Type of Secondary Guarantee

	Yr. began writing	Net Premiums ($ millions)	Face Amount ($ millions)	Policy Count (1000s)
Long-term guarantee using **Shadow Account**				

Design				
Long-term guarantee using **Cumulative Premium** Design				
Long-term guarantee using **Other** Design				
Shorter term no-lapse guarantee, up to approx. 10 years				
All other UL with Secondary Guarantees				
TOTAL				

If you would consider your secondary guarantee as non-standard in the industry, please provide further description or unique formulae below or email it to: bscott@soa.org.

Do you have more than one version of secondary guarantee that is material to your company?
If so, please describe any material secondary guarantees not described above. If not, leave blank.

Question 2: TAIL SCENARIO for Universal Life Guaranteed Benefits

Before examining policyholder behavior in the tail, the "tail scenario" needs to be defined. Information on your particular tail scenario will provide a frame of reference for each set of results.

2a. Do you currently use stochastic modeling to set and/or analyze capital levels (i.e., required surplus) for these guarantees?

◯ Yes

◯ No

2b. If so, how many scenarios do you typically model?

2c. How many years in the future do you typically project?

- ○ 30 years or less
- ○ 31-50 years
- ○ 51-75 years
- ○ >76 years / until the last maturity date of any policy issued

2d. If you are performing stochastic modeling on this product, please list the scenario that triggers the largest present value loss (i.e., the greatest amount of death benefits paid in years in which no COI is collected.) If you are not currently using stochastic modeling, please list the deterministic tail scenario.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1 year Treasury Rate										
7 year Treasury Rate										
30 year Treasury Rate										

	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
1 year Treasury Rate										
7 year Treasury Rate										
30 year Treasury Rate										

	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30

1 year Treasury Rate									
7 year Treasury Rate									
30 year Treasury Rate									

	Year 31	Year 32	Year 33	Year 34	Year 35	Year 36	Year 37	Year 38	Year 39	Year 40
1 year Treasury Rate										
7 year Treasury Rate										
30 year Treasury Rate										

Question 3: LAPSE ASSUMPTIONS for Universal Life Secondary Guarantees

3a. Do you use dynamic lapses when modeling Universal Life with secondary guarantees?

○ Yes

○ No

3b. If so, please describe the dynamic lapse functions you are using for each major product design with a secondary guarantee benefit on universal life policies.

Question 4: LAPSE RATES IN THE TAIL for Universal Life Secondary Guarantees

4a. Please enter the lapse rate assumed in the tail scenario listed in Question 2d.

	Issue ages 20-29	Issue ages 30-39	Issue ages 40-49	Issue ages 50-59	Issue ages 60-69	Issue ages 70+
Year 1						

Year 2				
Year 3				
Last year with surrender charge				
At end of surrender charge period				
First year after end of surrender charge period				
Last year before zero cash surrender value				
First year of zero cash surrender value				
For later years with zero cash surrender values				

4b. If there are any other occurrences or product features than those listed in 4a that would significantly affect the lapse rate assumptions and patterns, please describe:

Question 5: No lapse guarantees are considered to be "in-the-money" when the surrender value of the policy is zero, but the policy is kept inforce by the presence of the guarantee (e.g. the cumulative premium requirement is satisfied or the shadow account is positive). If the "in-the-moneyness" of the no-lapse guarantee is what causes a given scenario to be in the tail, you would expect that scenario to show a relatively large number of policies that are kept inforce - starting at some future first duration and continuing thereafter - solely because of the no-lapse guarantee. This question seeks to evaluate the distribution of that first duration.

For the tail scenario listed in 2d, if you had issued 10,000 policies at a given issue age, how many would you expect to <u>first</u> extinguish their cash value (i.e., first occurrence of surrender value = 0) in the following durations? If this information is not readily available for all issue ages and has to be developed, please focus on Issue ages 50-59.

	Issue ages under 20	Issue ages 20-29	Issue ages 30-39	Issue ages 40-49	Issue ages 50-59	Issue ages 60-69	Issue ages 70+
Durations 1-5							
Durations 6-10							
Durations 11-15							
Durations 16-20							
Durations 21-25							
Durations 26-30							
Durations 30+							

Question 6: LAPSE RATES BY DISTRIBUTION SYSTEM for UL Secondary Guarantee Benefits

6a. Do you sell business through different distribution systems?

⦿ Yes

⦿ No

6b. If so, what distribution systems do you use?

☐ Broker/Agent

☐ Bank

☐ Wirehouse

☐ Direct

☐ Other. Please List. _____

6c. Do you measure lapse experience separately by distribution system?

⦿ Yes

⦿ No

6d. Whether or not you have actually measured lapse experience by distribution system, do your lapse assumptions vary by distribution system?

⦿ Yes

⦿ No

6e. If so, please describe the differences in the lapse assumptions.

Question 7: LAPSE RATES BY PREMIUM PATTERN for UL Secondary Guarantee Benefits

7a. Do your lapse assumptions vary by premium pattern, e.g. level premium vs. paid up?

⦿ Yes

⦿ No

7b. If so, please describe the premium patterns and differences in lapse assumptions.

Question 8: SOURCES of Universal Life Secondary Guarantee Lapse Rate Assumptions

8a. What are the sources of your lapse assumptions? Check all that apply.

☐ Company experience study

☐ Industry study

☐ Actuarial judgment/best estimate

☐ Other (e.g. consultant advice, predictive modeling, etc.) Please describe.

8b. Does your company perform lapse studies of this product and benefit?

◯ Yes

◯ No

8c. If so, how often?

8d. How many years of experience data were used in your latest study?

8e. If your company doesn't perform lapse studies of this product and benefit, does it contemplate doing so in the future?

○ Yes

○ No

Question 9: MORTALITY RATES IN THE TAIL for UL Secondary Guarantees

9a. What reference table is your older-age mortality assumption based upon?

○ 2001 VBT

○ 2008 VBT

○ 75-80 Intercompany

○ Other. Please describe.

_____

9b. Please enter the ultimate mortality rates in the tail scenario described in question 2d expressed as an annual rate per 1,000. Note that "Std" in the table below refers to the worst mortality that is not table rated. "Smoker" class will include "Tobacco" class, and "Non-Smoker" class will include "Non-Tobacco" class.

	Male - Best Class Non-Smoker	Male - Std Non-Smoker	Male - Std Smoker	Female - Best Class Non-Smoker	Female - Std Non-Smoker	Female - Std Smoker
Age 80						
85						
90						
95						
100						
105						
110						
115						
120						

9c. How many Non-Smoker Underwriting Classes are used (excluding gender and rated substandard classes)?

9d. How many Smoker Underwriting Classes are used (excluding gender and rated substandard classes)?

9e. Are future mortality improvements assumed in your model?

○ Yes

○ No

9f. If so, please describe your assumed improvement schedule.

9g. Does your mortality assumption change when the Secondary Guarantee is in-the-money (e.g., account value = 0, but policy is still inforce)?

○ Yes

○ No

9h. If so, please describe the change.

Question 10: CRITICAL ASSUMPTIONS

10. Considering all the assumptions covered in the previous questions, as well as any other assumptions that are tested for your product, what have you found to be the most critical risk assumption for analyzing experience in the tail? (Multiple responses are allowed.)

☐ Investment return

☐ Mortality

☐ Lapses

☐ Other. Please describe.

_____

Question 11: COMMENTS

Please add any additional explanatory comments or clarifications.

Question 12:

Please provide us with a primary and secondary contact in case we need to follow-up with you on your submission.

	Name	Telephone	Email
Primary			
Secondary			

Please contact bscott@soa.org if you have any questions regarding this survey.