

**POLICYHOLDER BEHAVIOR IN THE TAIL
VARIABLE ANNUITY GUARANTEED BENEFITS SURVEY/C3 PHASE II
2007 AND 2008 RESULTS**

Highlights of Survey

- 1,000 scenarios and a 30 year projection horizon are by far the most popular C3 Phase II calculation parameters.
- There is a very wide variation in the description of the tail scenario across insurers.
- About 75% of insurers do not use dynamic lapses for death benefits.
- The vast majority of insurers (95%) use dynamic lapses for living benefits, however only 6% of those described their function as two-sided, where lapses decrease when benefits are in-the-money as well as increase when benefits are out-of-the-money.
- Around 70%-80% of insurers model dynamic utilization for income and withdrawal benefits.
- There are large differences in lapse rates provided by insurers for both death benefits and withdrawal benefits.
- Company experience continues to be the most popular response (95% of insurers) regarding the source of assumptions.
- Among all companies that perform experience studies, most insurers (65%) perform them annually.

Acknowledgements

The Society of Actuaries' Policyholder Behavior in the Tail (PBITT) working group gratefully acknowledges Stephen Hodges and Michael Altier for all of their efforts in analyzing the survey data and drafting the results report.

Special thanks to all of the companies that responded to the survey and provided helpful information. Without their efforts, this survey would not be possible.

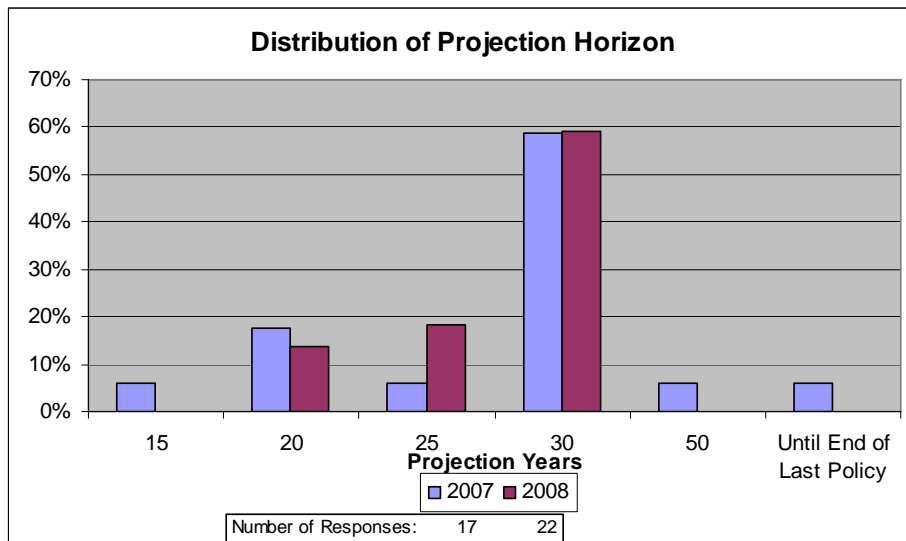
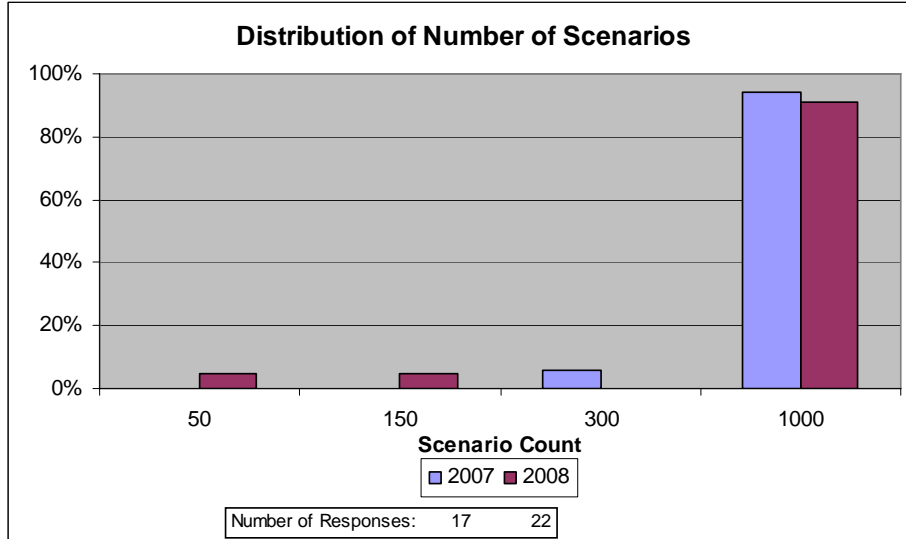
The Policyholder Behavior in the Tail group is interested in comments on the survey and results. Please e-mail comments to either Jim Reiskytl, Chair of the Policyholder Behavior in the Tail group at jimreiskytl@wi.rr.com or Steven Siegel, Society of Actuaries Research Actuary at ssiegel@soa.org.

Background

In late 2005, the Society of Actuaries' Policyholder Behavior in the Tail (PBITT) working group distributed a survey to insurers. The goal of the survey was to gain insight into companies' assumptions of variable annuity policyholder behavior in the tail of the C3 Phase II calculation. This survey was also offered in early 2007 and again in early 2008. Each survey had around 20-25 responses, however not every company answered every question. The following sections highlight responses from 2008 and, where applicable, show how answers compare to 2005 and 2007 surveys. As a way to judge the credibility of results, most charts indicate how many companies responded to the question for each survey year.

Specifics of C3 Phase II Calculation

Insurers were asked to provide details on their C3 Phase II calculation such as the number of scenarios used, and the length of projection horizon. Answers were similar to 2007 in that most insurers project 1000 scenarios for 30 years. However, answers regarding the projection horizon were more widely dispersed in 2007 than in 2008.

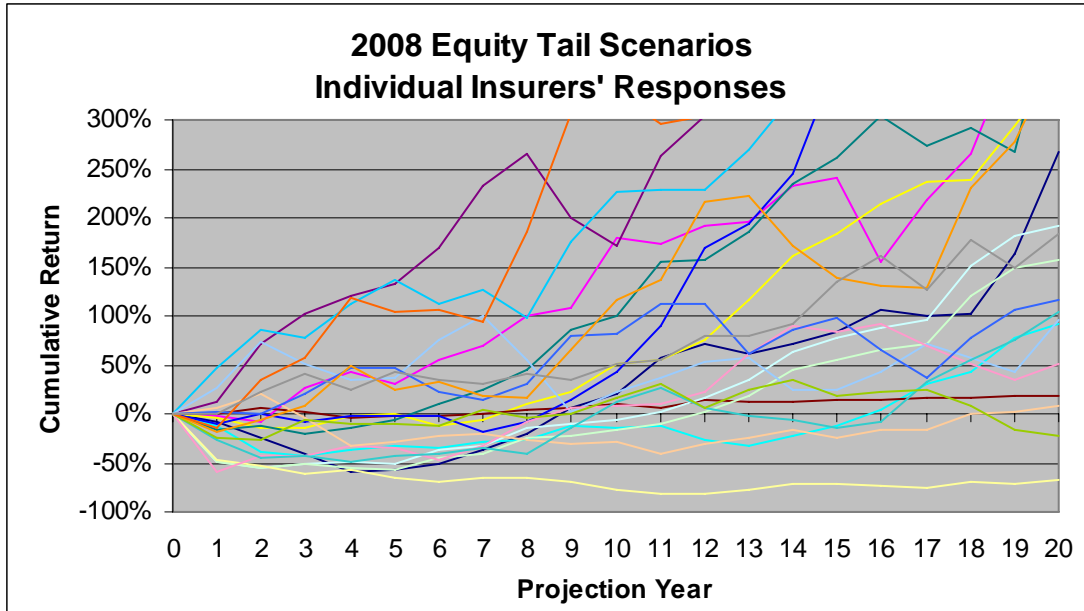


*2005 answers were not available for comparison.

Tail Scenario

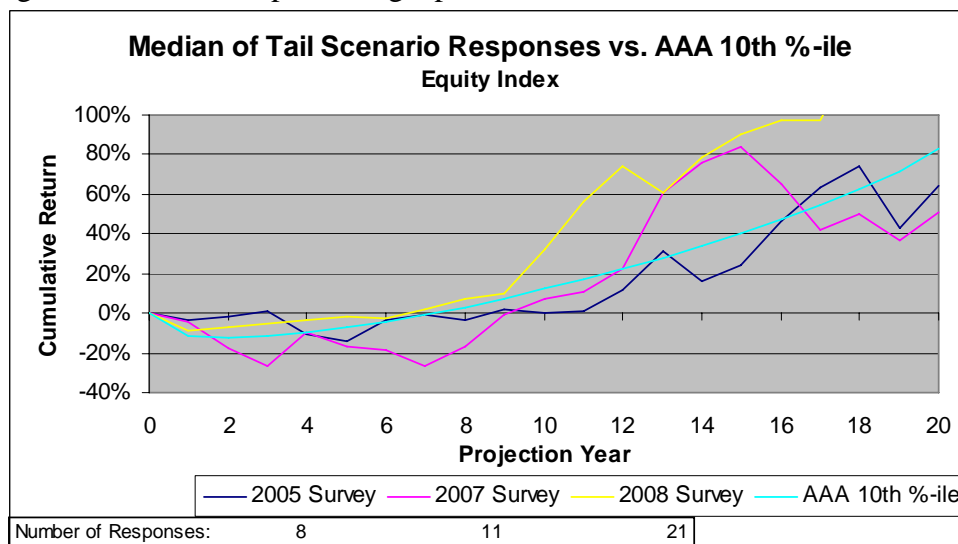
Insurers were asked to describe the tail scenario that gives the first positive Additional Asset Requirement (AAR). For example, if the sorted AARs for each scenario in the tail were 100, 90, 50, 30, 15, -5, -20,..., the scenario the insurer would provide would be the one that produced an additional asset requirement of 15.

Responses varied widely across insurer regarding the description of the tail scenario. The chart below shows each insurer’s description of the equity performance in their tail scenario.



One explanation of the variation could be the wide variety of guarantees sold. Companies with substantial ratcheting guarantees may be most hurt by a rapidly rising scenario followed by a crash, but this scenario may not be in the tail of companies with return of premium guarantees.

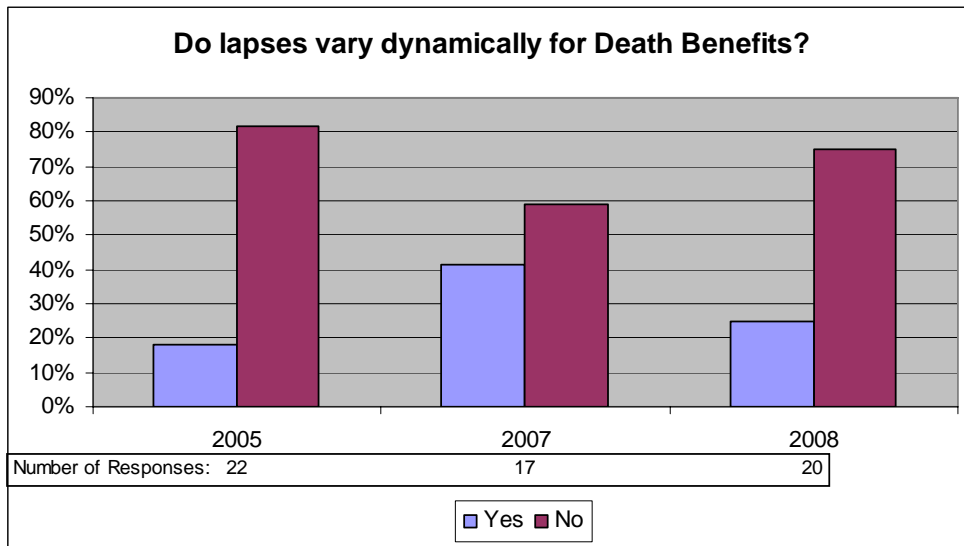
In the chart below, the median of the lines above is plotted against the 10th percentile of the equity returns from the American Academy of Actuaries pre-packaged scenario set (http://www.actuary.org/life/phase2_2.asp). For reference, the median of insurers' responses from the 2005 and 2007 surveys are also plotted on the graph below. Note that the lines below reference the median (of each survey year) and 10th percentile (of the AAA scenarios) of the cumulative gains, rather than representing a particular scenario.



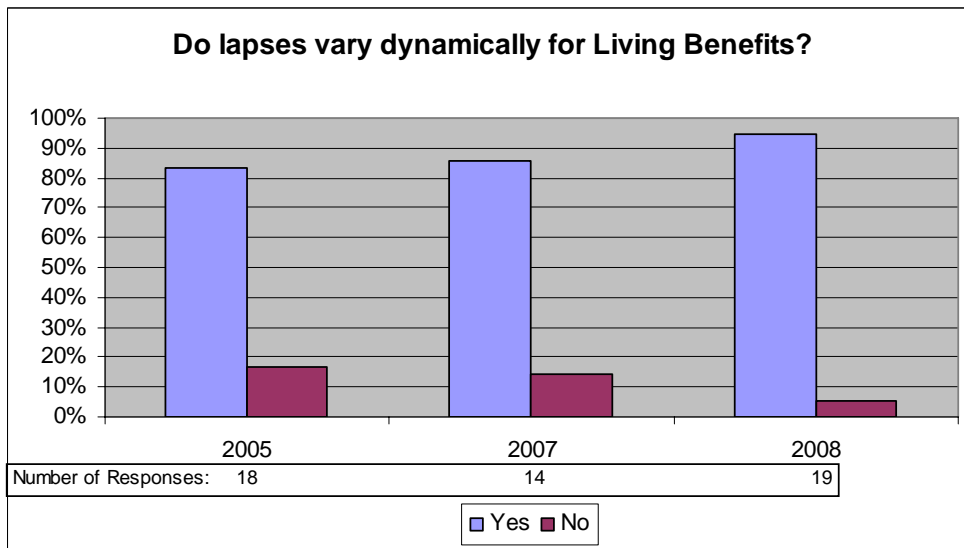
Over the first nine years, the 2008 survey results are fairly close to the 10th percentile of the AAA set, however starting in year 10 the returns diverge.

Dynamic Lapses and Dynamic Utilization

The charts below show the percentage of insurers that use dynamic lapses for variable annuities with death benefits and variable annuities with living benefits.

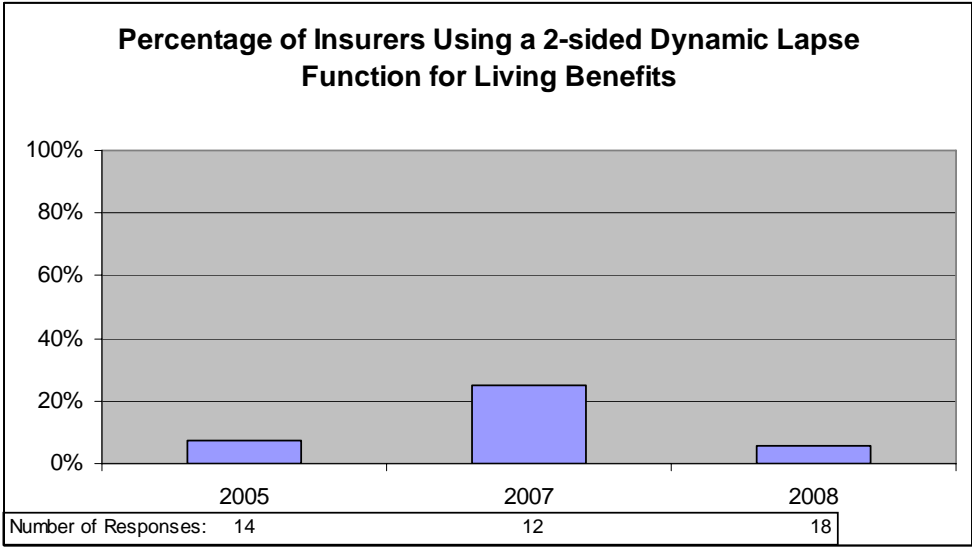


Although the vast majority of insurers do not use dynamic lapses for death benefits, those that do described their function. In all three survey years, all dynamic lapse functions for death benefits have been 1-sided (lapses slow when benefits are in-the-money, but do not speed up when benefits are out-of-the-money).

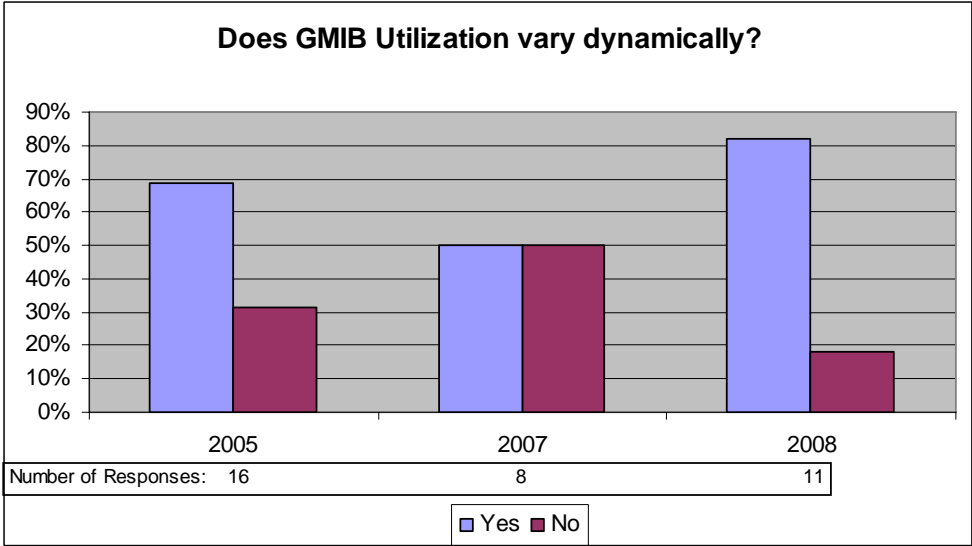


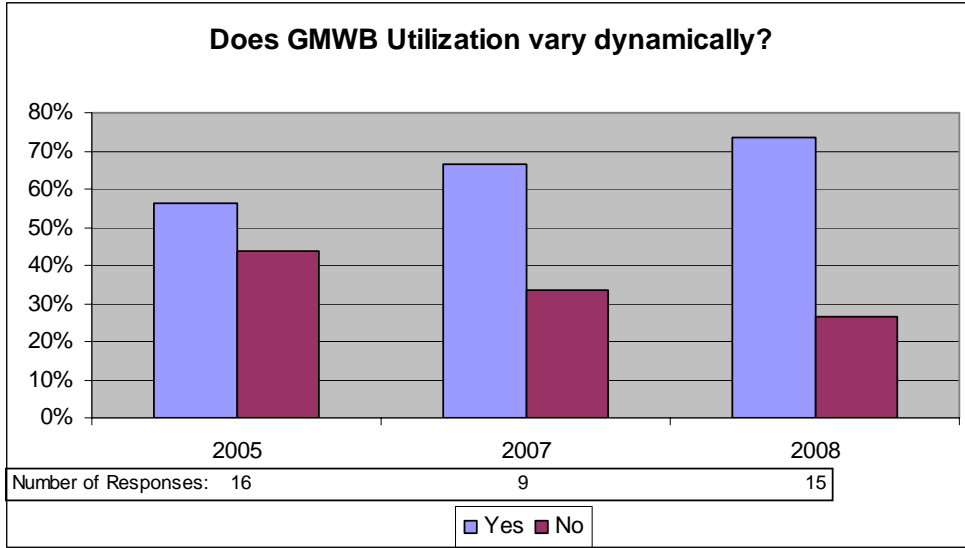
An overwhelming majority of insurers use dynamic lapses for living benefits. Although the sample size is small, there is a noticeable trend in the percentage of insurers using dynamic lapses with living benefits. The percentage of insurers using dynamic lapses has risen from 83% in 2005 to 95% in 2008.

Insurers were also asked to describe their living benefit dynamic lapse function. This question yielded a wide variety of responses, however most insurers described a 1-sided dynamic function that only slows lapses when the guarantee becomes in-the-money. A very small number of insurers described a two sided dynamic function, where lapses also speed up when guarantees are out-of-the-money.



The charts below show the percentage of insurers who use dynamic utilization functions for Income Benefits and for Withdrawal Benefits.

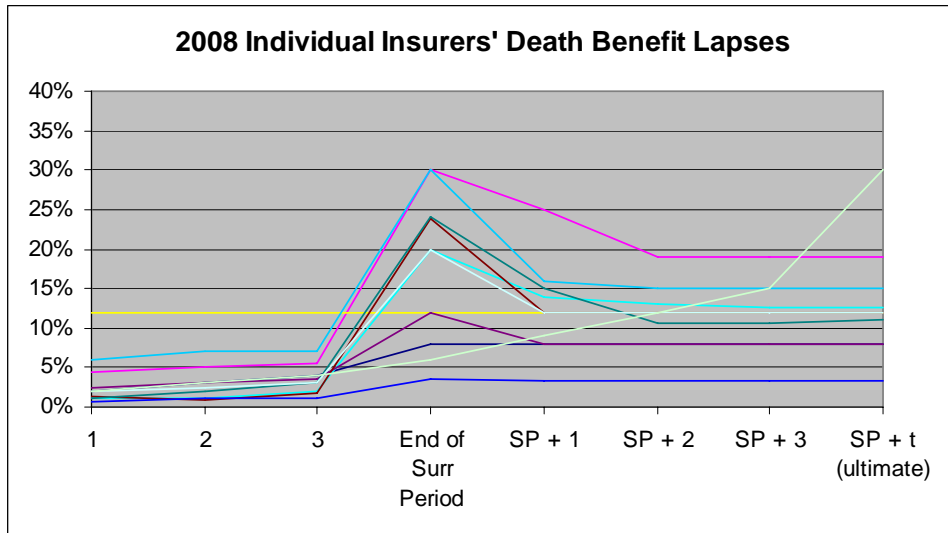


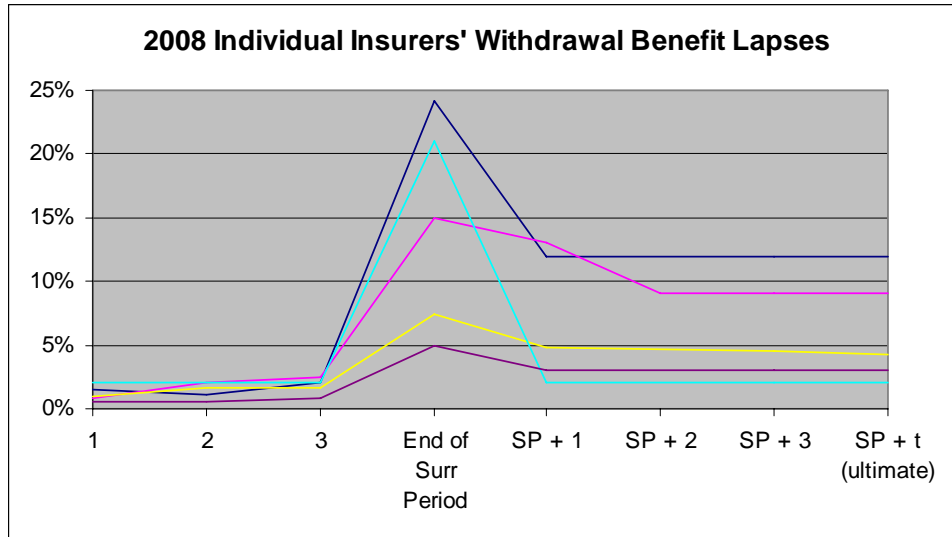


Dynamic utilization for GMWBs has risen steadily from about 55% in 2005 to more than 70% in 2008.

Lapses in the Tail

Insurers were asked to list the actual lapse rate experienced in the tail for Death, Maturity, Income, and Withdrawal benefits. Lapse rates are provided at policy years 1, 2, and 3, as well as several durations following the surrender charge period.

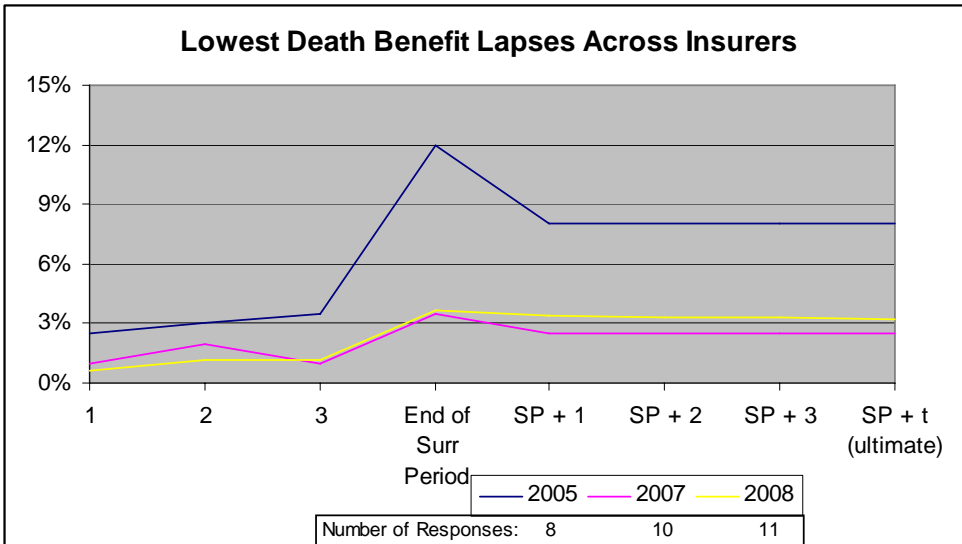
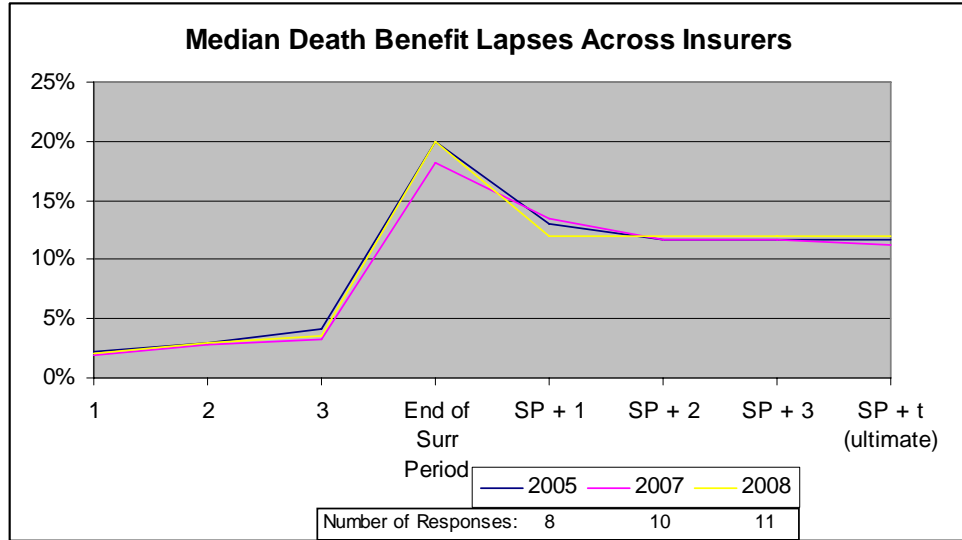
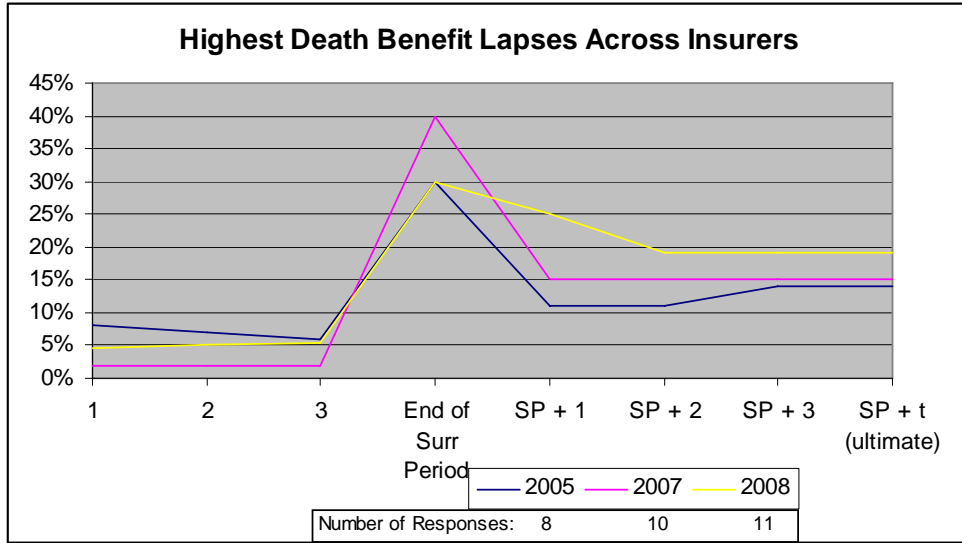




No insurer provided maturity benefit lapse rates and only one provided rates for income benefits.

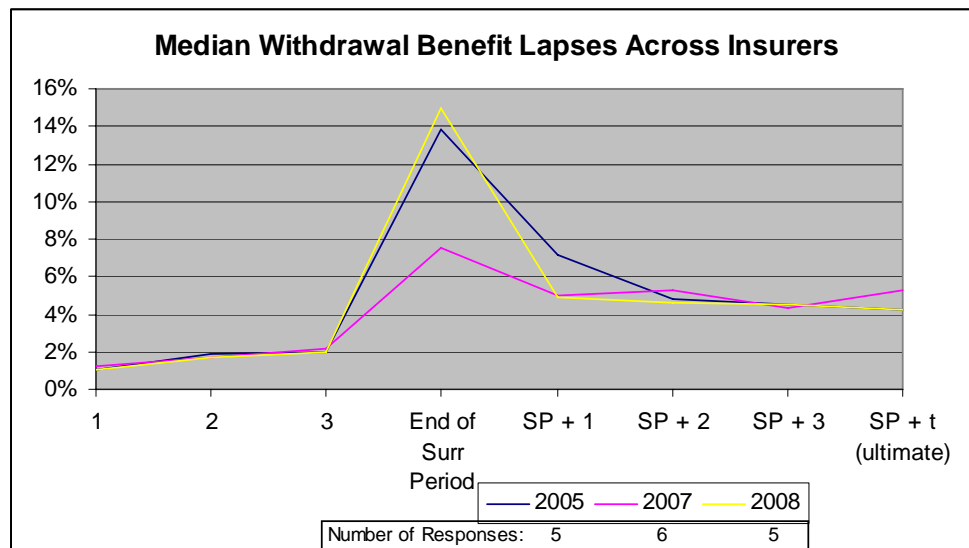
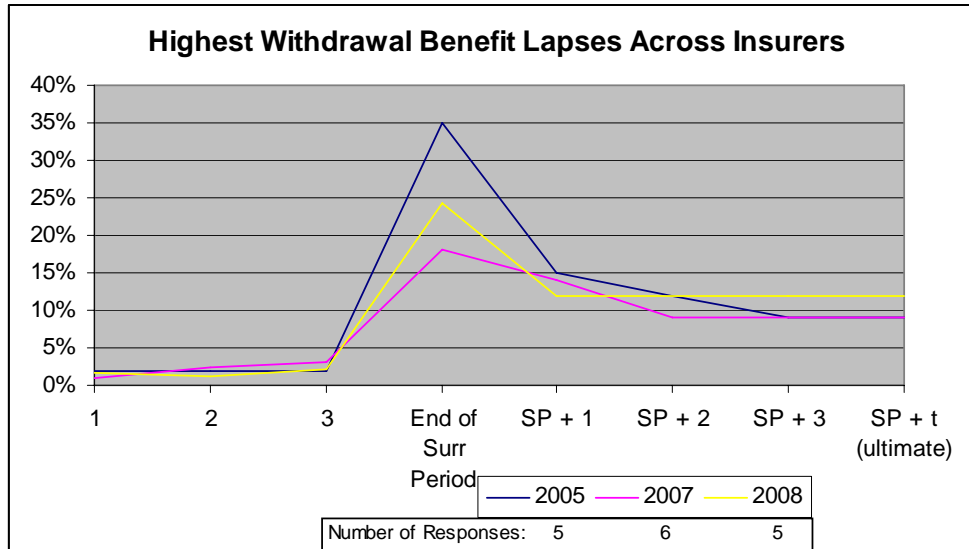
As a way to compare 2008 to prior years, the charts below show the highest, median, and lowest lapse rates in the tail for Death Benefits and Withdrawal Benefits for 2005, 2007 and 2008 surveys. Due to the low response rates, Income Benefits and Maturity benefit comparisons are omitted.

Death Benefits (Note that each graph has a different y-axis scale.)

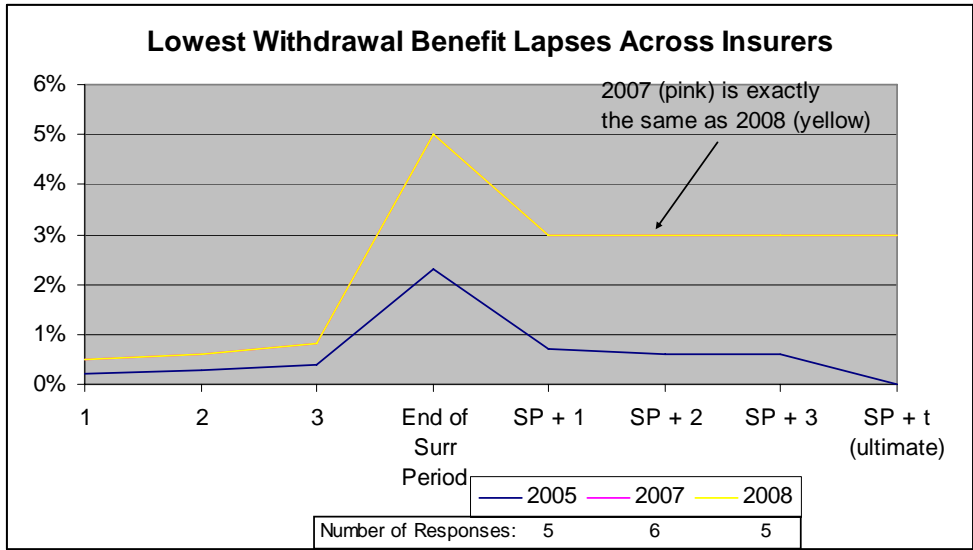


The median lapse rates for death benefits have remained quite stable over the three survey years, while the lowest lapse rate has come down substantially since 2005.

Withdrawal Benefits (Note that each graph has a different y-axis scale.)



Median withdrawal benefit lapse rates are relatively consistent across the three surveys with the exception of the shock lapse at the end of the surrender charge period. 2007 responses indicated a much lower shock lapse than 2005 or 2008.



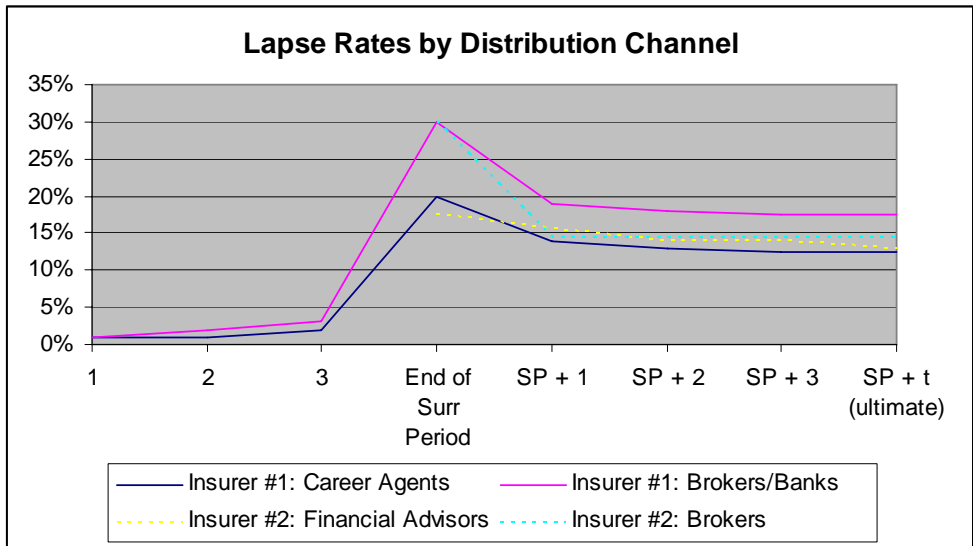
The lowest lapse rate provided by insurers for withdrawal benefits was higher in 2007 and 2008 than in 2005 (although notice the relatively small scale on the chart above).

Income and Withdrawal Utilization

Insurers were also asked to describe their Income and Withdrawal utilization assumptions. Of the three that described their Income utilization function, all indicated utilization varies by in-the-moneyness, and two of the three also vary utilization by age and duration. However regarding Withdrawal benefits, only one company out of five varies utilization by in-the-moneyness. The other companies indicated their functions vary by age and duration, and two of the four explicitly described different cohorts of withdrawal behavior.

Lapses by Distribution

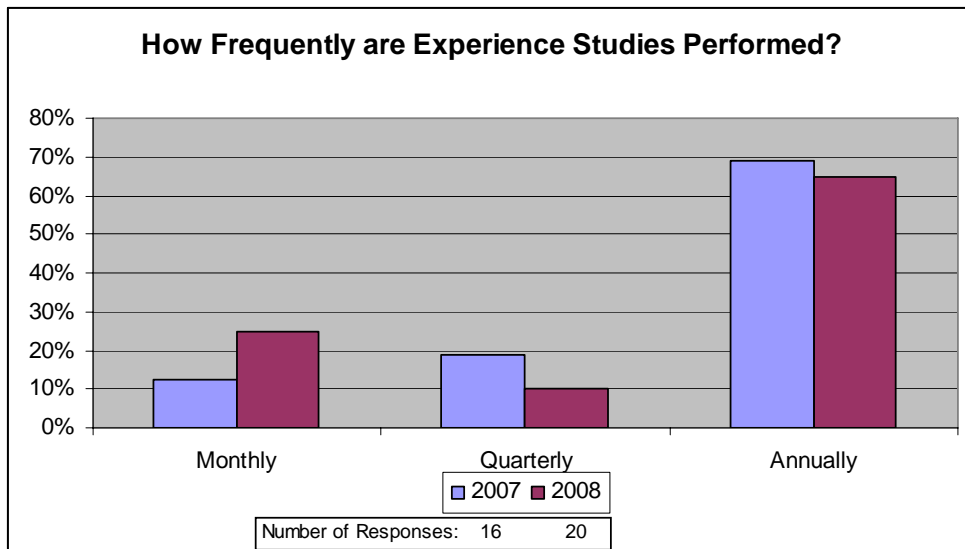
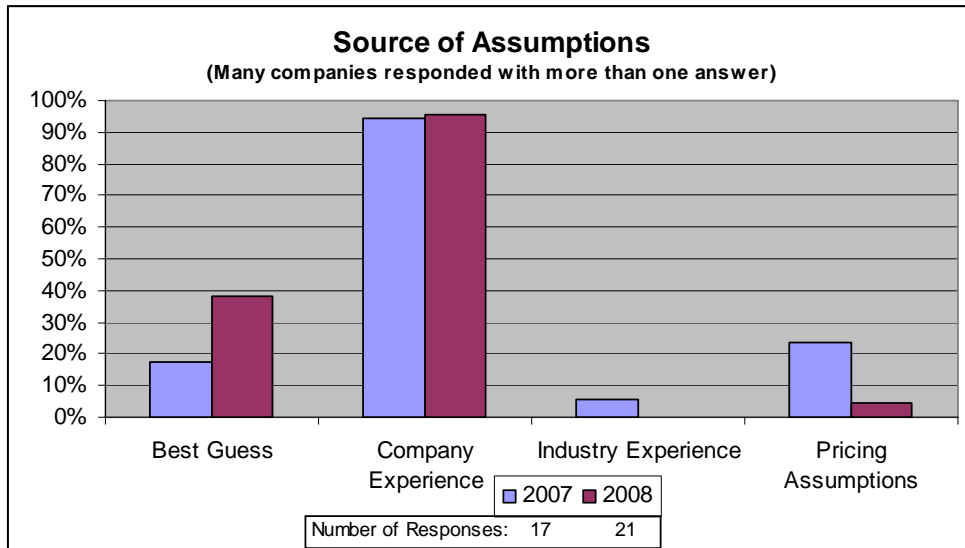
Two insurers provided their lapse assumption by distribution channel.



*Insurer #2 didn't provide lapse data for policy years 1, 2, or 3

Source of Assumptions

Insurers were asked to provide the source they used for their lapse assumptions, as well as the frequency of lapse studies performed in the company. Clearly company experience studies are the most popular source of baseline assumptions, and companies that perform experience studies most often perform them annually. Note that in 2008 no companies indicated that they used industry experience. It is our hope that with the publication of these and future survey results, we'll increase the availability of industry experience for all companies to consider when setting assumptions or when extrapolating to the tail.



*2005 answers were not available for comparison.

APPENDIX – COMPLETE SURVEY QUESTIONS

Policyholder Behavior in the Tail
Third Annual Variable Annuity Guaranteed Benefits Survey

The Society of Actuaries' Risk Management Task Force is trying to develop better estimates of policyholder behavior in the tail (PBITT). Our mission is to examine and ultimately give guidance to actuaries on how to set policyholder assumptions in extreme scenarios. We are most interested in the assumptions for the scenarios in the 90 CTE calculations if stochastically modeled, or the assumptions for events that occur above two standard deviations of expected experience.

This brief questionnaire, the third of its kind, is designed to confidentially gather the range of assumptions actuaries use in pricing, reserving, and risk management of secondary guarantees on Variable Annuity products, such as death benefits, income benefits, withdrawal benefits and maturity benefits. The definitions of these benefits are as follows:

- Guaranteed Minimum Death Benefit (GMDB)
guarantees minimum account value at death

- Guaranteed Minimum Income Benefit (GMIB)
guarantees minimum monthly income at annuitization

- Guaranteed Minimum Withdrawal Benefit (GMWB)
guarantees a minimum stream of income, provided it is withdrawn within specified limits over time

If data is not available, please report your best estimate assumptions for behavior in the tail. Please respond even if you are unable to answer all questions. Partial responses are both acceptable and helpful. Kindly disregard any questions that are not relevant to your business.

Since capital adequacy (or RBC) for these benefits on a new basis was required as of 12/31/05, we hope more companies will participate in the third survey. 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 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 **October 22**.

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

Question 1: BACKGROUND Variable Annuity Guaranteed Benefits Information

List the approximate size of your company's current total VA book by line (understanding there may be some benefits with more than one guaranteed benefit). Please enter amounts in millions. For example, 20,000,000 should be entered as 20.

	Yr began writing	Net Premiums	Account Value	Guaranteed Value
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Question 1: VAGB

GMDB

GMIB

GMWB

Total

Question 2: TAIL SCENARIO for Variable Annuity 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 capital levels? (e.g. for the RBC C-3 phase 2 calculation)

Yes

No

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

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

2d. If you are performing stochastic modeling for required capital/RBC calculation purposes, please list the scenario that triggered the loss at the first non-zero result of your modified 90 CTE calculation (i.e. the first negative present value in these calculations). If you are not currently using stochastic modeling, please list the tail scenario.

Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
1	2	3	4	5	6	7	8	9	10	

Equity

Bond

Int Rates

Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
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Equity

Bond

Int Rates

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

Bond

Int Rates

Year 31	Year 32	Year 33	Year 34	Year 35	Year 36	Year 37	Year 38	Year 39	Year 40
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Equity

Bond

Int Rates

Question 3: DYNAMIC ASSUMPTIONS for Variable Annuity Guaranteed Benefits

3a. Does your lapse assumption vary dynamically for death benefits?

Yes

No

3b. If so, please describe the dynamic lapse functions you are using for death benefits:

3c. Does your lapse assumption vary dynamically for living benefits?

Yes

No

3d. Please describe the dynamic lapse functions you are using for living benefits:

3e. For Income Benefits, does your utilization assumption vary dynamically?

Yes

No

3f. If so, please describe the dynamic utilization function that you are using:

3g. For Withdrawal Benefits, does your withdrawal assumption vary dynamically?

Yes

No

3h. If so, please describe the withdrawal dynamic function you are using:

Question 4: LAPSE RATES IN THE TAIL for Variable Annuity Guaranteed Benefits

Please enter the lapse rates assumed in the tail scenario listed in Question 2:

Death
BenefitsMaturity
BenefitsIncome
BenefitsW/D
BenefitsCombo of
Benefits*

Year 1

Year 2

Year 3

End of Surr Period

SP+1

SP+2

SP+3

SP+t (ultimate)

*Please describe the combined benefits:

Question 5: GMIB ANNUITIZATION UTILIZATION RATES IN THE TAIL

For Income Benefits, please enter the utilization rate or range of rates assumed in the tail scenario in Question 2. If rates vary by age, duration, or any other factor, please specify:

Age

Duration

Other (*please specify:*)

Factor

Utilization

Factor 1

Factor 2

Factor 3

Factor 4

Factor 5

NOTE: If this does not accommodate your assumptions, please e-mail a table or other information specifying the rates to jnallon@soa.org.

Question 6: GMWB WITHDRAWAL RATES IN THE TAIL

For Withdrawal benefits, please enter the % using full withdrawal rates assumed in the tail scenario in Question 2. If rates vary by age, duration, or any other factor, please specify:

Age

Duration

Other (*please specify:*)

Factor

Utilization

Factor 1

Factor 2

Factor 3

Factor 4

Factor 5

NOTE: If this does not accommodate your assumptions, please e-mail a table or other information specifying the rates to jnallon@soa.org.

Question 7: LAPSE RATES BY DISTRIBUTION SYSTEM for VA Guaranteed Benefits

If lapse rates vary by distribution system, please list them in the following four boxes. In addition, if they vary, please complete the table below with the appropriate lapse rates:

Distribution 1:

Distribution 2:

Distribution 3:

Distribution 4:

Dist. #1

Dist. #2

Dist. #3

Dist. #4

Year 1

Year 2

Year 3

End of Surr Period

SP+1

SP+2

SP+3

SP+t (ultimate)

Question 8: LAPSE RATES BY MARKET for VA Guaranteed Benefits

If lapse rates vary by market, please list them in the following four boxes. In addition, if they vary, please complete the table below with the appropriate lapse rates:

Market 1:

Market 2:

Market 3:

Market 4:

Market #1

Market #2

Market #3

Market #4

Year 1

Year 2

Year 3

End of Surr Period

SP+1

SP+2

SP+3

SP+t (ultimate)

Question 9: SOURCES of Variable Annuity Lapse Rate Assumptions

9a. What is the source of your assumptions? (e.g. company study, best guess)

9b. Does your company perform lapse studies?

Yes

No

9c. If so, how often?

9d. How many years of experience data were used in your latest study?

Question 10: COMMENTS

Please add any additional explanatory comments or clarifications:

Question 11:

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 jnallon@soa.org if you have any questions regarding this survey.

[Enterprise Feedback Management Solution](#) By Qualtrics [Survey Software](#)