Report on the Survey of Post-Level Premium Period Lapse and Mortality Assumptions for Level Premium Term Plans

Sponsored by The Product Development Section and The Committee on Life Insurance Research of the Society of Actuaries

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TABLE OF CONTENTS

Background

The Product Development Section Council and the Committee on Life Insurance Research of the Society of Actuaries ("the SOA") engaged RGA Reinsurance Company ("RGA") to undertake a research project on level premium term life insurance products with a particular focus on the magnitude and impact of the "shock lapse" at the end of the level premium period. A prior survey on this topic was completed in May 2007 by Jeffery T. Dukes and Kathleen M. Dziedzic. A copy of their report can be found at http://www.soa.org/files/pdf/post-level-premiumsurvey-final.pdf.

The project will be completed in two phases:

- Phase 1 included a survey of the mortality and lapse assumptions used by actuaries for pricing and modeling level premium term products at the end of 2008. This report summarizes the findings from the 41 Phase 1 survey responses received.
- Phase 2 is currently in progress and includes a study of the mortality and lapse experience of level premium term policies as they transition out of the level premium period. Participating companies will be asked to supply policy level inforce and termination records so that experience results may be analyzed at a granular level including, but not limited to, age, gender, risk class, premium jump, and policy size.

Upon completion of this project, a report incorporating final results of the pricing assumption survey and the Phase 2 experience study will be prepared.

Project Overview

The survey asked participants to respond to some general questions about the structure of their term products and their company's approach to developing actuarial assumptions beyond the level premium period. Respondents were also asked to provide the specific shock lapse and mortality deterioration assumptions used in pricing at the end of 2008. A list of the 41 companies who submitted responses to the survey can be found in Appendix A (p. 35). Survey questions can be found in Appendix B (p. 36).

Disclaimer of Liability

The results provided herein come from a variety of life insurance companies with unique product structures, target markets, underwriting philosophies, and distribution methods. As such, these results should not be deemed directly applicable to any particular company or representative of the life insurance industry as a whole.

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Executive Summary

Summary of Key Results

The following table summarizes the shock lapse and mortality assumptions used at the end of the level premium period for a selected common pricing cell. Refer to the Lapse Assumptions section for details on the specific risk parameters chosen for this comparison.

	Term Period (L)			
	10	15	20	30
Total Respondents	41	33	41	35
100% Shock Lapse Assumed	8	8	10	12
Less than 100% Shock Lapse Assumed	33	25	31	23
Dur L Median Lapse Rate	80%	82%	82%	80%
Dur L through L+1 Cumulative Median Lapse Rate	86%	87%	88%	88%
Dur L through L+2 Cumulative Median Lapse Rate	87%	88%	91%	91%
Dur L through L+3 Cumulative Median Lapse Rate	89%	89%	91%	92%
Mortality Deterioration Assumption Provided	29	21	27	20
Dur L+1 Median Mortality Deterioration (100% = none)	200%	250%	250%	239%
Dur L+2 Median Mortality Deterioration (100% = none)	225%	270%	250%	268%
Dur L+3 Median Mortality Deterioration (100% = none)	217%	258%	250%	265%
Dur L+5 Median Mortality Deterioration (100% = none)	200%	250%	245%	250%
Dur L+10 Median Mortality Deterioration (100% = none)	200%	227%	227%	240%

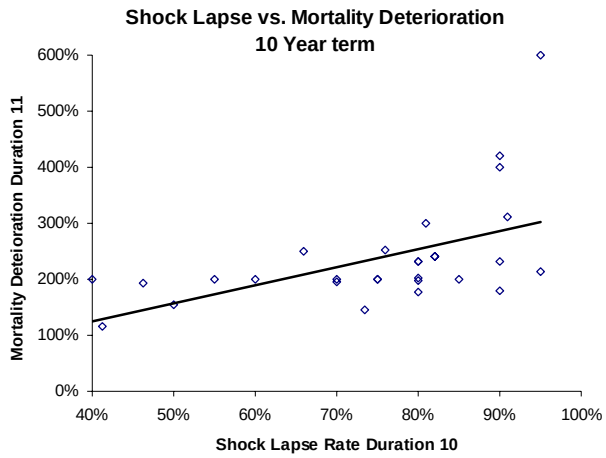
33 of the 41 respondents provided a shock lapse assumption of less than 100% for at least one of their level term products. Respondents were more likely to assume a 100% shock lapse for 20 and 30-year term than for 10 and 15-year term.

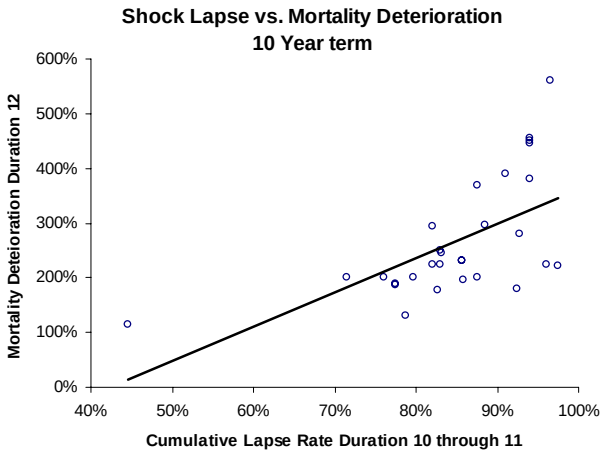
For those who did not assume a 100% shock lapse:

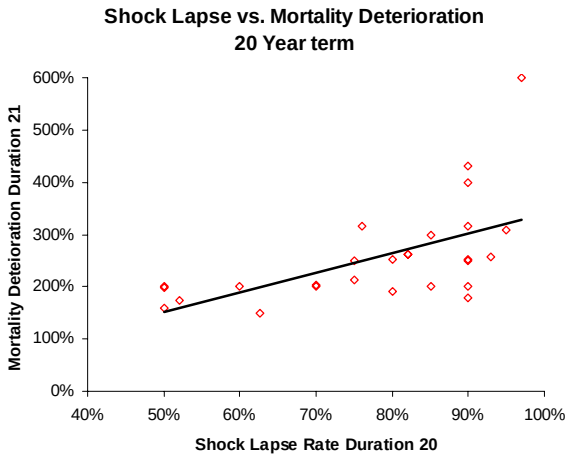
- The median lapse rate assumed at the end of the level premium period was between 80% and 82%.
- The median cumulative lapse rate assumed from duration L through the end of duration L+1 was between 86% and 88%.
- The median mortality deterioration assumed for duration L+1 was between 200% and 250%.
- Mortality deterioration assumptions generally begin grading down by duration L+3.
- A variety of methods were used for determining mortality deterioration assumptions including the Dukes-MacDonald model, the Canadian Institute of Actuaries Valuation Technique Paper #2 method, and a variety of “other” methods based on actuarial judgment.

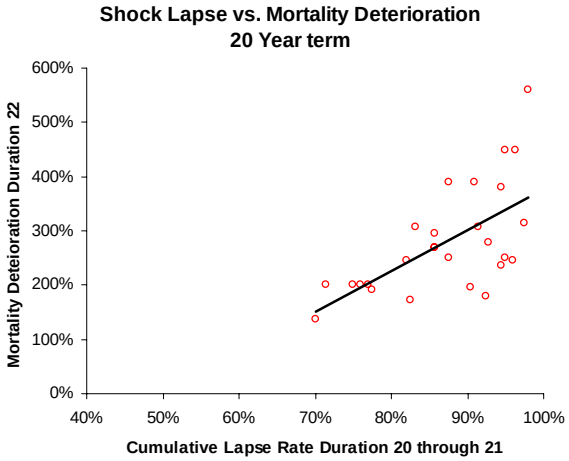
Relationship Between Shock Lapse and Mortality Deterioration Assumptions

The following XY scatter plots show the relationship between the shock lapse assumption and the mortality deterioration assumption for 10 and 20-year term. The left panel represents the duration L+1 mortality deterioration assumption as a function of the duration L shock lapse assumption. The right panel displays the duration L+2 mortality deterioration assumption as a function of the cumulative lapse rate assumed for durations L and L+1. There appears to be a fairly strong correlation between the size of the shock lapse assumed by a company and the amount of mortality deterioration assumed. This relationship appears even stronger in the right panel displays because some companies use two consecutive durations of shock lapses rather than one large shock lapse. Despite this general correlation for most companies, there is still a clustering of mortality deterioration assumptions for some companies around the 200% level regardless of the shock lapse rate assumption. *(NOTE: Diagonal regression lines have been drawn to aid the visual display. The authors do not suggest a strictly linear relationship exists between the magnitude of the shock lapse and the amount of mortality deterioration.)*









Introduction

The Phase 1 survey was sent to the top 100 term writers based on the face amount of 2008 term insurance sales. Responses were provided from 41 companies representing approximately 63% of 2008 term sales (as reported in a July 2009 A.M. Best Statistical Study on U.S. Term Life). A list of survey participants is included in Appendix A (p. 35).

Product Mix

Respondents were asked to provide the amount of term business (by face amount) they sold in 2008 by level premium period.

Level Premium Term Product Mix by Level Period				
Product Level Period	Aggregate Distribution for respondents	Number of Companies where product represents at least x% of individual company's term sales		
		x=5%	x=15%	x=30%
5-year Term	1.9%	3	1	1
10-year Term	22.5%	39	36	8
15-year Term	8.9%	31	23	1
20-year Term	49.8%	41	41	38
25-30 Year Term	16.9%	35	31	9

20 and 10-year term are the dominant product types, but most companies still sell at least some business at other term periods.

Distribution Channels

Respondents were asked to provide information on the distribution channels used to sell their term products in 2008.

Distribution Channels Selling Level Premium Term Insurance				
Distribution Channel	Aggregate Distribution for respondents	Number of Companies where channel represents at least x% of individual company's term sales		
		x=5%	x=25%	x=75%
Independent Agent	28.4%	22	14	9
Managing General Agent	20.8%	10	6	4
Captive Agent	44.7%	25	21	14
Banks	0.2%	1	1	1
Internet	0.5%	2	0	0
Other	5.4%	4	1	1

Post Level Term Premium Structure

Respondents were asked to describe their current premium structure after the end of the level premium period. Some respondents selected more than one option.

Post-Level Period Product Design	
Product Structure	Responses
Premium jump to ART	39
Premium grade to ART	3
Jump to new level period	3
Amount at Risk (Face Amount) decreases after level period	0
Product Terminates	2

The dominant premium structure among respondents is a level premium followed by a jump to an ART scale after the end of the level premium period. Respondents were then asked to describe the general level of their guaranteed ultimate premium rates. Some companies provided more than one answer for different products. Although the responses varied and were submitted as free-form text, they can be generally summarized as follows:

Structure of Guaranteed Ultimate Rates	
Description	Responses
% of 1980 CSO	
Less than 200%	2
Exactly 200%	3
Between 200-300%	1
Exactly 300%	2
% of 2001 CSO	
Less than 200%	1
Exactly 200%	12
Between 200-300%	7
Exactly 300%	12
Exactly 350%	1
Other	5

The most common responses describe products with a guaranteed ultimate premium rate of at least 200% of the 2001 CSO ultimate rate scale.

Post Level Term Premium Structure (cont.)

Respondents were then asked to describe the relationship between the current and guaranteed rates beyond the level period. Some companies provided more than one answer for different products. The responses could be generally grouped as follows:

Relationship between Current Ultimate and Guaranteed Ultimate Premiums	
Description	Responses
Product has guaranteed rates only	15
Current Rates = Guaranteed Rates	12
Current Rates < Guaranteed Rates	16
Current rates grade to Guaranteed Rates	2

Respondents were asked to describe the parameters by which their current level premium and post-level period premium rates vary (apart from issue age and level period).

Parameters by which Current Premium Rates Vary		
Parameter	Level Premium Period	Beyond Level Period
Gender	41	41
Policy Duration	n/a	7
Attained Age	n/a	39
Smoking Status	41	40
Preferred Risk Class	41	10
Substandard Rating	35	30
Face Amount Issued	37	6

Potential Premium Jumps

Based on the survey responses, the most common product structures have a level premium that jumps to an ART scale that is usually at least 200% of the 2001 CSO Ultimate Rates. To get a sense of the potential magnitude of the premium jumps, we have gathered level period premiums as of the end of 2008 from Term4Sale.com and compared them to hypothetical post-level period ART rates. In the table below, rates are presented for $500,000 of coverage for the company with the 10th lowest super-preferred non-smoker level period rate available at each cell. The first ART premium (A) is calculated assuming that ultimate premiums are based on 300% of the 2001 CSO Ultimate age-nearest birthday rate plus a $65 policy fee. The level period premiums (B) for issue age (x) and (C) for issue age (x+L) are also displayed. The ratio (A)/(B) of the first ART premium to the level period premium gives an indication of the financial impact felt by policyholders choosing to persist beyond the level period. The ratio (A)/(C) gives an indication of the amount a persisting policyholder would pay over and above a newly underwritten level term policy with the same level period. This table only provides indicative relationships between the level period rate and first post-level period ART rate. These premium jumps would obviously be smaller for products with less competitive level period rates or for other preferred or residual standard risk classes.

Hypothetical Comparison of Level Period and Post-Level Period Premiums; $500,000 coverage; 10th lowest Super-Preferred NS

Term period (L)	Gender	Issue Age (x)	(A) Annual Prem* for duration L+1 at att age (x + L)	(B) Annual Prem for L-year level period at iss age (x)	(A) / (B) Premium Jump Multiple	(C) Ann Prem* for new L-year level period at iss age (x + L)	(A) / (C) Premium Jump Multiple
10	Male	25	$ 1,700	$ 175	10x	$ 180	9x
		35	3,560	180	20x	355	10x
		45	8,315	355	23x	890	9x
		55	23,270	890	26x	2,455	9x
		65	60,110	2,455	24x	8,000	8x
	Female	25	1,400	155	9x	155	9x
		35	2,630	155	17x	310	8x
		45	7,085	310	23x	640	11x
		55	16,640	640	26x	1,505	11x
		65	40,025	1,505	27x	5,370	7x
20	Male	25	3,560	255	14x	635	6x
		35	8,315	265	31x	1,505	6x
		45	23,270	635	37x	5,015	5x
		55	60,110	1,505	40x	n/a	n/a
	Female	25	2,630	225	12x	490	5x
		35	7,085	240	30x	1,125	6x
		45	16,640	490	34x	3,185	5x
		55	40,025	1,125	36x	n/a	n/a

*Premiums calculated based on a $65 policy fee

Lapse Assumptions

Overview

Respondents were asked to provide their lapse assumptions at the end of 2008 for six durations beginning with the last year of the level premium period. The responses often varied by a number of parameters including the length of the level term period, issue age, risk class, premium payment mode, and premium jump ratio.

- Of the 41 respondents, 33 (80%) assumed a shock lapse of less than 100% at the end of the level premium period for their 10-year level term products.
- Of the 33 respondents who used a shock lapse of less than 100% for 10-year term:
    - 2 used a shock lapse of 100% for their 20-year term product.
    - 4 used a shock lapse of 100% for their 30-year term product.
    - 6 used an assumption that varied by level premium period, but not issue age.
    - 8 used an assumption that varied by issue age, but not level premium period.
    - 4 used an assumption that varied by issue age and level premium period.
    - 3 used an assumption that varied by underwriting risk class.
    - 2 used an assumption that varied by premium payment mode.
    - 2 used an assumption that varied by the ratio of the premium jump from the level period to the first premium beyond the level premium period.

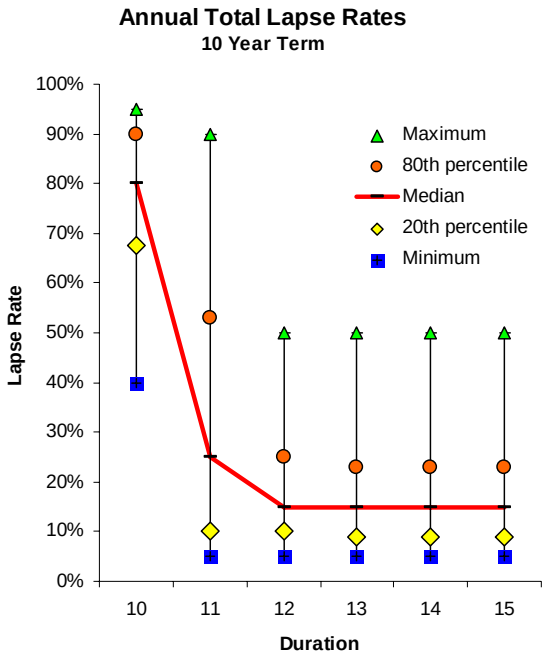
Specific Shock Lapse Assumptions

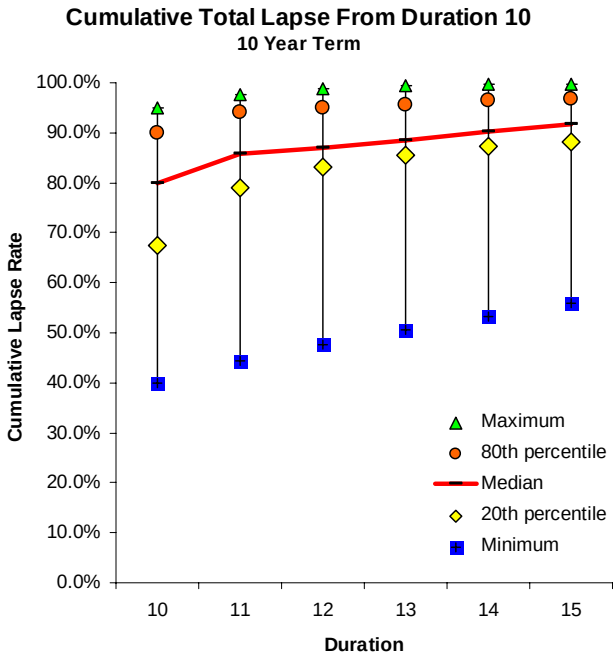
As indicated on the prior page, some respondents provided assumptions that varied by pricing cell. For the sake of a consistent comparison, the assumptions summarized in the Executive Summary and elsewhere in this report were selected for a common pricing cell, which was chosen as follows:

- Preferred Non-Tobacco
- Issue Age 45 for 10 and 15-year term; Issue Age 35 for 20 and 30-year term
- Annual Premium Payment mode
- 20x premium jump for 10-year term; 25x jump for 15 and 20-year term; 30x jump for 30-year term

The values displayed in the charts and graphs that follow are by duration across all companies, such that a company's lapse assumption by duration may fall within different percentile ranges. For example, looking across all participating companies 10-year term products, Company A's lapse rate assumption may represent the minimum lapse rate assumption value in duration 10 and may represent the median assumption value in duration 11, etc. Cumulative lapses were calculated by company and then the percentiles were calculated across all companies.

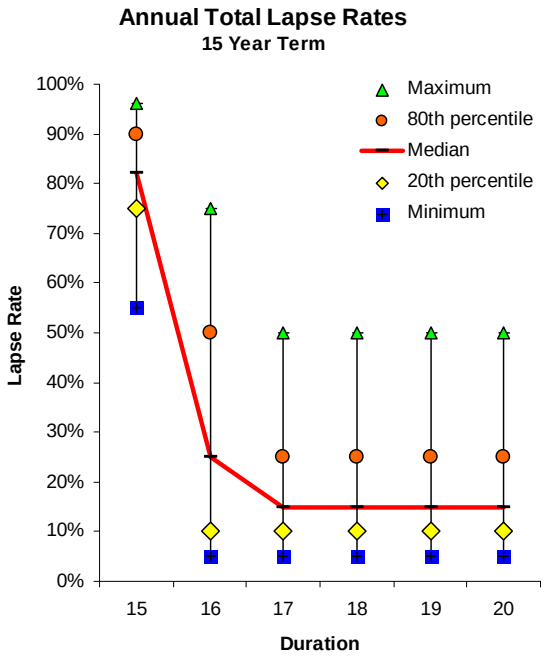
10 Year Term (n=33)	Annual Lapse Rate Assumption by Duration						Cumulative Lapse through Duration					
	10	11	12	13	14	15	10	11	12	13	14	15
Minimum	40%	5%	5%	5%	5%	5%	40.0%	44.5%	47.6%	50.5%	53.3%	55.9%
20th percentile	68%	10%	10%	9%	9%	9%	67.6%	79.1%	83.1%	85.4%	87.2%	88.3%
Median	80%	25%	15%	15%	15%	15%	80.0%	85.8%	87.1%	88.6%	90.4%	91.6%
80th percentile	90%	53%	25%	23%	23%	23%	90.0%	94.0%	94.9%	95.7%	96.3%	96.9%
Maximum	95%	90%	50%	50%	50%	50%	95.0%	97.5%	98.8%	99.4%	99.7%	99.8%

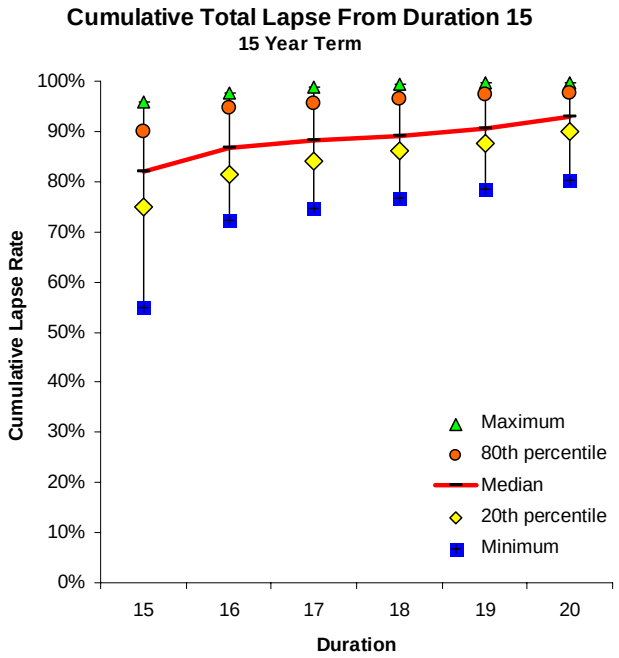




Specific Shock Lapse Assumptions (15-Year Term)

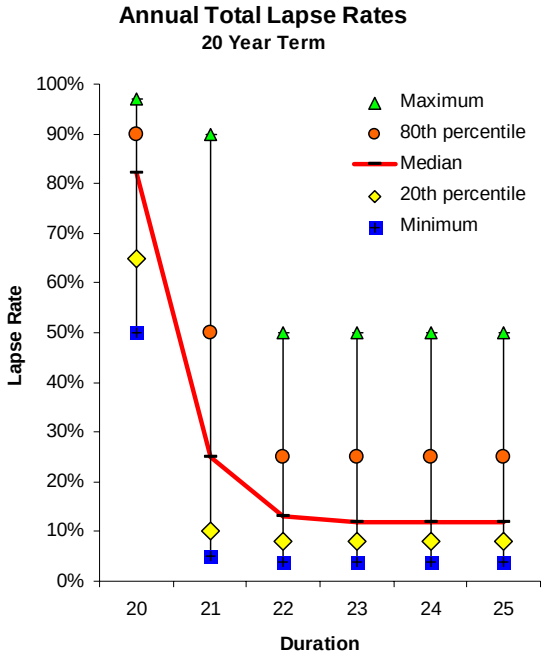
15 Year Term	Annual Lapse Rate Assumption by Duration						Cumulative Lapse through Duration					
(n=25)	15	16	17	18	19	20	15	16	17	18	19	20
Minimum	55%	5%	5%	5%	5%	5%	55%	72%	75%	77%	79%	80%
20th percentile	75%	10%	10%	10%	10%	10%	75%	82%	84%	86%	88%	90%
Median	82%	25%	15%	15%	15%	15%	82%	87%	88%	89%	91%	93%
80th percentile	90%	50%	25%	25%	25%	25%	90%	95%	96%	97%	97%	98%
Maximum	96%	75%	50%	50%	50%	50%	96%	98%	99%	99%	100%	100%

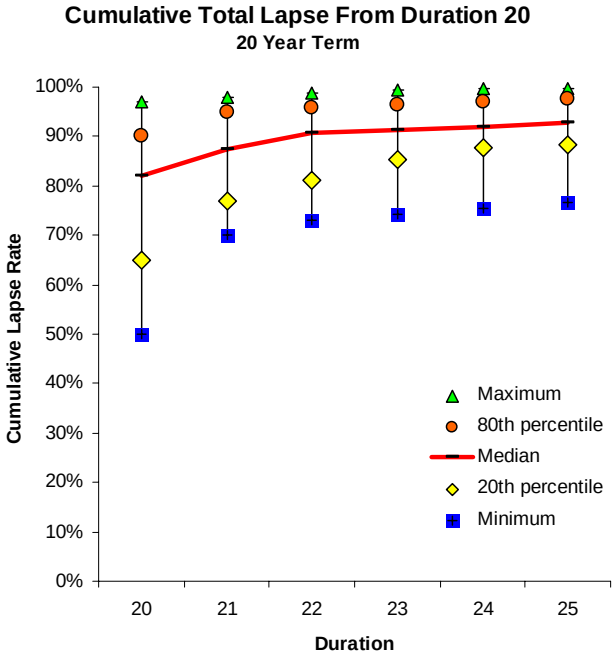




Specific Shock Lapse Assumptions (20-Year Term)

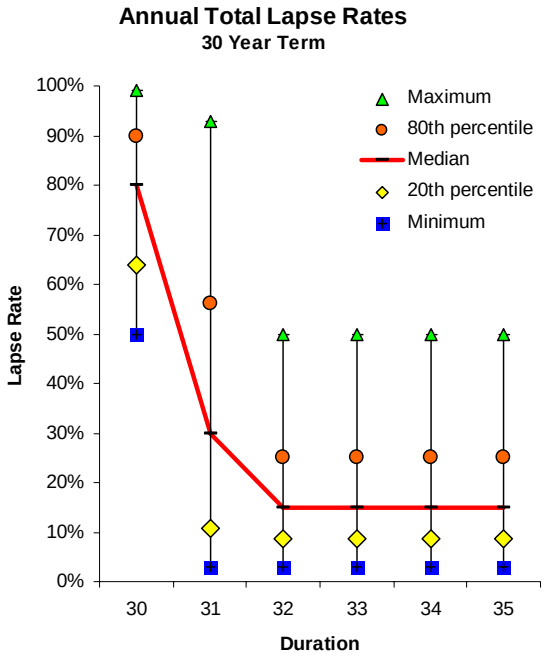
20 Year Term (n=31)	Annual Lapse Rate Assumption by Duration						Cumulative Lapse through Duration					
	20	21	22	23	24	25	20	21	22	23	24	25
Minimum	50%	5%	4%	4%	4%	4%	50%	70%	73%	74%	76%	77%
20th percentile	65%	10%	8%	8%	8%	8%	65%	77%	81%	85%	88%	88%
Median	82%	25%	13%	12%	12%	12%	82%	88%	91%	91%	92%	93%
80th percentile	90%	50%	25%	25%	25%	25%	90%	95%	96%	96%	97%	98%
Maximum	97%	90%	50%	50%	50%	50%	97%	98%	99%	99%	100%	100%

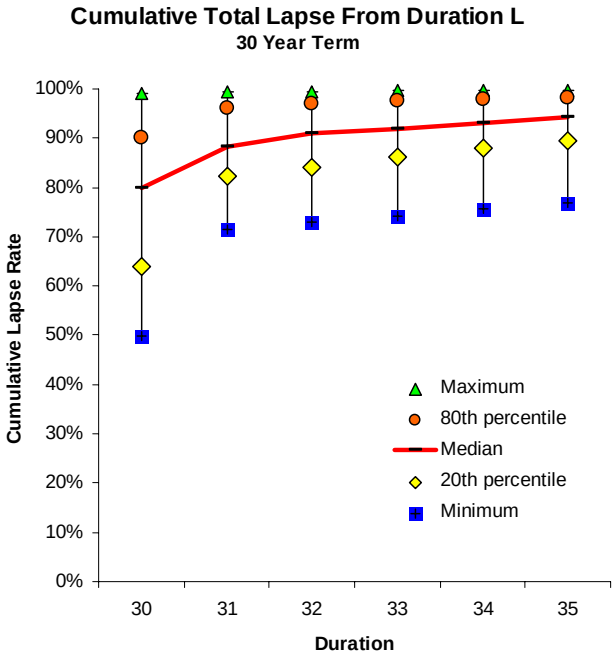




Specific Shock Lapse Assumptions (30-Year Term)

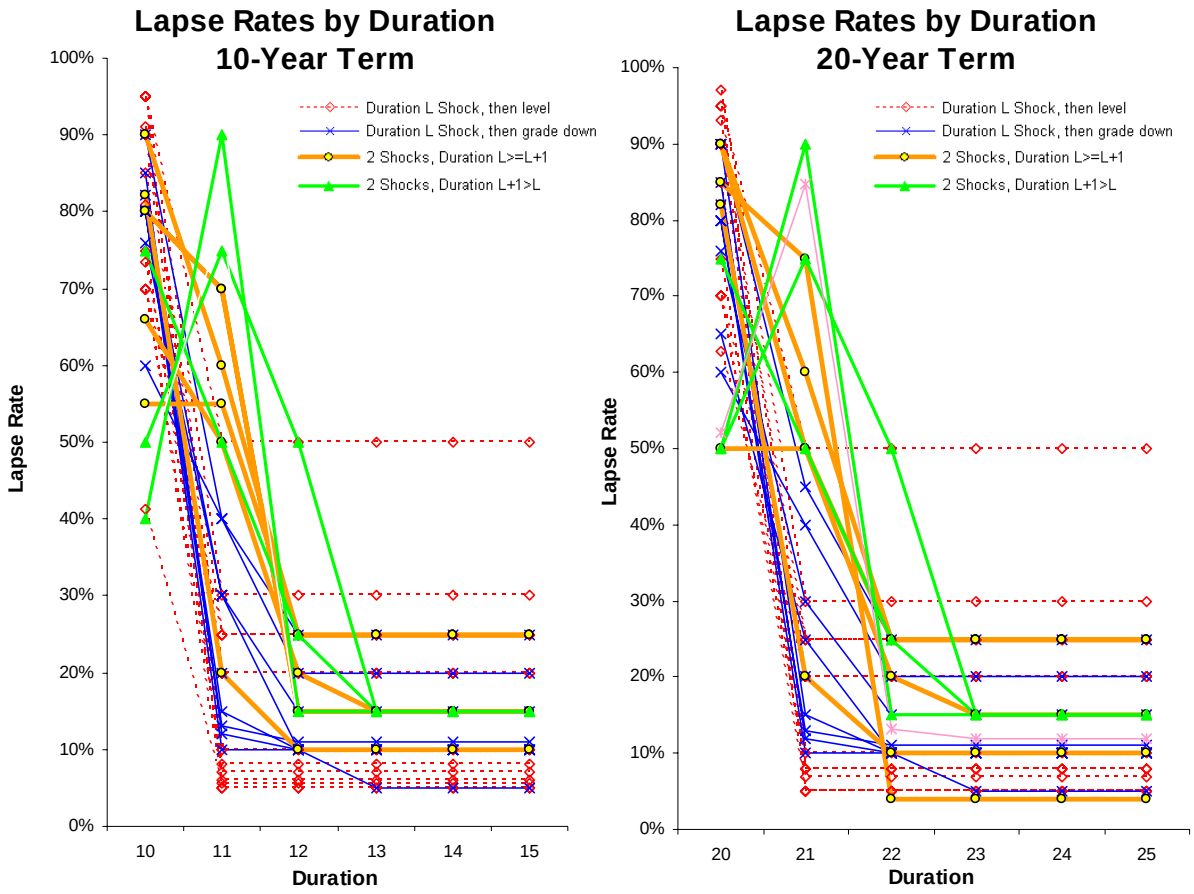
30 Year Term	Annual Lapse Rate Assumption by Duration						Cumulative Lapse through Duration					
(n=23)	30	31	32	33	34	35	30	31	32	33	34	35
Minimum	50%	3%	3%	3%	3%	3%	50%	72%	73%	74%	76%	77%
20th percentile	64%	11%	9%	9%	9%	9%	64%	82%	84%	86%	88%	90%
Median	80%	30%	15%	15%	15%	15%	80%	88%	91%	92%	93%	94%
80th percentile	90%	56%	25%	25%	25%	25%	90%	96%	97%	98%	98%	98%
Maximum	99%	93%	50%	50%	50%	50%	99%	99%	100%	100%	100%	100%





Specific Shock Lapse Assumptions (10 & 20-Year Term – All Responses)

Although the graphs on the previous pages give a sense of the general levels and distributions of lapse assumptions by duration, they don't necessarily reflect durational trends of any individual company's assumption. Quite often, companies assuming an initial shock lapse rate that is lower than the median assumption will assume a second shock lapse that is much higher than the median in the following duration. The following charts plot each respondent's 10 and 20-year term post-level period lapse rate assumptions by policy year to illustrate these trends.

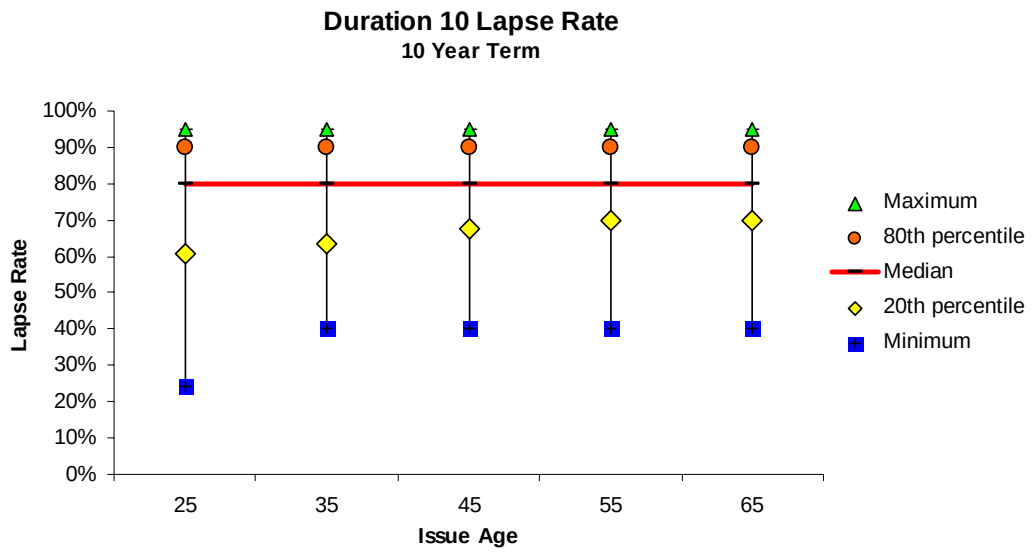


Lapse Rate Trend by Duration		
Description	Responses	
	10-Year Term	20-Year Term
Duration L Shock, then Level	15	14
Duration L Shock, then Grade Down	9	9
2 Shocks, Duration L>=L+1	6	5
2 Shocks, Duration L+1>L	3	3

Specific Shock Lapse Assumptions (Variations by Issue Age)

As mentioned previously, a few respondents provided lapse rates varying by issue age within each product. Some used a shock lapse that was higher for older ages than younger ages and some used a shock lapse that was higher for younger ages than older ages. The following table and chart show the distribution of the duration 10 lapse assumptions by issue age for 10-year term products. In the aggregate, there is very little difference in the shock lapse assumption used by issue age.

10 Year Term (n=33)	Duration 10 Lapse Rate Assumption				
	25	35	45	55	65
Minimum	24%	40%	40%	40%	40%
20th percentile	61%	63%	68%	70%	70%
Median	80%	80%	80%	80%	80%
80th percentile	90%	90%	90%	90%	90%
Maximum	95%	95%	95%	95%	95%



Lapse Skewness

The researchers were curious as to how companies were distributing their lapse assumptions by month before and after the shock lapse. This issue will be explored more directly during the Phase 2 experience study. Respondents were asked to describe or provide the assumptions used for monthly skewed lapses during the level period and beyond the level period. Most respondents used the same assumptions for lapses before and after the shock lapse. Six respondents provided assumptions with skew factors that varied between the level period and after the level period: While the specific assumptions varied, five of these respondents indicated that their lapses were skewed more heavily toward the beginning of the year following the end of the level period.

Mortality Deterioration Assumptions

Overview

Due to the adverse selection of unhealthy policyholders choosing to persist after a large increase in their premium, most actuaries assume a corresponding increase in the mortality after the shock lapse. Respondents were asked to provide their annual mortality deterioration assumptions at the end of 2008 beginning with the first year after the level premium period. The responses often varied by a number of parameters including the length of the level term period, policy duration, issue age, risk class, and gender.

- Of the 33 respondents who used a shock lapse of less than 100% for 10-year term, 29 provided details of their mortality deterioration assumptions:
    - 6 used an assumption that was constant across all level term periods, policy durations, issue ages, risk classes, and genders
    - 7 used an assumption that varied by policy duration only
    - 14 used an assumption that varied by policy duration, issue age, and level period.
        - 1 of these 14 used an assumption that also varied by risk class, but not gender
        - 3 of these 14 used an assumption that also varied by risk class and gender
    - 1 used an assumption that varied by policy duration and issue age, but not level period.
    - 1 used an assumption that varied by level premium period, but not issue age.

Methodology for Developing Deterioration Assumptions

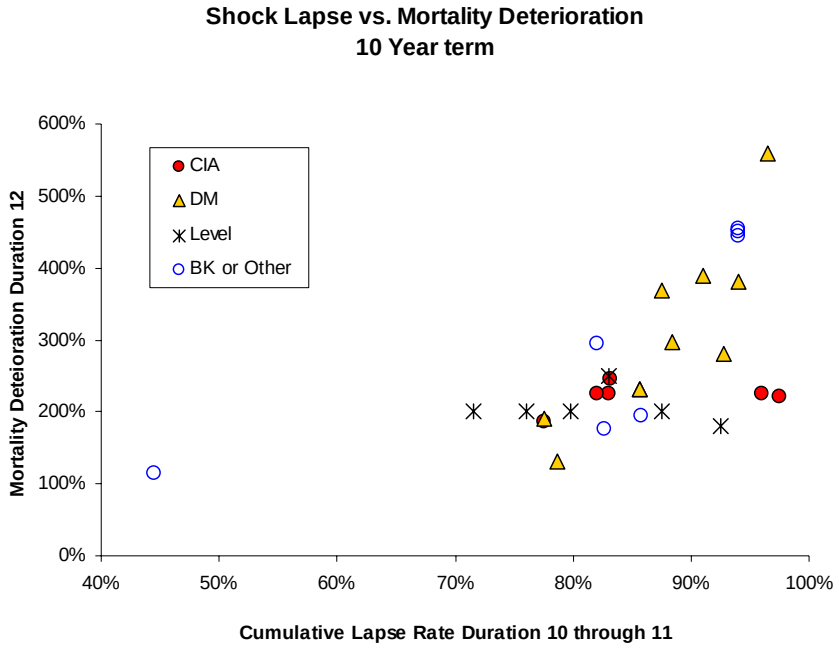
Respondents were asked what methodology they used to develop mortality deterioration assumptions.

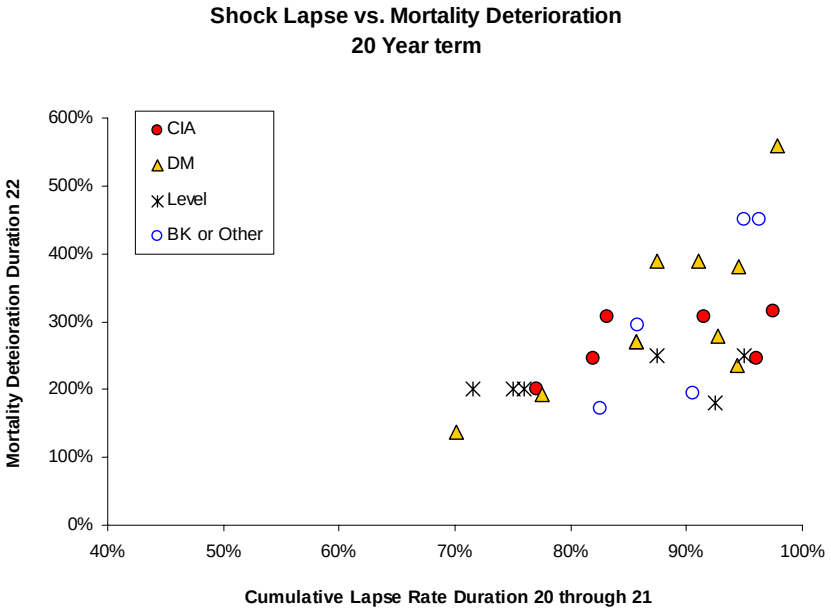
Method of Developing Mortality Deterioration Assumption	
Method	Responses
N/A – 100% Shock Lapse	8
Becker-Kitsos	1
Dukes-MacDonald	11
Canadian Institute of Actuaries Valuation Technique Paper #2	7
Other: Level by age, duration, term period, etc.	7
Other: Variable by duration	7

Respondents were also asked to provide their specific mortality deterioration assumptions for pricing and modeling their level premium products. All but 4 respondents using a shock lapse of less than 100% also provided their corresponding mortality deterioration multiples.

Methodology for Developing Deterioration Assumptions (cont.)

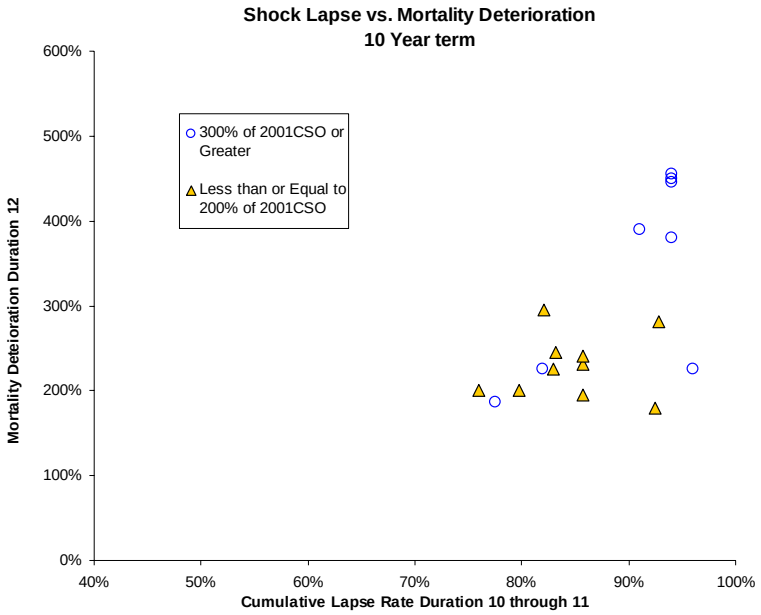
The XY scatter plots in the Executive Summary display each company's mortality deterioration assumption as a function of their shock lapse assumption. The following charts display the same data with plot points differentiated based on the method used to develop the deterioration assumption. From these charts, it seems that a general relationship between the shock lapse and mortality deterioration assumptions is evident regardless of the specific method chosen to develop the assumptions. The correlation seems to be strongest for those using Dukes-MacDonald or non-level "Other" methods.





Relationship to ART Premium

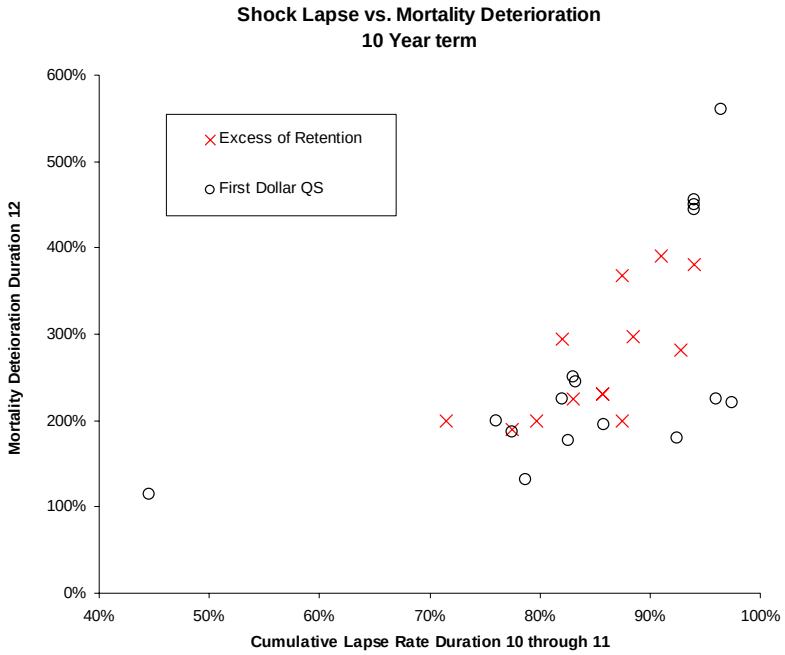
The following chart displays the same data for 10-year term products with plot points differentiated based on the description of the guaranteed ART scale provided. Data points are plotted for 18 companies grouped into those who used 200% or less of the 2001 CSO Ultimate table for their ART scale and those that used 300% or greater. Although the data is thin, it seems that companies with a larger ART premium scale (and therefore a higher premium jump between the level period and the post-level period) might be assuming somewhat higher shock lapse and mortality deterioration than companies with smaller ART premium scales. We will attempt to study the actual relationship between the size of the Prem(L+1)/Prem(L) ratio and the corresponding shock lapses and post-level period mortality in detail during the Phase 2 experience study.



	ART Premium % of 2001 CSO		
	<=200%	>=300%	Subtotal
Total Respondents	11	13	24
100% Shock Lapse Assumed	0	3	3
Less than 100% Shock Lapse Assumed	11	10	21
Dur L Median Lapse Rate	81%	80%	80%
Dur L through L+1 Cumulative Median Lapse Rate	86%	94%	86%
Dur L through L+2 Cumulative Median Lapse Rate	86%	95%	87%
Dur L through L+3 Cumulative Median Lapse Rate	88%	96%	89%
Mortality Deterioration Assumption Provided	10	8	18
Dur L+1 Median Mortality Deterioration (100% = none)	236%	216%	232%
Dur L+2 Median Mortality Deterioration (100% = none)	228%	385%	231%
Dur L+3 Median Mortality Deterioration (100% = none)	200%	365%	217%

Relationship to Reinsurance Method

The following chart displays the same data for 10-year term products with plot points differentiated based on the type of reinsurance used. Companies were grouped into those primarily using “Excess of Retention” reinsurance and those using primarily “First Dollar Quota Share” reinsurance (YRT or coinsurance). There does not appear to be any distinguishable relationship between the type of reinsurance used and the shock lapse or mortality deterioration assumption.

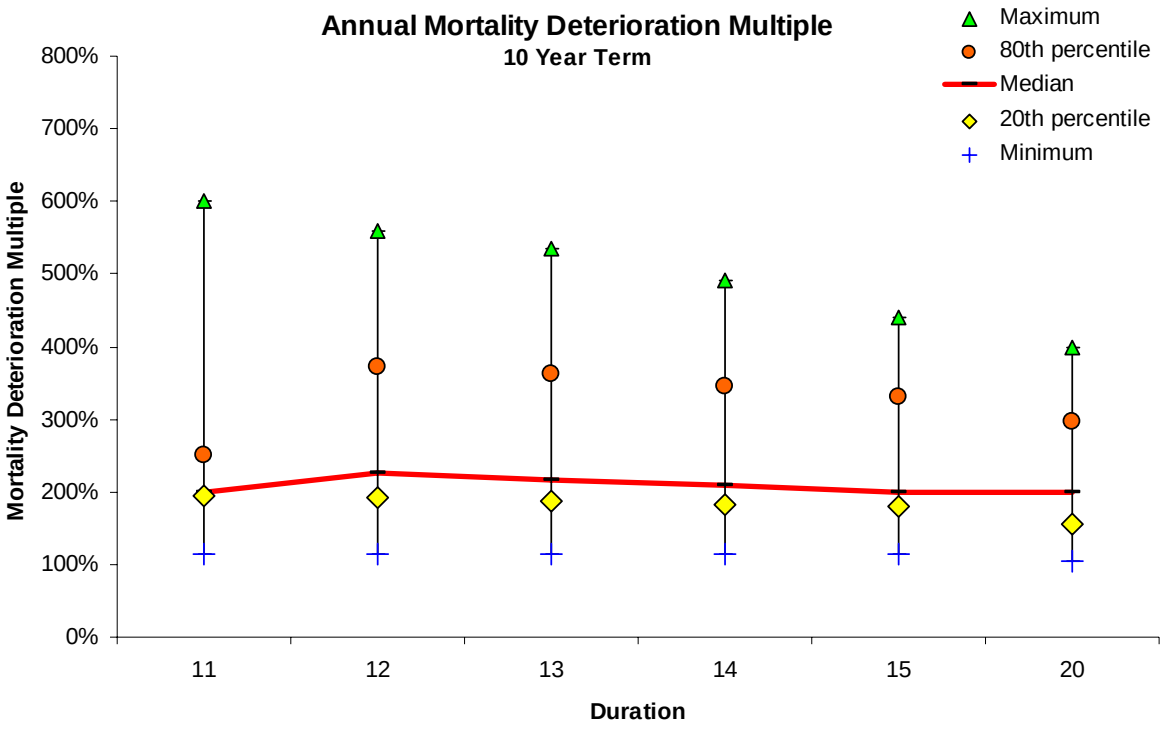


	Reinsurance Method		
	FDQS	Excess	Total
Total Respondents	24	17	41
100% Shock Lapse Assumed	5	3	8
Less than 100% Shock Lapse Assumed	19	14	33
Dur L Median Lapse Rate	80%	80%	80%
Dur L through L+1 Cumulative Median Lapse Rate	86%	86%	86%
Dur L through L+2 Cumulative Median Lapse Rate	86%	87%	87%
Dur L through L+3 Cumulative Median Lapse Rate	88%	89%	89%
Mortality Deterioration Assumption Provided	16	13	29
Dur L+1 Median Mortality Deterioration (100% = none)	200%	232%	200%
Dur L+2 Median Mortality Deterioration (100% = none)	223%	231%	225%
Dur L+3 Median Mortality Deterioration (100% = none)	217%	217%	217%

Specific Mortality Deterioration Assumptions

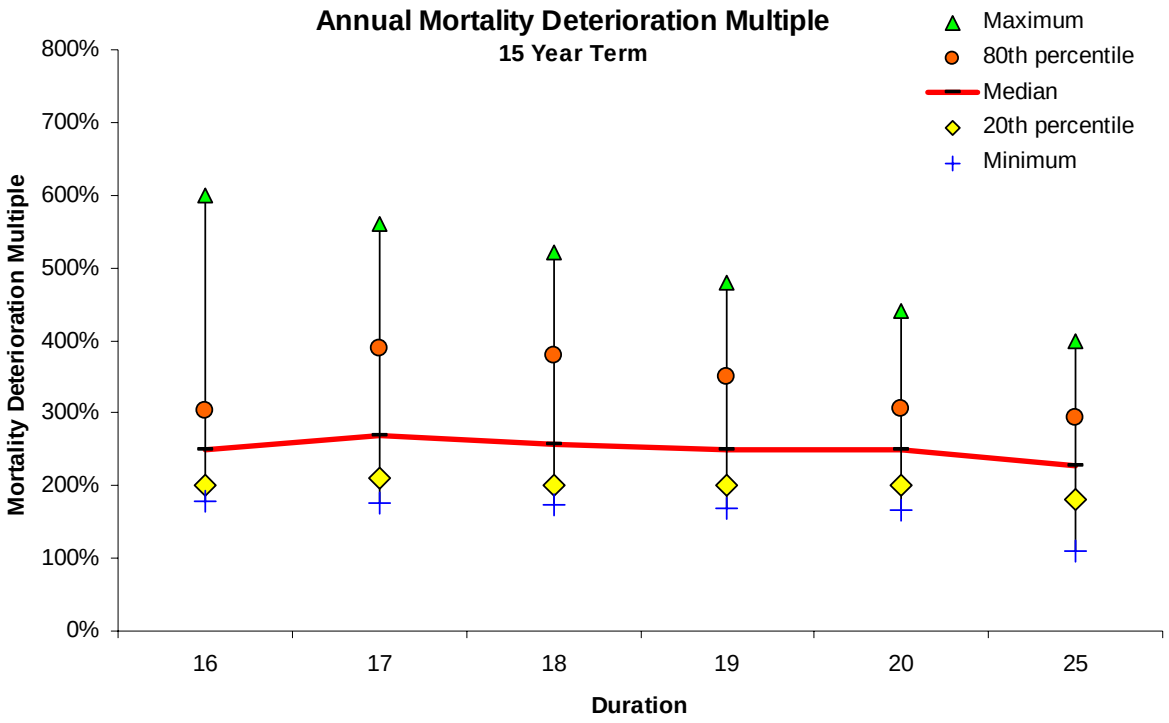
The following tables and charts show the range of specific mortality deterioration assumptions used by respondents. For companies that provided assumptions varying by age, level term period, or risk class, the assumption displayed is for the same pricing cell described in the "Lapse Assumptions" section. The values displayed are by duration across all companies, such that a different company's assumption may be represented as the minimum, 20th percentile, etc. in different durations. Most respondents who provided assumptions that varied by deterioration graded the amount of deterioration down over time.

10 Year Term (n=29)	Annual Mortality Deterioration Multiple Assumption by Duration					
	11	12	13	14	15	20
Minimum	115%	115%	115%	115%	115%	104%
20th percentile	194%	193%	188%	183%	180%	156%
Median	200%	225%	217%	208%	200%	200%
80th percentile	251%	373%	362%	346%	330%	296%
Maximum	600%	560%	535%	491%	440%	400%



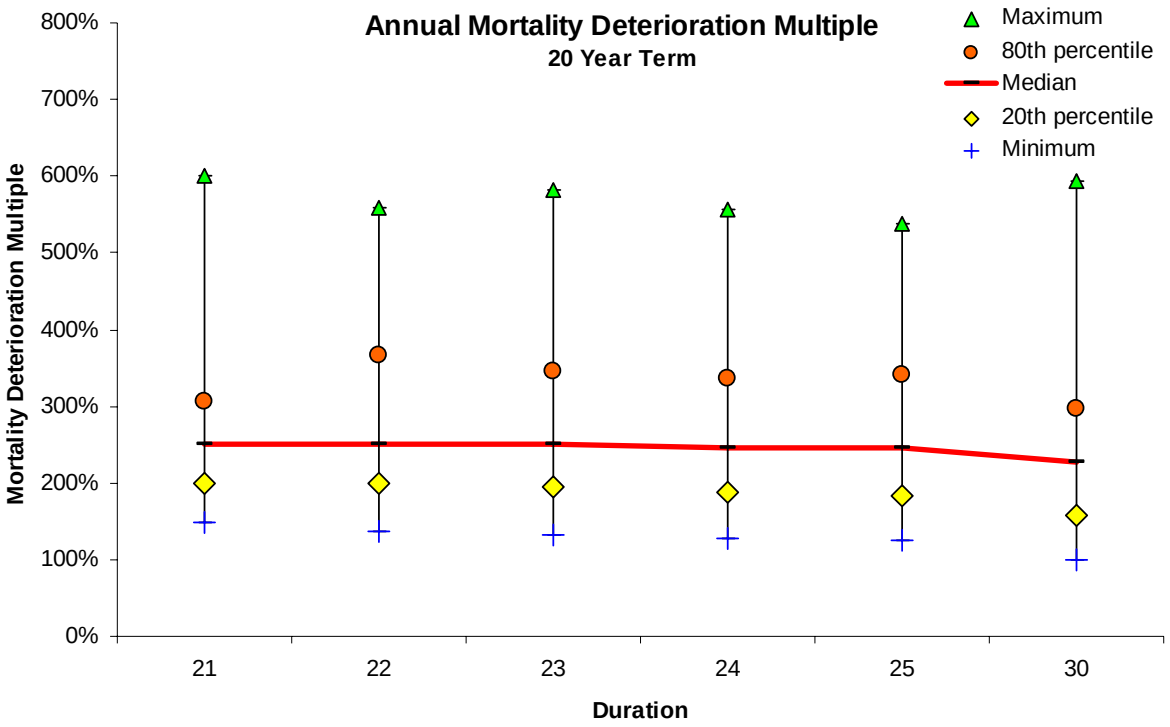
Specific Mortality Deterioration Assumptions (15-Year Term)

15 Year Term (n=21)	Annual Mortality Deterioration Multiple Assumption by Duration					
	16	17	18	19	20	25
Minimum	178%	177%	173%	168%	166%	110%
20th percentile	200%	210%	200%	200%	200%	180%
Median	250%	270%	258%	250%	250%	227%
80th percentile	303%	390%	380%	350%	306%	293%
Maximum	600%	560%	520%	480%	440%	400%



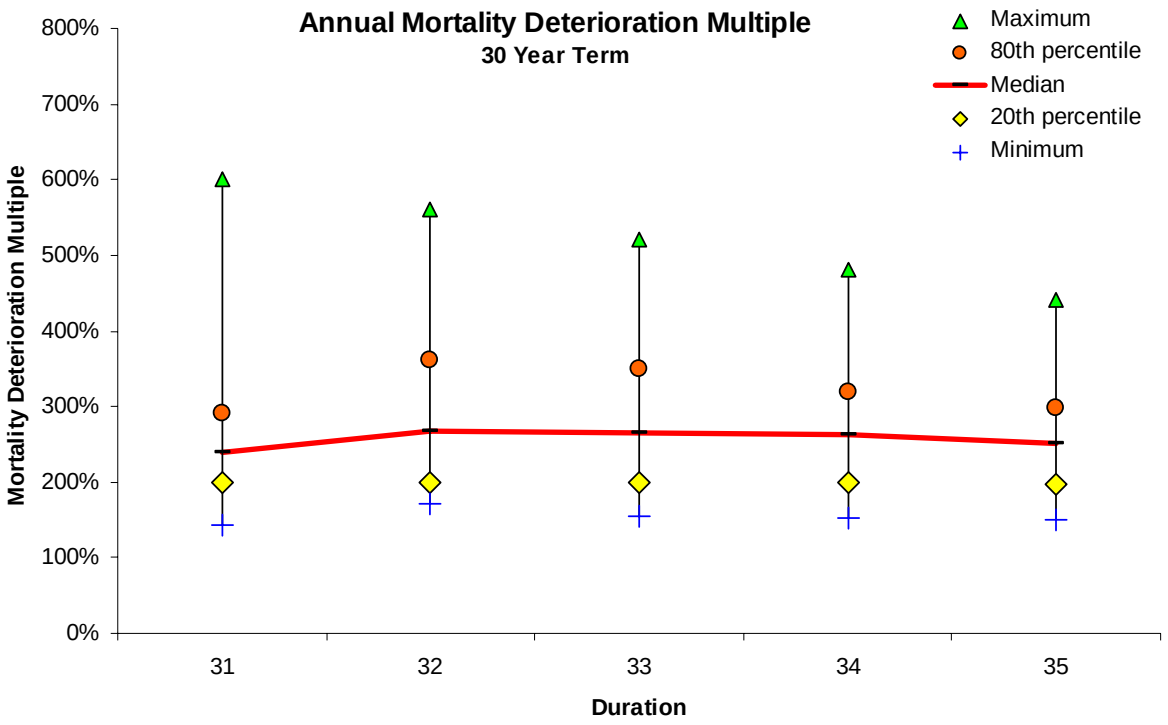
Specific Mortality Deterioration Assumptions (20-Year Term)

20 Year Term (n=27)	Annual Mortality Deterioration Multiple Assumption by Duration					
	21	22	23	24	25	30
Minimum	149%	137%	133%	129%	124%	100%
20th percentile	200%	200%	194%	188%	184%	157%
Median	250%	250%	250%	246%	245%	227%
80th percentile	307%	367%	344%	337%	341%	296%
Maximum	600%	560%	582%	557%	539%	593%



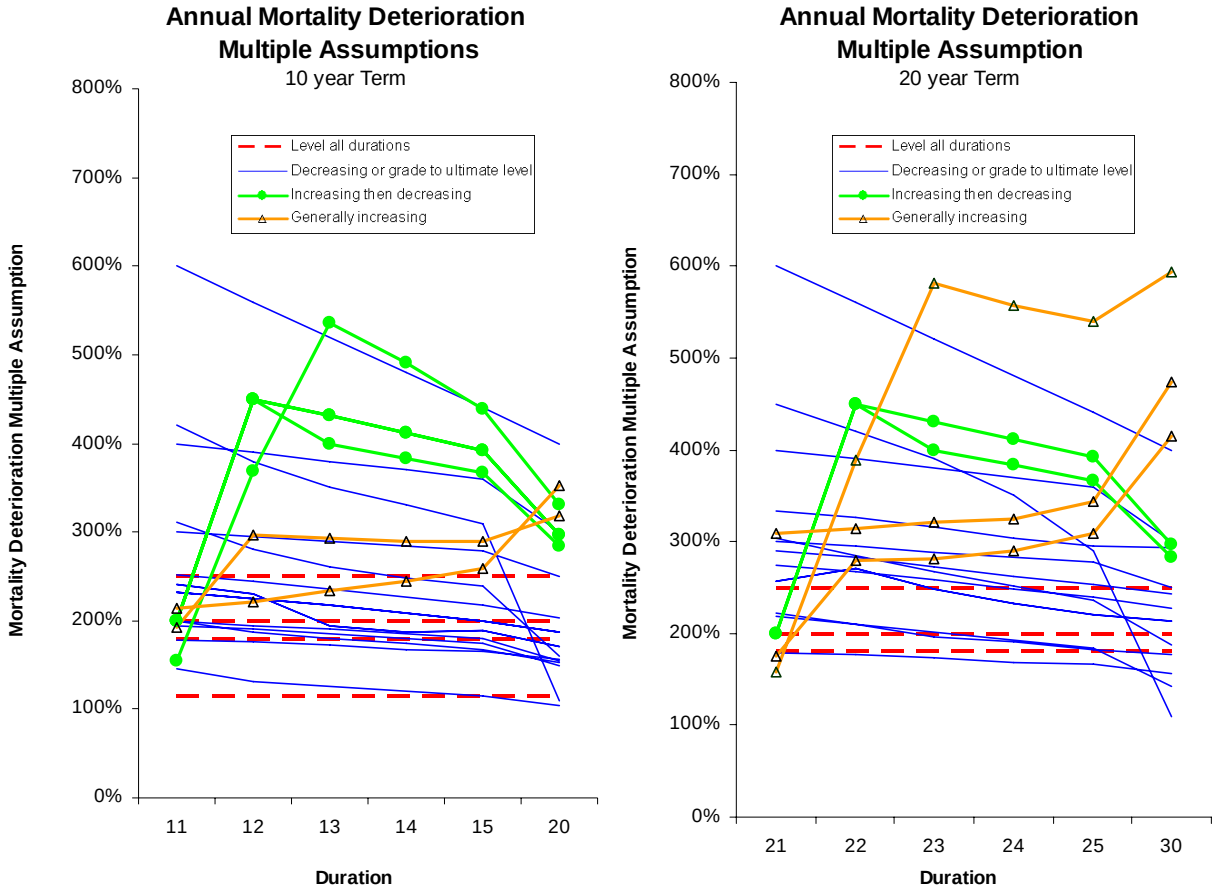
Specific Mortality Deterioration Assumptions (30-Year Term)

30 Year Term (n=20)	Annual Mortality Deterioration Multiple Assumption by Duration				
	31	32	33	34	35
Minimum	142%	172%	156%	152%	151%
20th percentile	200%	200%	200%	200%	198%
Median	239%	268%	265%	262%	250%
80th percentile	292%	360%	348%	319%	298%
Maximum	600%	560%	520%	480%	440%



Specific Mortality Deterioration Assumptions (10 and 20-Year Term – All Responses)

Although the graphs on the previous pages give a sense of the general levels and distributions of mortality deterioration assumptions by duration, they don't necessarily reflect durational trends of any individual company's assumption. Most companies provided an assumption that was either level for all durations or began decreasing in by the second or third duration after the level period. The left chart displays the individual assumptions for 10 year term and the right chart includes all responses for 20 year term. Some responses were identical from different companies, including 4 respondents using a 200% level mortality deterioration multiple for 10-year term.

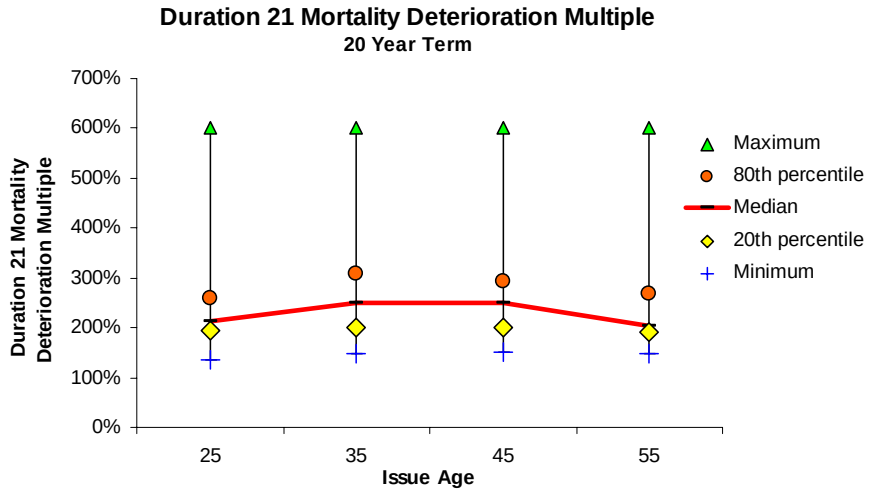


Mortality Deterioration Assumption Trend by Duration		
Description	Responses	
	10-Year Term	20-Year Term
Level all durations	7	5
Decreasing or grade to ultimate level	16	13
Increasing then decreasing	4	2
Generally increasing	2	3

Specific Mortality Deterioration Assumptions (Variations by Issue Age)

Some companies provided mortality deterioration assumptions that varied by issue age within a given product type. In general, these companies provided slightly increasing multiples for issue ages 25, 35, 45, and 55 with a lower multiple for age 65. All companies providing multiples that varied by issue age used either the Dukes-MacDonald model or the method described in CIA VTP#2. The following table and charts show the distributions of duration L+1 mortality deterioration multiple assumptions by issue age used for 10 and 20-year term products.

	Mortality Deterioration Assumption by Issue Age								
	10 Year Term Duration 11					20 Year Term Duration 21			
	25	35	45	55	65	25	35	45	55
Minimum	115%	115%	115%	115%	115%	137%	149%	152%	147%
20th percentile	165%	184%	194%	200%	163%	194%	200%	200%	190%
Median	200%	200%	200%	211%	200%	213%	250%	250%	205%
80th percentile	245%	252%	251%	278%	245%	260%	307%	294%	267%
Maximum	600%	600%	600%	600%	600%	600%	600%	600%	600%



Term Conversions

Respondents were asked whether they use different anti-selective mortality deterioration assumptions for term policies that convert to a permanent plan instead of persist in the term policy. Of the 33 respondents that use a shock lapse of less than 100%, 10 responded that they use different anti-selective mortality deterioration for conversions than for term persisters. Of these 10 respondents,

- 2 indicated that more anti-selection was assumed for conversions.
- 3 indicated that no anti-selection was assumed for conversions.
- 1 indicated that less anti-selection was assumed for conversions.
- 4 others simply indicated that their assumption was different for conversions.

Other Assumptions & Practices

Use and Development of Assumptions

Companies were asked to indicate applications where they utilize assumptions for projecting beyond the level premium period.

Situations Utilizing Assumptions Beyond the Level Premium Period		
Situation	Products sold at YE 2008	Inforce Business No Longer Sold
Pricing	26	16
Cash Flow Testing	23	23
Embedded Values	10	8
Illustrations	16	16
SAP Earnings Projections	18	19
GAAP Reserves & DAC	17	16
GAAP Income Projections	21	19

Companies were asked for their primary sources of information for developing lapse and mortality assumptions for pricing beyond the level period.

Source of Assumptions		
Source	Shock Lapse	Mortality Deterioration
Internal Experience	28	16
External Consultants	10	12
Reinsurers	13	19
Industry Studies	16	9

Companies were asked for the primary factors driving their post level premium period lapse and mortality assumptions.

Primary Factors Driving Post-Level Period Assumptions		
Factor	Shock Lapse	Mortality Deterioration
Distribution channel	0	0
Premium mode	3	0
Policy size	1	3
Percentage (%) increase in premium between level period and first duration after level period	13	8
Dollar amount ($) increase in premium between level period and first duration after level period	1	1
Underwriting class	1	4
Issue age	8	8
Gender	0	6
Length of level premium period	12	10
Duration since the end of the level premium period	14	15

Reinsurance

Respondents were asked about their use of reinsurance on term products at the end of 2008. Note that several respondents had more than one type of reinsurance arrangement.

Type of Reinsurance Used on Term Products at YE 2008	
First Dollar QS Coinsurance	18
First Dollar QS YRT	8
Excess of Retention YRT	19
Other	5
None	0

Respondents were also asked about reinsurance recapture options. Again, some respondents are included in multiple rows.

Use of Reinsurance in Practice and in Pricing		
Recapture Option	Treaty provides for	New Business pricing assumes
Full recapture at end of level period	11	0
Full recapture at level period + n years	6	0
Full recapture after 10 years for all plans	4	0
Limited recapture up to current retention limit	14	0
No recapture	5	33
No reinsurance	0	2
Other	3	0
Unknown	2	5

Most respondents have at least some option to recapture business, but no respondents indicated that this option was built into their new business pricing.

Conservation Programs

Respondents were asked whether they had an organized effort in place to promote persistency at the end of the level premium period. The responses can be broadly grouped as follows.

Conservation Programs	
Response	Respondents
No	27
Yes – Letter or other communication made to policyholder or agent as policyholder approaches end of level period (generally to encourage term conversion)	8
Yes – Other	6

Conversion Options

Respondents were asked to describe the conversion options available to term policyholders. A wide variety of restrictions were disclosed including limits on the number of years that conversion was available, the maximum attained age that conversion was allowed, and the types of products into which a policyholder may convert.

The following responses reflect the type of permanent plan into which term policyholders may convert:

Conversion Product Options	
Response	Respondents
May convert into any permanent plan	28
May convert into a permanent plan of the insurer's choice	6
May convert into Whole Life product only (not UL)	3

Few companies place restrictions on the permanent product to be used for conversion. This raises the question of whether it would be cheaper for an unhealthy insured to convert to a permanent plan with guaranteed death benefit coverage than pay the ART premiums after the end of the level term period.

The following responses reflected the type of attained age or duration restrictions attached to conversions. Given the wide variety of responses, they have been grouped into the following broad categories:

Conversion Restrictions	
Response	Respondents
Prior to specified attained age (often 65, 70, or 75)	7
Prior to specified number of years (often 10)	5
Prior to end of level premium period	2
Prior to attained age and duration	12
Prior to attained age and end of level period	20
Not prior to specified number of years (5)	3

Special Thanks

The authors would again like to extend our thanks to all participating companies for making this project a success. Without your support, such research projects would not be possible. Your contributions have led to this broad industry benchmark of assumptions and practices for term lapse and mortality rates beyond the level premium period.

The authors would also like to thank the SOA and the following members of the Project Oversight Group and SOA Staff for their guidance and support on this research project. Their comments, feedback, and direction have greatly improved the value of this project.

Jeff Beckley

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Alex Faynberg

Christie Goodrich

Sebastian Kleber

David Wylde

Ronora Stryker

Jan Schuh

Appendix A: Survey Participants

Allianz

Allstate

American National

American United Life

Americo

Aviva USA

AXA - Equitable

Baltimore Life

Banner Life

Beneficial

Conseco

Erie Family

Farm Bureau Life

Farmers New World

First Investors

ING US

John Hancock

Kansas City Life

Massachusetts Mutual

MetLife

Midland National

Modern Woodmen of America

Nationwide

New York Life

North American Company for Life and Health

Northwestern Mutual

Ohio National

Pacific Guardian

Pekin

Penn Mutual

Principal

Protective / West Coast Life

Prudential

RiverSource

Security Mutual

Sentry

State Farm

Transamerica

USAA

VantisLife

Woodmen of the World

Appendix B: Survey Questions

2009 SOA Post Level Premium
"Shock Lapse" Pricing Assumption Survey

Please answer as many of the following questions as possible with the answer that best fits your level term products sold at year end 2008. If you do not know the answer, please respond "Unknown".

For purposes of this survey, "Level Premium Term" or "Level Term" is term insurance with level premiums for 10, 15, 20 or 30 years followed by an increase in the premium rates beyond the level period.

Contact Information

Your Name:	
Title:	
Phone:	
Email:	

Company and Product Background Information

1. Company Name

2. Sales Volume

How much level term business (by face amount) did your company sell in 2008?

Product Level Premium Period	2008 Sold by Face amount
5 Year Term	
10 Year Term	
15 Year Term	
20 Year Term	
25-30 Year Term	
Other	
Total	-

If other, describe

3.Distribution Channels

Please provide entries to the following table for each distribution channel through which your company sells material amounts of level premium term.

Channel	% of 2008 Level Term Face Amt. Sales
Independent Agent	
Managing General Agents	
Captive Agent	
Banks	
Internet	
Other	

If other, describe

4.Reinsurance

Please select the types of reinsurance used on your term products at YE 2008. (Place an X for all that apply.)

First Dollar QS Coinsurance	-
First Dollar QS YRT	-
Excess of Retention YRT	-
Other	-

If other, describe

2009 SOA Post Level Premium
"Shock Lapse" Pricing Assumption Survey

Please answer as many of the following questions as possible with the answer that best fits your level term products sold at year end 2008. If you do not know the answer, please respond "Unknown".

For purposes of this survey, "Level Premium Term" or "Level Term" is term insurance with level premiums for 10, 15, 20 or 30 years followed by an increase in the premium rates beyond the level period.

---

5. Conservation Programs

Does your company have an organized effort to promote persistency at the end of the level period (through agent incentives, conversion options, re-underwriting discounts, etc.)?

Yes (describe below)	-
No	-
Unknown	-

If yes, describe

6. Product Structure

a) What is the general product structure after the level period? (Place an X for all that apply.)

Premium jump to ART	-
Premium grade to ART	-
Jump to new level period	-
AAR decrease	-
Product terminates	-
Other (describe)	-
Unknown	-
NA	-

Please provide any additional description as necessary

b) Please describe the general level of your guaranteed ultimate premium rates.

*Examples may be "Approximately 300% of 2001 CSO Ultimate" or "Approximately x * level period rates"*

c). Please describe the relationship between the current and guaranteed rates beyond the level period.

Example may be "Current equal to guarantee" or "Product has guaranteed rates only" or "current approximately 75% of guaranteed"

d). Please describe the conversion options available on your level premium term policies including the length of the conversion period (or maximum age) and the types of plans that a policyholder may convert into.

Example may be "Conversion available for first 5 policy years into any existing UL plan."

e). By what parameters do your current premium rates vary? (Place an X for all that apply.)

	Level Premium Period	Beyond Level Period
Gender	-	-
Policy Duration	-	-
Attained Age	-	-
Smoking status	-	-
Preferred risk class	-	-
Substandard Rating	-	-
Face Amount Issued	-	-
Others (please enter)	-	-

If others, describe

2009 SOA Post Level Premium
"Shock Lapse" Pricing Assumption Survey

Please answer as many of the following questions as possible with the answer that best fits your level term products sold at year end 2008. If you do not know the answer, please respond "Unknown".

For purposes of this survey, "Level Premium Term" or "Level Term" is term insurance with level premiums for 10, 15, 20 or 30 years followed by an increase in the premium rates beyond the level period.

General Assumptions

1. Source for Assumptions

What are your primary sources of lapse and mortality assumptions for pricing beyond the level period? (Place an X in all that apply.)

	Lapse	Mortality
Internal experience	-	-
External consultants	-	-
Reinsurers	-	-
Industry studies	-	-
Other (describe)	-	-

If other, describe

2. Pricing Horizon

Does your company's pricing or modeling horizon extend beyond the level premium period?

If your answer to the question above is "yes", please indicate in the following table where assumptions for periods beyond the level premium period are used by entering "Yes" or "No". Enter "Unknown" if you do not know and enter "NA" if the application is not applicable (e.g., if your company does not calculate embedded values, enter "NA" for those entries.)

Application	Product sold at YE 2008	In-Force Business No Longer Sold
Pricing		
Cash Flow Testing		
Embedded Values		
Illustrations		
SAP Earnings Projections		
GAAP Reserves & DAC		
GAAP Income Projections		
Other (Describe)		

If other, describe

2009 SOA Post Level Premium
"Shock Lapse" Pricing Assumption Survey

Please answer as many of the following questions as possible with the answer that best fits your level term products sold at year end 2008. If you do not know the answer, please respond "Unknown".

For purposes of this survey, "Level Premium Term" or "Level Term" is term insurance with level premiums for 10, 15, 20 or 30 years followed by an increase in the premium rates beyond the level period.

General Assumptions

3. Reinsurance Recapture

What are the recapture provisions and assumptions for reinsured business at the end of the level period?

	Treaty provides for	New Business pricing assumes
Full recapture at end of level period	-	-
Full recapture at level period + n years	-	-
Full recapture after 10 years for all plans	-	-
Limited recapture to current retention limit	-	-
No recapture	-	-
No reinsurance	-	-
Other (describe)	-	-
Unkown	-	-
NA	-	-

Please provide any additional description as necessary

4. What factors drive post level premium period assumptions for products sold at year end 2008?

- Please put an "X" in each cell of the table below that describes a primary factor that impacts the indicated assumption.
- To clarify what is meant by a "primary factor", suppose the percentage increase in premium is a primary factor. The fact that the percentage increase will likely vary by gender, length of level premium period and issue age does not make them primary factors unless they independently influence the assumption.
- Shock lapses are likely to occur at the end of and for the first years after the level premium period.
- Shock lapses are the difference between total lapse rates and expected base lapse rates consistent with less dramatic premium increases.
- If the factors differ by application (see #2 above), please provide separate responses for each application.

	Assumption	
Factor	Shock Lapse	Mortality
Distribution channel	-	-
Premium mode	-	-
Policy size (face amount band)	-	-
% increase in premium between level period and first duration after level period	-	-
$ increase in premium between level period and first duration after level period	-	-
Underwriting class (e.g., Super Pref. Non-Tob vs. Standard Non-Tob)	-	-
Issue age	-	-
Gender	-	-
Length of level premium period	-	-
Duration since the end of the level premium period	-	-
Others (describe)	-	-

If others, describe

2009 SOA Post Level Premium
"Shock Lapse" Pricing Assumption Survey

Please answer as many of the following questions as possible with the answer that best fits your level term products sold at year end 2008. If you do not know the answer, please respond "Unknown".

For purposes of this survey, "Level Premium Term" or "Level Term" is term insurance with level premiums for 10, 15, 20 or 30 years followed by an increase in the premium rates beyond the level period.

Total Lapse Rate Pricing Assumptions for Currently Sold Products

Total lapse rates are intended to include voluntary withdrawals and conversions to other products. If you have separate assumptions for lapses and conversions, please provide them separately.

This sheet requests your total lapse rate pricing assumptions for products sold at YE 2008 for policy years where high shock lapses would be expected--generally at the end of the last year (L) of the level premium period and in the first few years (L+1, L+2, etc.) after the level premium period.

1. Verbal description of the way shock lapse rate assumptions are determined.
   If possible, please describe how total lapse rate assumptions are set

An example might be:

Total lapses vary only by the number of years since the end of the level premium period (L=length of the level premium period) and the ratio (R) of the first non-level premium to the level premium (R = GP([x]+L)/GP([x]))

Description:

2. Monthly Skewness Factors
   Describe or provide your assumptions for monthly skewed lapse rates within policy years.

An example might be: Lapses are assumed to occur on premium modes during the level period and 50% heaped to the beginning of the year after the level period

During the level premium period:

Beyond the level premium period.

2009 SOA Post Level Premium
"Shock Lapse" Pricing Assumption Survey

Please answer as many of the following questions as possible with the answer that best fits your level term products sold at year end 2008. If you do not know the answer, please respond "Unknown".

For purposes of this survey, "Level Premium Term" or "Level Term" is term insurance with level premiums for 10, 15, 20 or 30 years followed by an increase in the premium rates beyond the level period.

Total Lapse Rate Pricing Assumptions for Currently Sold Products

3. Total Lapse Rate Assumptions

Please provide your total lapse assumptions for products sold at YE 2008 for each primary factor identified in your response to #4 of the "General Assumptions" sheet. Create as many copies of the table as necessary to describe your lapse rate assumptions. Please include conversion to other plans in the total assumed lapse rate or provide separate assumptions for conversions.

Primary Factor	Level Premium Period (L)	Issue Age	Total Assumed Lapse Rate for Policy Year					
			L	L+1	L+2	L+3	L+4	L+5
	10 Year	25						
		35						
		45						
		55						
		65						
	15 Year	25						
		35						
		45						
		55						
		65						
	20 Year	25						
		35						
		45						
		55						
	30 Year	25						
		35						
		45						
		55						

Primary Factor	Level Premium Period (L)	Issue Age	Total Assumed Lapse Rate for Policy Year					
			L	L+1	L+2	L+3	L+4	L+5
	10 Year	25						
		35						
		45						
		55						
		65						
	15 Year	25						
		35						
		45						
		55						
		65						
	20 Year	25						
		35						
		45						
		55						
	30 Year	25						
		35						
		45						
		55						

2009 SOA Post Level Premium
"Shock Lapse" Pricing Assumption Survey

Please answer as many of the following questions as possible with the answer that best fits your level term products sold at year end 2008. If you do not know the answer, please respond "Unknown".

For purposes of this survey, "Level Premium Term" or "Level Term" is term insurance with level premiums for 10, 15, 20 or 30 years followed by an increase in the premium rates beyond the level period.

Pricing Mortality Anti-Selection Multiples after the Level Premium Period for Currently Sold Products

1. Do you assume mortality anti-selection after the level premium period?

2. If the response to 1. was "Yes", what methodology is used to determine the level of anti-selection?

Method	Yes or No
Becker-Kitsos	
Dukes-MacDonald	
Canadian Institute of Actuaries VTP #2	
Other	

If other, describe

3. Term conversions
If the response to 1. was "Yes", do you assume different anti-selection multiples for policies that convert to a permanent plan at the end of the level period than for policies that persist in the term plan?

If yes, describe

4. Anti-Selection Multiples
The table below assumes that multiples do not vary materially by gender, underwriting class or other factors. If multiples do vary and the differences are material, please provide additional tables with labels indicating the underwriting class or relevant factor. Multiples should be 1.0 if there is no anti-selection.

Level Premium Period (L)	Issue Age	Mortality Anti-Selection Multiples in the Post-Level Premium Period								
		L+1	L+2	L+3	L+4	L+5	L+10	L+15	L+20	L+25
10 Years	25									
	35									
	45									
	55									
	65									
15 Years	25									
	35									
	45									
	55									
	65									
20 Years	25									
	35									
	45									
	55									
30 Years	25									
	35									
	45									
	55									