

**Report on the
Lapse and Mortality Experience
of Post-Level Premium Period
Term Plans**

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

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Project Overview

The Product Development Section Council and the Committee on Life Insurance Research of the Society of Actuaries (“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.

The project was 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. A copy of this report can be found at <http://www.soa.org/files/pdf/research-2009-post-level.pdf>.
- Phase 2 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 were asked to supply policy level inforce and termination records so that experience results could be analyzed at a granular level including, but not limited to, age, gender, risk class, premium jump, and policy size.

This report will analyze the results of the Phase 2 study in the following sections:

- 1) Analysis of shock lapse rate experience
- 2) Analysis of post-level period mortality deterioration experience
- 3) Comparisons of results between Phase 1 assumption survey and Phase 2 experience study
- 4) A proposed generalized linear model of shock lapse rates.

Supplemental pivot tables with the aggregated 10 year level-term (T10) lapse and mortality study results are also available for more customized analysis. These pivot tables enable multi-dimensional drilling of experience results. Due to potentially limited exposure in some of these drill-downs, users should exercise caution when considering the credibility of experience results at finer levels of granularity.

A list of the 26 companies who submitted data for Phase 2 can be found in Appendix A (p. 64).

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.

RGA, its directors, officers, and employees, disclaim liability for any loss or damage arising or resulting from any error or omission in RGA's analysis and summary of the results or any other information contained herein. The report is to be reviewed and understood as a complete document.

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Executive Summary

Shock Lapses

The total duration 10 shock lapse for all 10 year level term plans (T10) was 60.9% although there was a wide range of results by company, product structure, and policy attributes. The duration 10 shock lapse was 65.7% for T10 products structured with an annually increasing post-level premium scale. For 15 year level term plans (T15), the duration 15 shock lapse was 50.3%. The initial shock lapse at the end of the level period was followed by a smaller secondary shock lapse in the following duration. Lapse rates tend to grade down in later durations of the post-level period.

The policy attribute most highly correlated with shock lapse is the size of the jump in premium from the level period to the post-level period. This is especially significant since more recently issued products might experience higher shock lapses than those in this study due to larger premium jumps after the end of the level period. Shock lapses are higher for older issue ages although this is also correlated with the jump in premium rate. Shock lapse rates are higher for annual premium modes than for monthly premium modes, which might be due to the large dollar increase in the premium after the level period.

Lapses within the first year of the post-level period are more heavily skewed toward the beginning of the policy year, indicating a disproportionate amount of off-anniversary lapse activity compared to the level period.

Mortality Deterioration

The median of company-specific experience for T10 showed duration 11 mortality as 275% of the duration 6-10 mortality level, although there was a wide range of results by company. Mortality deterioration seemed to grade down by duration, although credibility in later durations is somewhat limited.

As with shock lapses, mortality deterioration seems to increase by issue age and by the size of the post-level period premium jump. These dimensions are important considerations when applying shock lapse and mortality deterioration assumptions for pricing new products.

Introduction

The Phase 2 data request was sent to companies who indicated a willingness to participate during the Phase 1 survey. A list of participants is included in Appendix A (p. 64).

Methods of Analysis

Participating companies were asked to provide a listing of each inforce and terminated level term policy, including exact issue dates and dates of termination. The collection of data in this manner allowed the researchers to ensure a consistent calculation of experience study exposures across multiple companies. This also enabled cells with relatively small exposure to be aggregated such that total credibility can be improved. This data was used to create a 2000-2008 anniversary year lapse study and a 2000-2008 calendar year mortality study. The anniversary year method was chosen for the lapse study to account for the skewness of lapses throughout the policy year. Since many lapses occurred on policy anniversaries, a calendar year study would potentially miss much of the anticipated lapse activity at the end of a policy's most recent policy year. Since deaths were generally evenly distributed throughout the policy year, a calendar year method was used for the mortality study to increase the amount of fully completed experience that could be included in the study. Both studies were primarily performed on a policy count basis to help minimize the impact of volatility related to policy size. Results by face amount band are provided to help identify differences in experience at different policy sizes.

A process of data validation and cleansing was undertaken with each company's submission. This process helped the researchers ensure that they had a good understanding of the data that had been submitted. In several cases, this process led to companies providing additional or corrected data.

Grace Period Adjustments

The most significant adjustment that was made during the data validation process was to account for differences in how companies captured the effective date of lapses. For terminations due to lack of premium payment, some companies submitted a termination date equal to the anniversary date plus the grace period. To ensure consistency across companies, the researchers adjusted these dates to be the true effective date of the termination. This adjustment effectively moved shock lapses that were reported 30 to 90 days into duration 11 to the end of duration 10 for 10 year term policies. After this adjustment, the results from these companies were much more consistent with those who reported the effective date of the termination (often on the policy anniversary). While other approaches may also have been appropriate, it was felt that this was the best way to report results in a manner most likely to be consistent with premium calculations and new business pricing model mechanics. An illustration of the impact of the grace period adjustments can be found in Appendix B. All displays in the remainder of the document exclude the grace period when appropriate.

Lapse Study Specifications

The lapse study covered policy anniversary in 2000 to policy anniversary in 2008. For the purposes of this study, any voluntary termination was considered a “lapse”. This includes terminations coded as “lapse”, “full conversion”, “term upgrade”, and some other miscellaneous values. Exposure was calculated for up to 8 policy years for each policy. Fractional exposure was calculated for policies in the year of death. A full policy year of exposure was credited to policies in the year of lapse.

Mortality Study Specifications

The mortality study covered calendar years 2000 through 2008. Fractional exposure was calculated for policies in the year of lapse. A full policy year of exposure was credited to policies in the year of death. Expected mortality was calculated using several industry standard tables: SOA 1975-80, 2001 VBT, and 2008 VBT. Actual/Tabular ratios were calculated as the ratio of the actual number of deaths to the tabular expected number of deaths.

Relative mortality ratios are also provided to compare the post-level period mortality to the level period mortality. These values are calculated as the ratio of 2008 VBT actual/tabular ratio for a given post-level period duration to the 2008 VBT actual/tabular ratio during the last 5 durations of the level period.

Lapse Experience

Overview

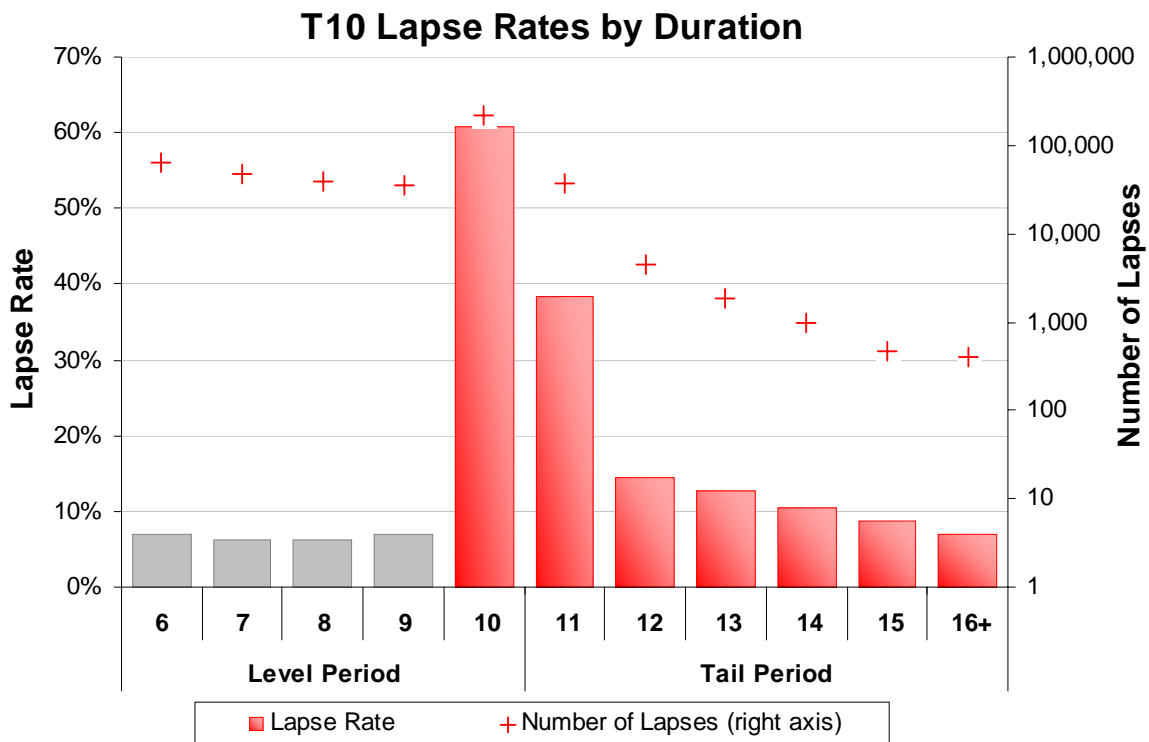
This section will present lapse experience from participating companies with a primary focus on the shock lapse at the end of the level period. Multiple companies have submitted credible data for T10 products and these results will be shown for all of the dimensions being analyzed. A smaller number of companies contributed T15 experience, so these results will only be shown when the dimensions being analyzed are credible and represent an appropriate cross-section of companies. Five-year term and 20-year term results will not be provided since there were not multiple companies contributing credible experience for these products.

Total Lapse Rates By Duration

T10

The following table and chart show the lapse experience for T10 by duration. The aggregate shock lapse at the end of the level period is about 61% with a smaller secondary shock lapse in duration 11. Lapse rates continue to drift down by duration thereafter.

T10 Lapse Experience by Duration			
Policy Duration	Policy-Years Exposed	Total Lapses	Lapse Rate
6	917,272	63,382	6.9%
7	755,442	47,565	6.3%
8	614,434	38,821	6.3%
9	506,713	34,811	6.9%
10	349,253	212,528	60.9%
11	96,483	36,914	38.3%
12	31,492	4,573	14.5%
13	14,604	1,871	12.8%
14	9,062	958	10.6%
15	5,205	459	8.8%
16+	5,924	412	7.0%
Grand Total	3,305,884	442,294	

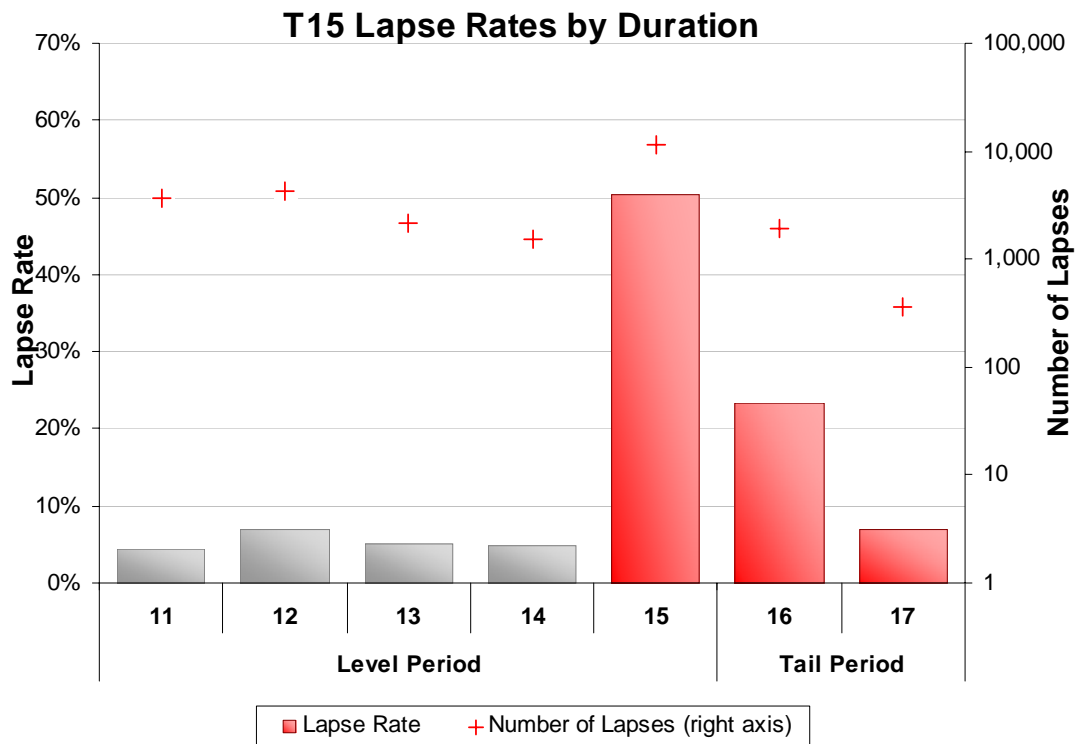


Total Lapse Rates by Duration (cont.)

T15

A large shock lapse is also evident on T15 products at the end of duration 15. A secondary shock lapse in duration 16 is followed by lower lapses thereafter, similar to the patterns observed in T10.

T15 Lapse Experience by Duration			
Policy Duration	Policy-Years Exposed	Total Lapses	Lapse Rate
11	82,032	3,676	4.5%
12	60,484	4,238	7.0%
13	42,361	2,169	5.1%
14	31,253	1,515	4.8%
15	22,470	11,299	50.3%
16	8,072	1,889	23.4%
17	5,307	362	6.8%
Grand Total	251,981	25,148	

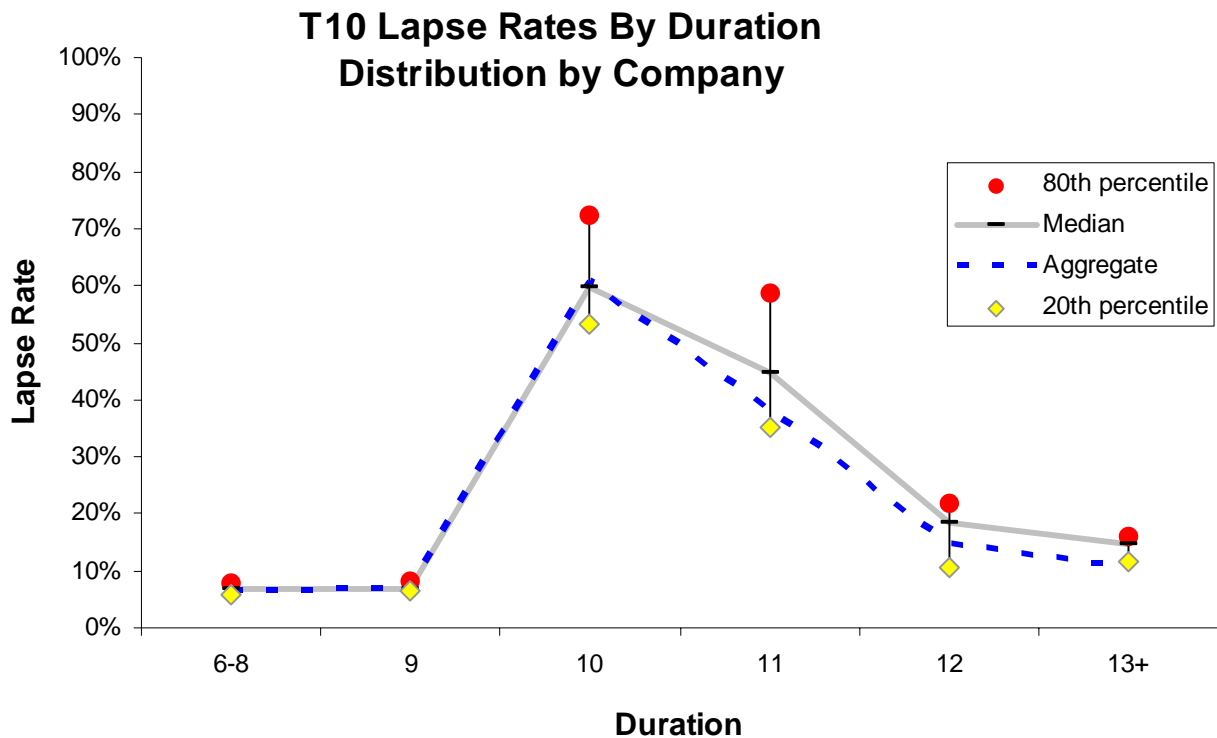


Distribution of Results

T10

As mentioned in the Executive Summary, a wide spread of company-specific results was observed. The following table and chart plot the company-specific T10 lapse rates at different percentiles. Only companies with at least 100 lapses in a given duration are included in the display.

Lapse Rate Range	Duration					
	6-8	9	10	11	12	13+
# of Companies	25	24	24	21	12	10
20 th percentile	5.8%	6.3%	53.2%	35.3%	10.6%	11.6%
Median	6.8%	6.9%	59.8%	44.9%	18.4%	14.7%
Aggregate	6.5%	6.9%	60.9%	38.3%	14.5%	10.6%
80 th percentile	7.7%	8.3%	72.3%	58.8%	21.8%	16.0%



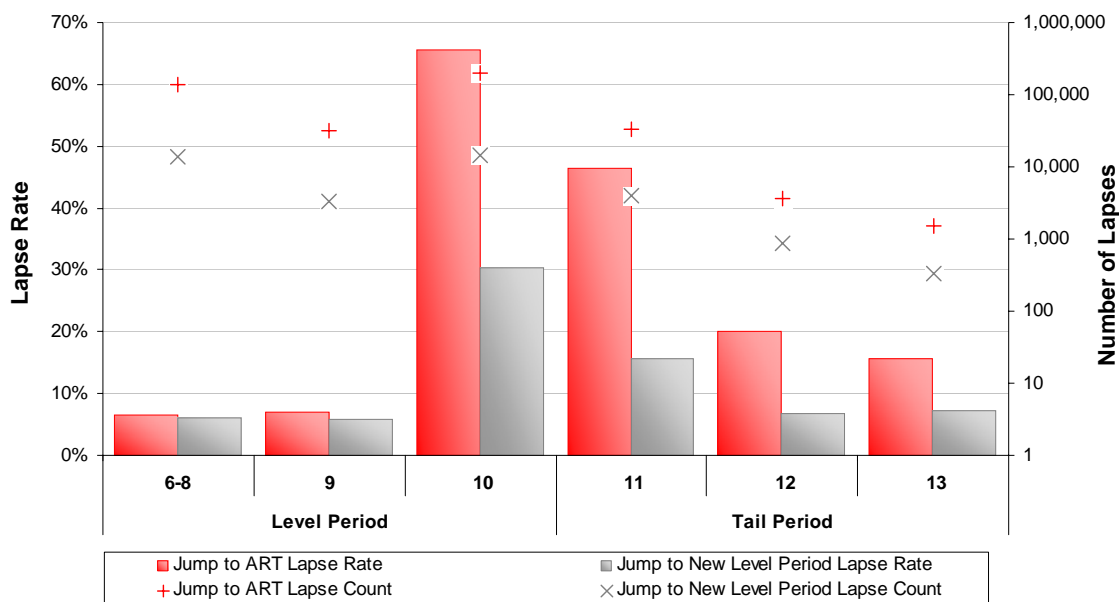
Post-Level Period Premium Structure

T10

Contributors were asked to describe the structure of the premium rates after the end of the level premium period. The two descriptions provided were “Premium Jump to ART⁽¹⁾” and “Premium Jump to New Level Period”. The dominant design is “Premium Jump to ART”, although there were multiple companies with credible lapse experience for the “Jump to New Level Period” structure through duration 13. Phase 1 Survey results indicate that the “Premium Jump to ART” design is overwhelmingly the predominant structure used for new products. In total, the products with a jump to a new level period experienced lower shock lapse rates than those jumping to a new ART scale.

Policy Duration	Policy-Years Exposed		Total Lapses		Lapse Rate	
	Jump to ART	Jump to New Level Period	Jump to ART	Jump to New Level Period	Jump to ART	Jump to New Level Period
6-8	2,052,029	235,120	135,772	13,996	6.6%	6.0%
9	450,652	56,061	31,573	3,238	7.0%	5.8%
10	301,690	47,563	198,116	14,412	65.7%	30.3%
11	70,621	25,862	32,841	4,073	46.5%	15.7%
12	18,482	13,010	3,688	885	20.0%	6.8%
13	9,889	4,715	1,535	336	15.5%	7.1%
Total (6-13)	2,903,363	382,330	403,525	36,940		

T10 Lapse Rates by Duration and Tail Period Premium Structure



(1) ART stands for “annually renewable term”, but is used more generally to describe any product with an annually increasing premium structure. The products often have premiums in the post-level period that are set as a fixed percentage of the ultimate period rates from an industry mortality table such as 1980 CSO or 2001 CSO.

Premium Jump Ratio

T10

Since the shock lapse is primarily driven by the dramatic increase in premiums that a policyholder would have to pay to keep his or her policy in force, it stands to reason that policies with larger premium jumps might also have larger shock lapses. To study this, the researchers asked participants to supply the level period and post-level period per-thousand premium rates for each policy record. Usable premium data was provided by 10 participating companies, representing approximately 39% of the T10 duration 10 exposure. For each policy, the researchers calculated a “Premium Jump Ratio” as the ratio of the duration 11 per thousand rate to the duration 10 per thousand rate. The lapse rate experience was then stratified into bands by premium jump ratio. For example, “1.01x – 2x” in the charts on the following pages represents policies with a duration 11 premium rate between 1 and 2 times the premium rate in duration 10.

It is clear that policies with lower premium jump ratios experienced significantly lower shock lapses than policies with larger premium jump ratios. This is particularly relevant when considering how to apply the results from this experience study to current pricing. As seen in the Phase 1 survey, a common current practice is to set post-level period premium rates at 200% of 2001 CSO or higher. This would generally lead to much higher average premium jumps than the policies in this study that have already entered the post-level period. As a result, the researchers expect the shock lapse experience that eventually emerges on recently issued business could be much higher than the aggregated totals from this study suggest.

The results on the following pages provide a calculation of the “Average Prem Jump Ratio” and the “Average Issue Age”. The average premium jump obviously ends up near the midpoint of each premium jump ratio band. As mentioned earlier, issue age is strongly correlated with premium jump ratio.

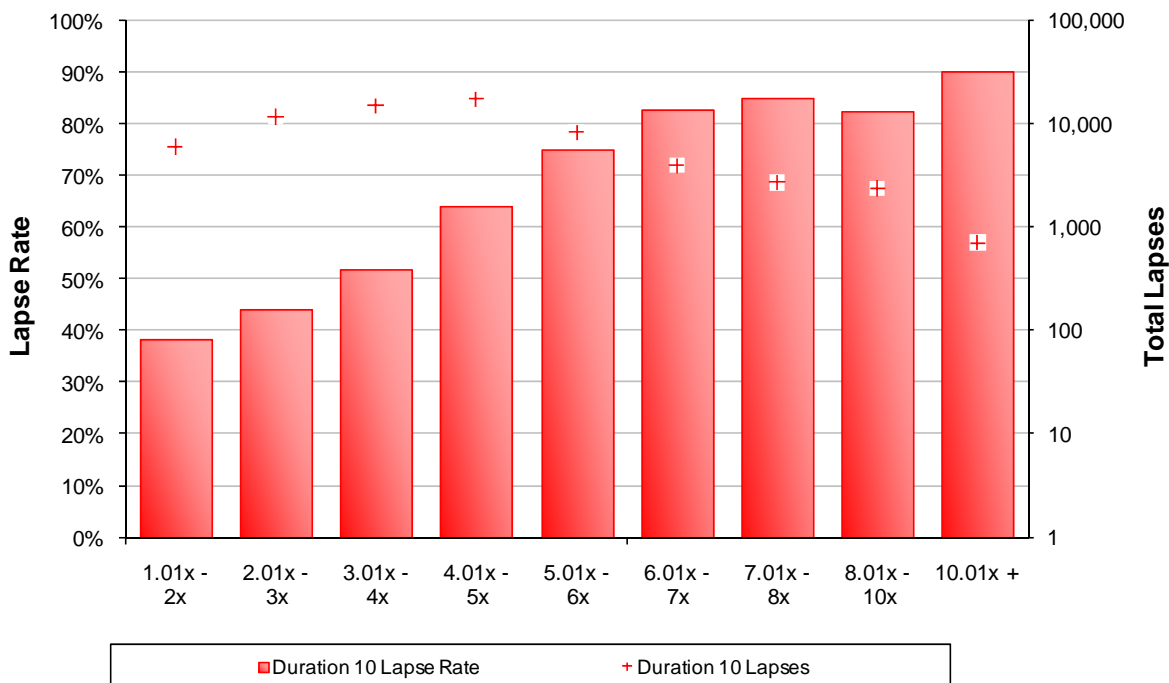
Premium Jump Ratio (T10 cont)

Premium Jump Ratio Band	Policy-Years Exposed	Duration 10 Lapses	Duration 10 Lapse Rate	Average Prem Jump Ratio ⁽¹⁾	Average Issue Age ⁽²⁾
1.01x - 2x	15,557	5,980	38.4%	1.6	35.4
2.01x - 3x	26,498	11,678	44.1%	2.7	39.3
3.01x - 4x	28,777	14,892	51.7%	3.6	39.0
4.01x - 5x	26,908	17,222	64.0%	4.5	43.0
5.01x - 6x	11,004	8,257	75.0%	5.4	49.9
6.01x - 7x	4,760	3,938	82.7%	6.5	55.2
7.01x - 8x	3,169	2,693	85.0%	7.5	57.3
8.01x - 10x	2,849	2,351	82.5%	8.8	54.5
10.01x +	785	707	90.1%	11.5	54.7
Subtotal Prem Data Available	120,307	67,718	56.3%	3.9	41.2
No Prem Data Available	228,946	144,810	63.3%	n/a	40.7
Grand Total	349,253	212,528	60.9%	n/a	42.1

(1) Weighted Average premium jump by duration 10 exposure for policies with premium data available

(2) Weighted Average issue age by duration 10 exposure

T10 Duration 10 Lapse Rate by Premium Jump Ratio



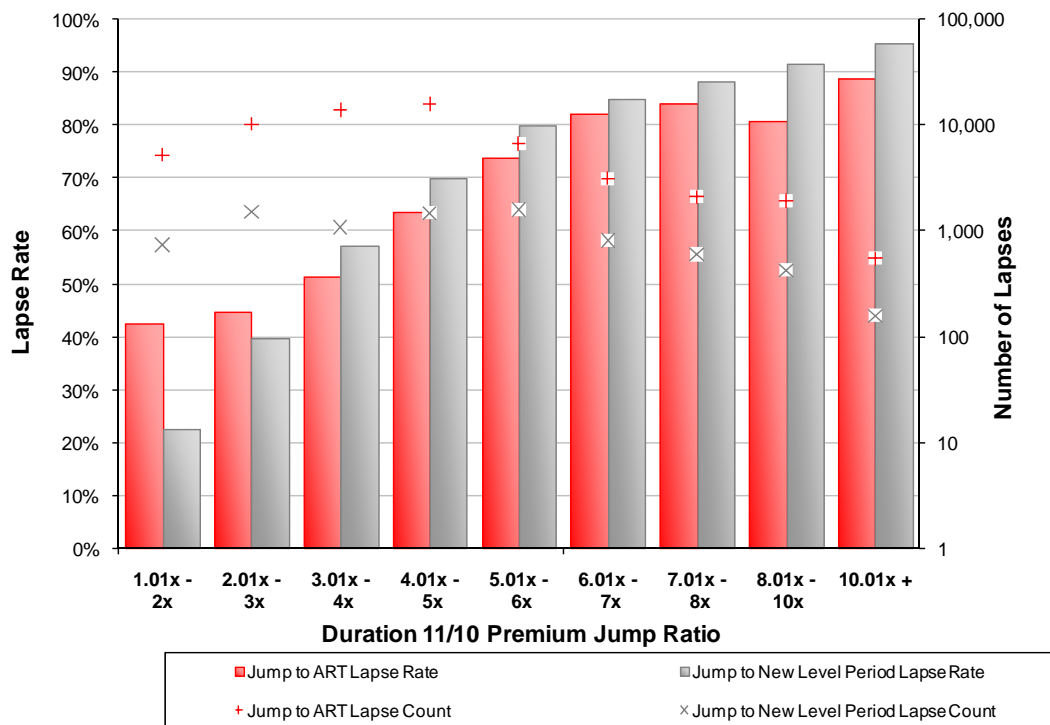
Premium Jump Ratio and Post-Level Period Premium Structure

T10

Both the “Jump to ART” and the “Jump to New Level Period” product designs have shock lapses that generally increase with the size of the premium jump. As seen earlier, the products with a jump to a new level period experienced lower shock lapses than those that jumped to an ART scale in total, although the shock lapse rates for those products were higher for all premium jump bands larger than 2 times. Within each premium jump band, the average issue age of the jump to new level period products is higher.

Premium Jump Ratio Band	Policy-Years Exposed		Total Lapses		Lapse Rate		Avg Prem Jump		Avg Issue Age	
	Jump to ART	Jump to New Level Period	Jump to ART	Jump to New Level Period	Jump to ART	Jump to New Level Period	Jump to ART	Jump to New Level Period	Jump to ART	Jump to New Level Period
1.01x - 2x	12,293	3,264	5,239	741	42.6%	22.7%	1.6	1.7	36.2	32.1
2.01x - 3x	22,684	3,814	10,162	1,516	44.8%	39.8%	2.7	2.5	39.1	40.6
3.01x - 4x	26,892	1,885	13,814	1,078	51.4%	57.2%	3.6	3.5	38.5	45.7
4.01x - 5x	24,796	2,112	15,744	1,478	63.5%	70.0%	4.5	4.5	42.3	50.8
5.01x - 6x	9,012	1,992	6,667	1,590	74.0%	79.8%	5.4	5.5	48.8	55.1
6.01x - 7x	3,802	959	3,123	815	82.1%	85.0%	6.5	6.5	54.4	58.4
7.01x - 8x	2,486	683	2,091	602	84.1%	88.1%	7.5	7.5	56.7	59.2
8.01x - 10x	2,385	464	1,926	425	80.8%	91.6%	8.7	8.8	53.8	58.4
10.01x +	619	166	549	158	88.7%	95.4%	11.6	11.4	50.9	68.7
Subtotal Data Available	104,969	15,338	59,315	8,403	56.5%	54.8%	3.9	3.9	41.6	45.5
No Prem Data Available	196,721	32,225	138,801	6,009	70.6%	18.6%	n/a	n/a	40.5	42.3
Grand Total	301,690	47,563	198,116	14,412	65.7%	30.3%	n/a	n/a	40.8	43.3

T10 Duration 10 Lapse Rates by Premium Jump Ratio and Post-Level Premium Structure

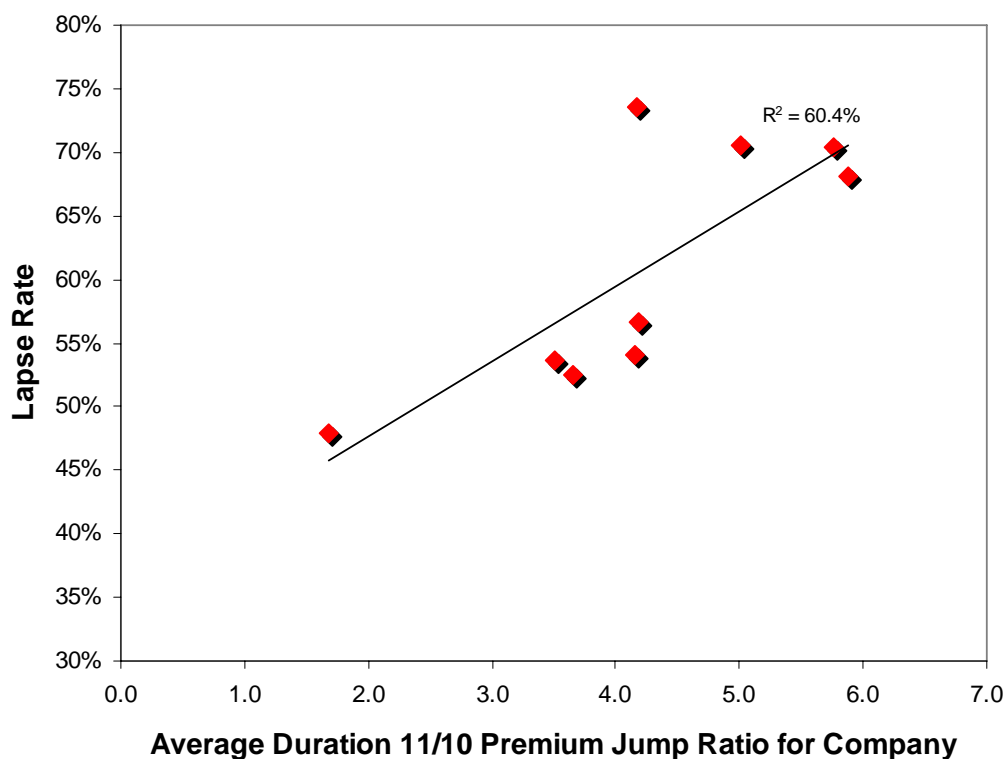


Average Premium Jump by Company

T10

A wide spread of shock lapse results was seen from company to company. This is attributable to a number of company-specific factors including product design, target market, age distribution, and policyholder retention programs. The following chart shows the impact of the premium jump ratio on company-specific shock lapse rates. This chart shows the company-specific duration 10 shock lapse as a function of the average premium jump ratio between durations 10 and 11 for each company that provided premium information. In general, companies with higher average premium jumps experienced higher shock lapses.

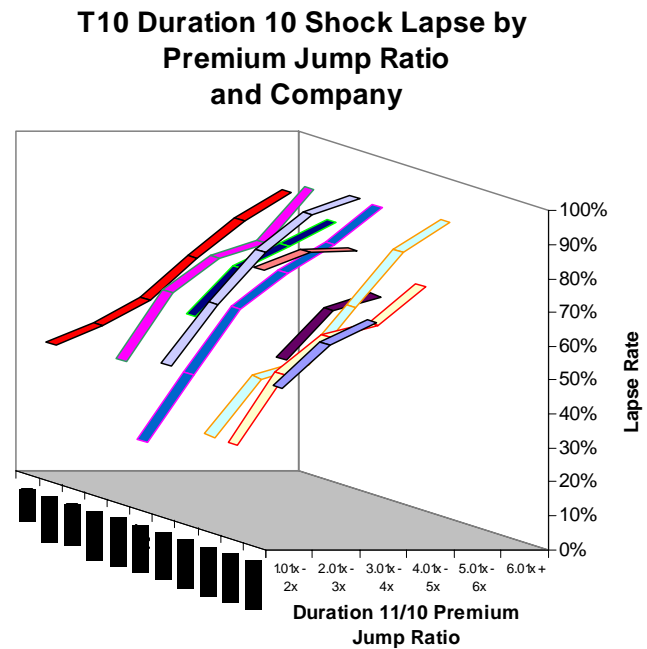
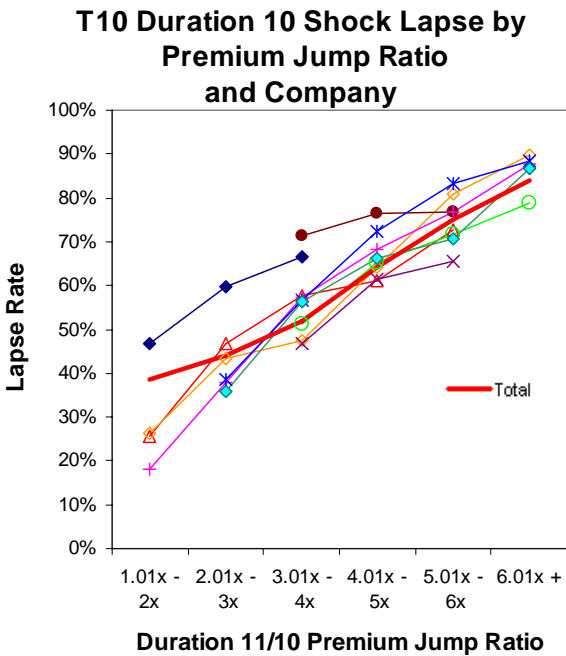
**T10 Duration 10 Lapse Rates
by Average Premium Jump Ratio**



Premium Jump Ratio by Company

T10

One possible concern might be that companies are represented disproportionately along different parts of the premium jump ratio spectrum. This is a valid concern given the wide spread of company-specific experience results and the differences between various companies' gross premium rates and product structures. To determine whether company mix was creating the trends displayed in the prior pages, each company's specific results were plotted by premium jump ratio. The two graphs below show the same data from different perspectives. The plotted points show company-specific data points with at least 100 lapses. The dark red line represents the total shock lapse rates across all companies. Although there are still significant company-specific differences at each premium jump level, it is clear that the general trend of increasing shock lapse rates with increasing premium jump ratios is persistent across all companies who reported premium data.



Lapse Skewness

The researchers were curious about how lapses were skewed by month before and after the shock lapse. While most companies in the Phase 1 survey did not explicitly adjust for differences in lapse skewness beyond the level period, five respondents indicated that their lapse assumptions were skewed more heavily toward the beginning of the year immediately following the end of the level period.

The tables and charts on the following pages show the proportion of T10 lapses within each policy month of lapse. Since the grace period adjustments discussed earlier that were made for some companies could potentially affect this analysis, the results for companies that had grace period adjustments are displayed separately from those without grace period adjustments. The results for these two groups are quite similar, despite the adjustments.

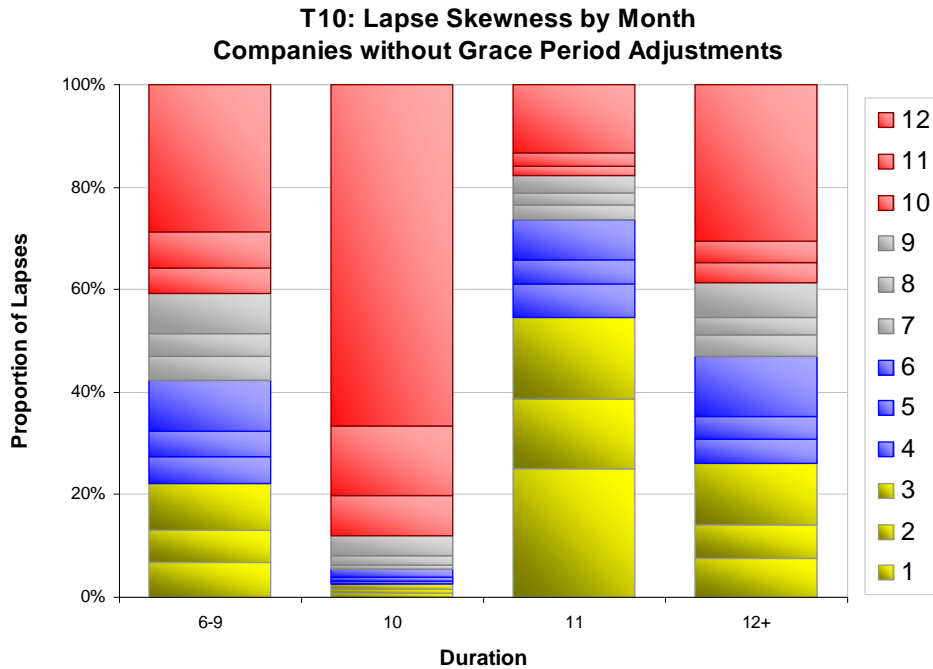
In total, it is clear that lapses in duration 10 are skewed heavily toward the end of the policy year. The most significant finding, however, is that duration 11 lapses are skewed heavily toward the beginning of the policy year. This is especially important when considering the portion of duration 11 premium that will be collected. To the extent that the distribution of off-anniversary lapses during the post-level period is different from the level period, this should be an important consideration in developing new business pricing assumptions.

Lapse Skewness (cont.)

The following displays cover all lapses in the study. Over 50% of duration 11 lapses occurred in the first 3 policy months following the policy's 10th anniversary, compared to less than 25% during durations 6-9.

The monthly distribution of lapses for durations 12+ is similar to the distribution during durations 6-9.

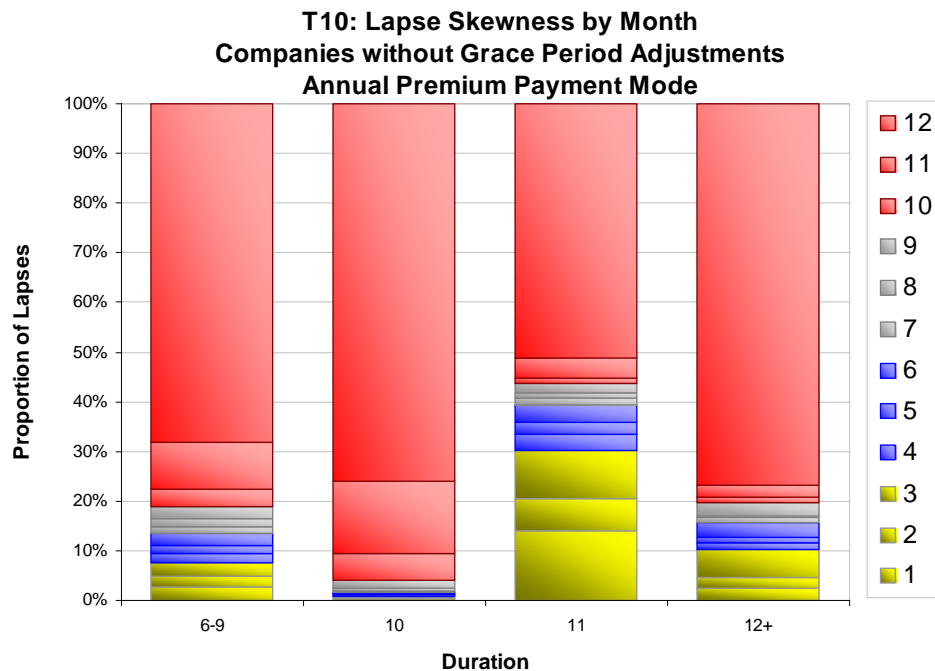
Grace Period Adjustment?	Lapse Month within Pol Yr	Number of Lapses				Proportion of Lapses			
		Dur 6-9	Dur 10	Dur 11	Dur 12+	Dur 6-9	Dur 10	Dur 11	Dur 12+
No	1	9,209	1,200	5,772	330	7%	1%	25%	8%
	2	8,169	1,135	3,096	290	6%	1%	14%	7%
	3	12,502	1,731	3,657	528	9%	1%	16%	12%
	4	6,863	1,053	1,487	203	5%	1%	6%	5%
	5	6,533	1,101	1,064	201	5%	1%	5%	5%
	6	13,341	2,304	1,795	515	10%	1%	8%	12%
	7	6,246	1,477	655	182	5%	1%	3%	4%
	8	6,170	2,592	564	153	5%	2%	2%	3%
	9	10,223	6,363	743	298	8%	4%	3%	7%
	10	6,952	12,222	461	170	5%	8%	2%	4%
	11	9,438	21,692	544	186	7%	14%	2%	4%
	12	38,304	105,215	3,081	1,337	29%	67%	13%	30%
		Total	133,950	158,085	22,919	4,393	100%	100%	100%
Yes	1	3,425	510	4,439	376	7%	1%	32%	10%
	2	2,900	470	2,201	305	6%	1%	16%	8%
	3	4,467	629	1,886	361	9%	1%	13%	9%
	4	2,761	409	848	219	5%	1%	6%	6%
	5	2,616	407	676	206	5%	1%	5%	5%
	6	5,072	855	842	361	10%	2%	6%	9%
	7	2,638	527	389	186	5%	1%	3%	5%
	8	2,506	674	320	164	5%	1%	2%	4%
	9	4,010	1,978	396	283	8%	4%	3%	7%
	10	3,162	6,232	369	232	6%	11%	3%	6%
	11	3,409	8,711	378	275	7%	16%	3%	7%
	12	13,663	33,041	1,251	912	27%	61%	9%	24%
		Total	50,629	54,443	13,995	3,880	100%	100%	100%
Grand Total		184,579	212,528	36,914	8,273				



Lapse Skewness – Annual Premium Payment Mode

Premium payment mode is also a fundamental driver of lapse skewness. The following displays cover business that was reported as having an annual premium payment mode. As expected, lapses during the level period are more heavily skewed toward the end of each policy year than for other modes, but a significant portion of duration 11 lapses still occur toward the beginning of the policy year.

Grace Period Adjustment?	Lapse Month within Pol Yr	Number of Lapses				Proportion of Lapses			
		Dur 6-9	Dur 10	Dur 11	Dur 12+	Dur 6-9	Dur 10	Dur 11	Dur 12+
No	1	982	162	426	25	3%	0%	14%	2%
	2	895	130	198	26	2%	0%	6%	2%
	3	983	165	300	60	3%	0%	10%	6%
	4	701	103	101	14	2%	0%	3%	1%
	5	629	105	71	11	2%	0%	2%	1%
	6	868	164	105	34	2%	0%	3%	3%
	7	604	158	44	10	2%	0%	1%	1%
	8	609	299	35	5	2%	1%	1%	0%
	9	827	808	53	27	2%	2%	2%	2%
	10	1,409	2,773	36	13	4%	5%	1%	1%
	11	3,565	7,535	120	25	9%	15%	4%	2%
	12	25,802	39,367	1,567	834	68%	76%	51%	77%
		Total	37,874	51,769	3,056	1,084	100%	100%	100%
Yes	1	494	84	631	62	4%	1%	34%	9%
	2	348	61	233	27	3%	0%	12%	4%
	3	334	63	96	20	3%	0%	5%	3%
	4	285	57	55	10	2%	0%	3%	1%
	5	252	57	34	5	2%	0%	2%	1%
	6	310	81	30	10	2%	1%	2%	1%
	7	257	71	21	8	2%	0%	1%	1%
	8	260	68	24	10	2%	0%	1%	1%
	9	299	171	24	24	2%	1%	1%	3%
	10	739	843	60	39	6%	5%	3%	5%
	11	941	1,412	72	71	8%	9%	4%	10%
	12	7,931	13,028	589	439	64%	81%	32%	61%
		Total	12,450	15,996	1,869	725	100%	100%	100%
Grand Total		50,324	67,765	4,925	1,809				

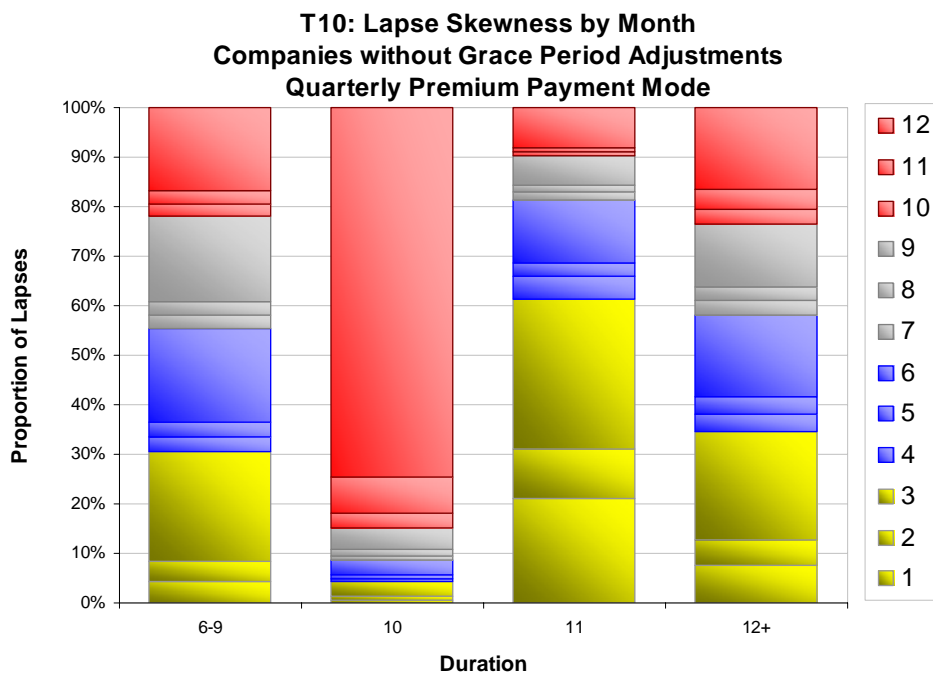


Lapse Skewness – Quarterly Premium Payment Mode

The following displays cover business that was reported as having a quarterly premium payment mode.

A spike in lapses is evident after each quarterly premium payment with a large shock lapse at the end of duration 10. Consistent with the other displays, duration 11 lapses are skewed toward the beginning of the policy year.

Grace Period Adjustment?	Lapse Month within Pol Yr	Number of Lapses				Proportion of Lapses			
		Dur 6-9	Dur 10	Dur 11	Dur 12+	Dur 6-9	Dur 10	Dur 11	Dur 12+
No	1	1,249	170	1,415	110	4%	1%	21%	7%
	2	1,160	173	683	76	4%	1%	10%	5%
	3	6,448	869	2,032	323	22%	3%	30%	22%
	4	829	163	306	50	3%	1%	5%	3%
	5	849	165	177	51	3%	1%	3%	3%
	6	5,541	898	857	243	19%	3%	13%	17%
	7	733	223	104	45	3%	1%	2%	3%
	8	780	319	89	39	3%	1%	1%	3%
	9	5,003	1,260	396	187	17%	5%	6%	13%
	10	707	791	61	45	2%	3%	1%	3%
	11	762	2,014	66	56	3%	7%	1%	4%
	12	4,888	20,737	536	244	17%	75%	8%	17%
		Total	28,949	27,782	6,722	1,469	100%	100%	100%
Yes	1	1,207	163	1,743	92	6%	1%	30%	7%
	2	1,129	160	889	111	6%	1%	15%	8%
	3	2,665	317	1,107	212	14%	1%	19%	16%
	4	1,070	153	325	65	6%	1%	6%	5%
	5	1,026	136	237	63	5%	1%	4%	5%
	6	2,422	339	370	163	13%	2%	6%	12%
	7	1,048	185	146	46	6%	1%	3%	3%
	8	1,027	302	116	49	5%	1%	2%	4%
	9	2,372	880	231	135	13%	4%	4%	10%
	10	1,034	2,065	124	73	5%	10%	2%	5%
	11	1,104	3,824	112	70	6%	18%	2%	5%
	12	2,735	12,695	370	276	15%	60%	6%	20%
		Total	18,839	21,219	5,770	1,355	100%	100%	100%
Grand Total		47,788	49,001	12,492	2,824				

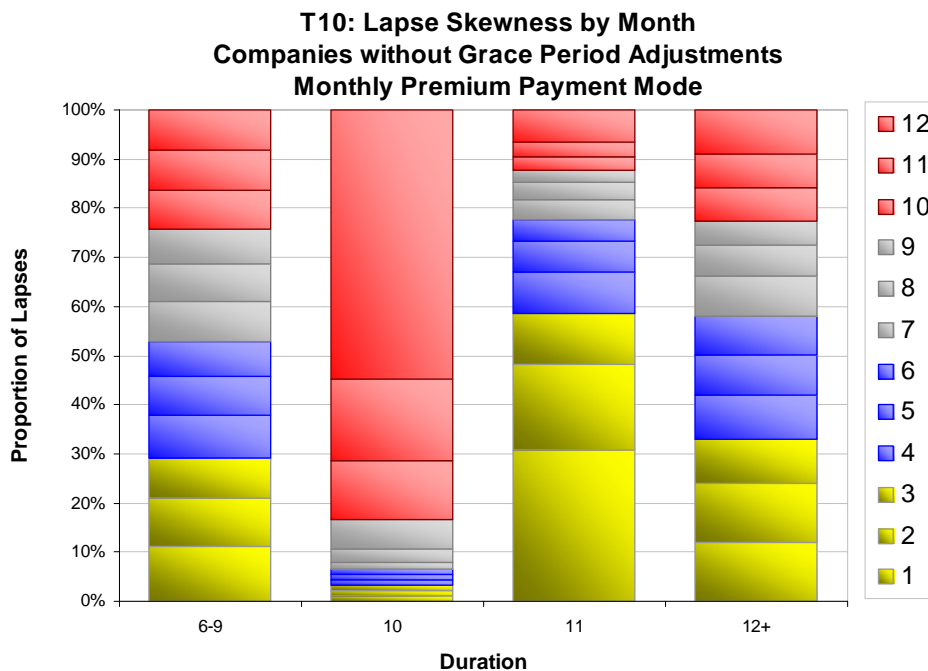


Lapse Skewness – Monthly Premium Payment Mode

The following displays cover business that was reported as having a monthly premium payment mode.

Lapses during the level period are very evenly distributed throughout the policy year. In duration 10, lapses are skewed toward the end of the policy year. In duration 11, lapses are skewed toward the beginning of the policy year.

Grace Period Adjustment?	Lapse Month within Pol Yr	Number of Lapses				Proportion of Lapses			
		Dur 6-9	Dur 10	Dur 11	Dur 12+	Dur 6-9	Dur 10	Dur 11	Dur 12+
No	1	6,822	829	3,662	179	11%	1%	31%	12%
	2	5,936	801	2,090	177	10%	1%	18%	12%
	3	4,915	671	1,212	131	8%	1%	10%	9%
	4	5,158	766	1,006	134	9%	1%	8%	9%
	5	4,895	799	770	123	8%	1%	6%	8%
	6	4,318	781	501	116	7%	1%	4%	8%
	7	4,800	1,058	492	121	8%	1%	4%	8%
	8	4,669	1,933	430	92	8%	3%	4%	6%
	9	4,281	4,202	274	74	7%	6%	2%	5%
	10	4,734	8,508	345	101	8%	12%	3%	7%
	11	4,983	11,903	350	98	8%	17%	3%	7%
	12	4,983	38,917	778	134	8%	55%	7%	9%
		Total	60,494	71,168	11,910	1,480	100%	100%	100%
Yes	1	1,445	221	1,812	207	10%	2%	33%	13%
	2	1,246	221	956	159	8%	2%	18%	10%
	3	1,113	190	579	120	8%	2%	11%	8%
	4	1,221	158	418	133	8%	1%	8%	9%
	5	1,146	168	368	120	8%	1%	7%	8%
	6	1,128	198	239	108	8%	2%	4%	7%
	7	1,184	221	202	127	8%	2%	4%	8%
	8	1,110	264	164	102	8%	2%	3%	7%
	9	1,073	842	131	116	7%	7%	2%	8%
	10	1,162	2,799	173	110	8%	23%	3%	7%
	11	1,169	3,061	179	124	8%	25%	3%	8%
	12	1,741	3,772	194	110	12%	31%	4%	7%
		Total	14,738	12,115	5,415	1,536	100%	100%	100%
Grand Total		75,232	83,283	17,325	3,016				



Issue Age

T10

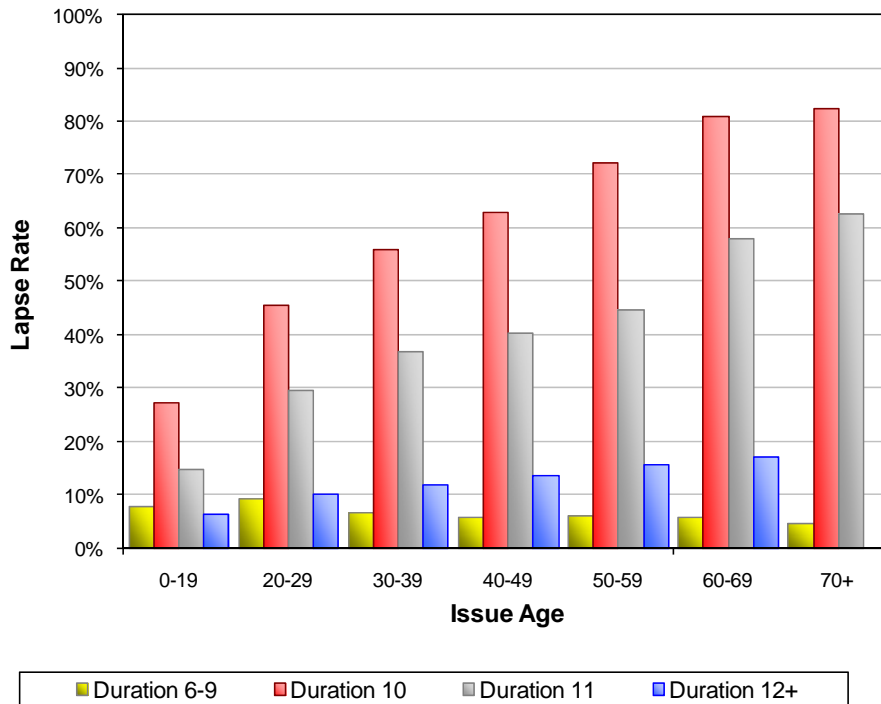
Shock lapse rates tend to increase dramatically by increasing issue age, although issue age is also correlated with increasing premium jump ratios. The columns on the right show the average premium jump ratios (calculated when available) and average issue age for duration 10 exposures.

Beyond the impact of the premium jump ratio, older issue ages may have less insurable need at the end of the level period. In addition, the dollar amount of the premium jump is also much larger which might be important independent of the percentage increase in the premium rate.

Issue Age	Duration 6-9			Duration 10			Duration 11			Duration 12+			Dur 10 Avg Prem Jump Ratio	Dur 10 Avg Issue Age
	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate		
0-19	4,846	381	7.9%	460	126	27.4%	210	31	14.8%	271	17	6.3%	2.2	18.4
20-29	279,819	26,440	9.4%	33,964	15,475	45.6%	12,544	3,701	29.5%	10,134	1,032	10.2%	2.7	26.6
30-39	959,924	65,566	6.8%	131,241	73,592	56.1%	41,107	15,205	37.0%	31,144	3,721	11.9%	3.4	34.9
40-49	895,195	52,631	5.9%	115,493	72,754	63.0%	30,554	12,353	40.4%	19,108	2,606	13.6%	3.8	44.1
50-59	498,310	30,560	6.1%	53,729	38,921	72.4%	10,410	4,660	44.8%	4,792	756	15.8%	5.0	53.6
60-69	135,330	8,046	5.9%	13,011	10,545	81.0%	1,526	884	57.9%	770	132	17.1%	6.1	63.2
70+	20,322	953	4.7%	1,340	1,106	82.6%	126	79	62.6%	*	*	*	6.8	71.8
Grand Total	2,793,861	184,579	6.6%	349,253	212,528	60.9%	96,483	36,914	38.3%	66,287	8,273	12.5%	3.9	41.2

* Insufficient Data

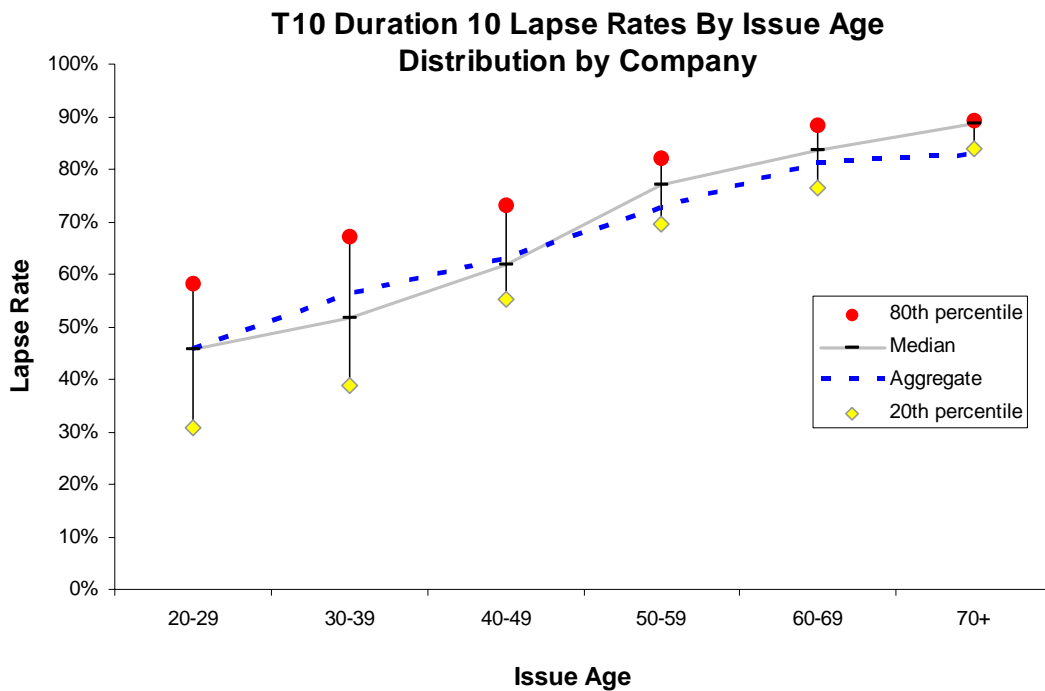
T10 Lapse Rates by Issue Age



Issue Age (cont.)

The same general trends of increasing duration 10 shock lapse by issue age hold true for each company with credible data.

Shock Lapse Rate Range	Issue Age					
	20-29	30-39	40-49	50-59	60-69	70+
# of Companies	14	22	24	23	15	5
20 th percentile	30.7%	38.7%	55.3%	69.5%	76.4%	83.8%
Median	45.7%	51.5%	61.7%	77.1%	83.5%	88.5%
Aggregate	45.6%	56.1%	63.0%	72.4%	81.0%	82.6%
80 th percentile	58.2%	67.0%	73.1%	82.0%	88.5%	89.4%



Issue Age (cont.)

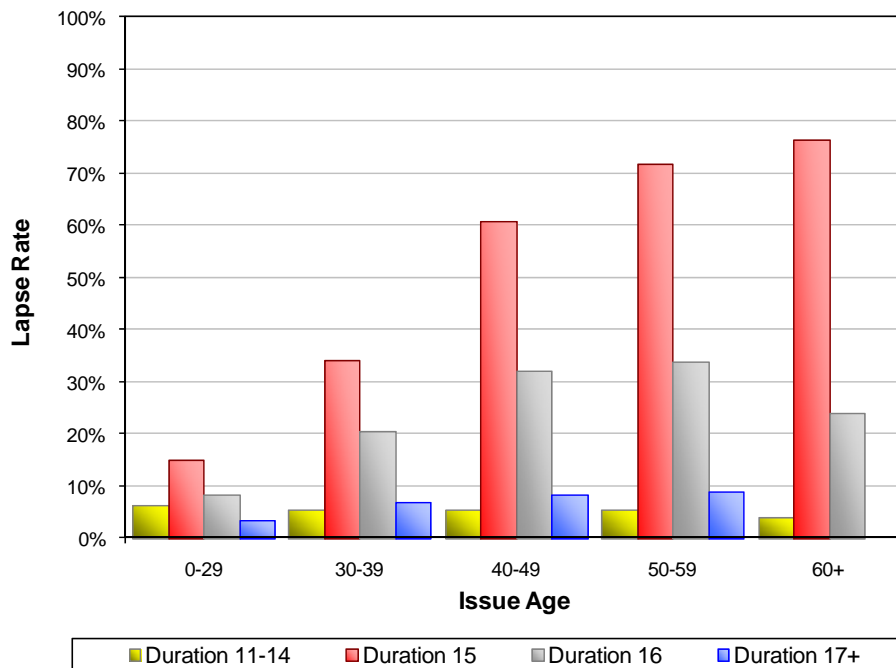
T15

Similar trends are seen in T15 with generally higher post-level period lapse rates at the older issue ages.

Issue Age	Duration 11-14			Duration 15			Duration 16			Duration 17+			Dur 15 Avg Issue Age
	Policy- Years Exposed	Total Lapses	Lapse Rate	Policy- Years Exposed	Total Lapses	Lapse Rate	Policy- Years Exposed	Total Lapses	Lapse Rate	Policy- Years Exposed	Total Lapses	Lapse Rate	
0-29	12,471	810	6.5%	1,525	228	14.9%	966	81	8.4%	828	29	3.5%	26.1
30-39	72,444	3,874	5.3%	8,216	2,801	34.1%	4,038	827	20.5%	2,768	195	7.0%	35.1
40-49	82,485	4,448	5.4%	8,384	5,095	60.8%	2,304	739	32.1%	1,297	110	8.5%	44.0
50-59	35,939	1,937	5.4%	3,267	2,351	72.0%	597	202	33.9%	292	26	8.9%	53.4
60+	12,785	528	4.1%	1,078	824	76.5%	167	40	24.0%	*	*	*	63.3
Grand Total	216,132	11,598	5.4%	22,470	11,299	50.3%	8,072	1,889	23.4%	5,307	362	6.8%	41.8

* Insufficient Data

T15 Lapse Rates by Issue Age



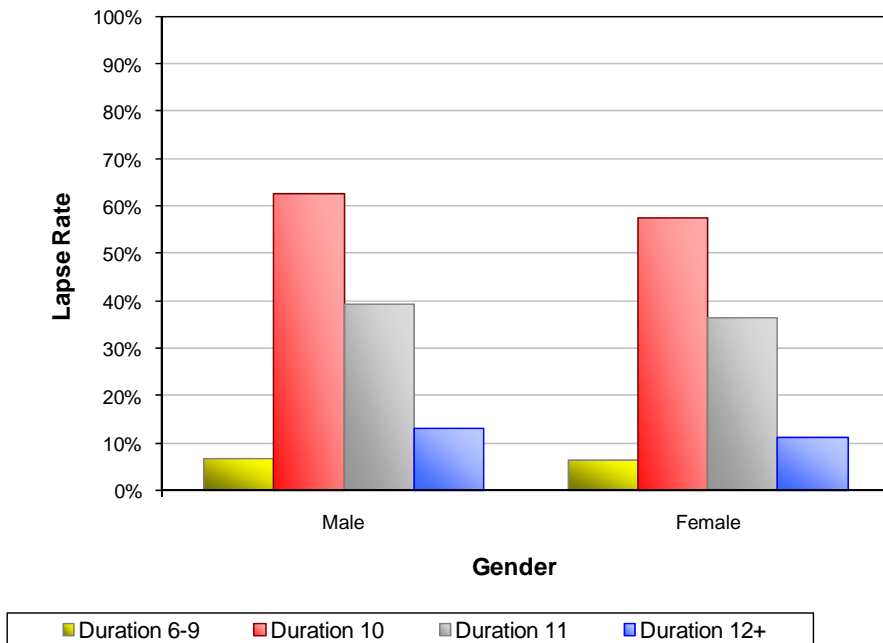
Gender

T10

Shock lapses are slightly higher for males than females, although they also have higher average issue ages and premium jump ratios.

Gender	Duration 6-9			Duration 10			Duration 11			Duration 12+			Dur 10 Avg Prem Jump Ratio	Dur 10 Avg Issue Age
	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate		
Male	1,817,138	122,142	6.7%	223,312	140,248	62.8%	58,430	23,052	39.5%	37,301	4,983	13.4%	4.1	42.5
Female	971,748	62,114	6.4%	125,234	72,063	57.5%	37,693	13,803	36.6%	28,724	3,275	11.4%	3.5	38.8
Grand Total	2,793,861	184,579	6.6%	349,253	212,528	60.9%	96,483	36,914	38.3%	66,287	8,273	12.5%	3.9	41.2

T10 Lapse Rates by Gender

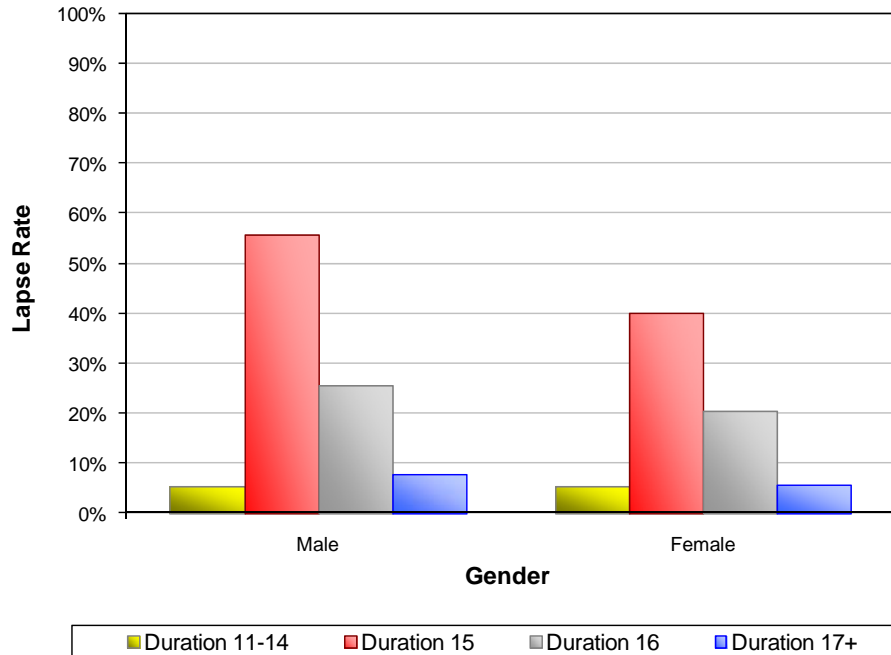


T15

The differential between male and female shock lapses is even more pronounced on T15 than T10.

Gender	Duration 11-14			Duration 15			Duration 16			Duration 17+			Dur 15 Avg Issue Age
	Policy- Years Exposed	Total Lapses	Lapse Rate	Policy- Years Exposed	Total Lapses	Lapse Rate	Policy- Years Exposed	Total Lapses	Lapse Rate	Policy- Years Exposed	Total Lapses	Lapse Rate	
Male	142,642	7,734	5.4%	14,578	8,138	55.8%	4,656	1,192	25.6%	2,957	231	7.8%	42.6
Female	73,482	3,863	5.3%	7,892	3,161	40.1%	3,417	697	20.4%	2,350	131	5.6%	40.3
Grand Total	216,132	11,598	5.4%	22,470	11,299	50.3%	8,072	1,889	23.4%	5,307	362	6.8%	41.8

T15 Lapse Rates by Gender



Risk Class

Respondents were asked to provide the underwriting risk class of each policy record. Due to differences in risk class structures and underwriting criteria, it is difficult to aggregate results across companies by risk class. In addition, these data fields presented some challenges from a data quality perspective. The researchers often combined the data “as submitted” with their independent knowledge of each company’s product structures and internal risk class definitions to cleanse and adjust the necessary fields to ensure consistency across companies.

Policies were mapped into the following risk classes based on the number of preferred classes and the rank of each risk class within the overall preferred class structure. The mapping used is as follows:

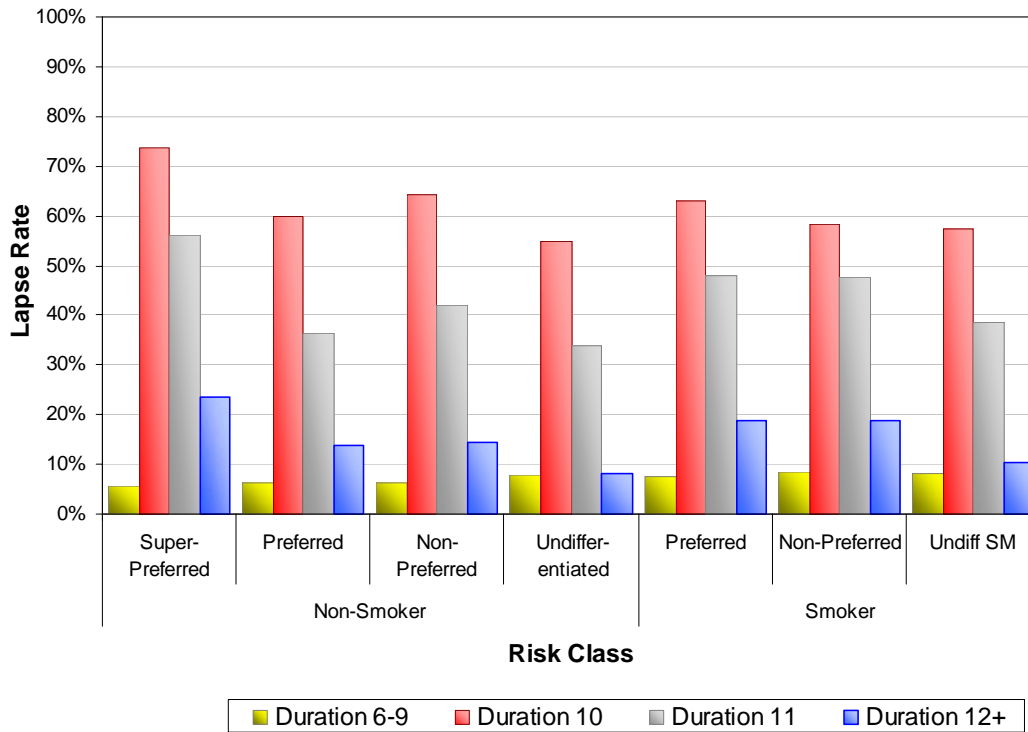
<u>Risk Class</u>	<u>Description</u>
Super-Preferred NS	Best class in a 3 or more NS class structure
Preferred NS	Best class in a 2 NS class structure or second class in a 3 NS class structure or second or third class in a 4 or more NS class structure
Non-Preferred NS	Third class in a 3 NS class structure or Fourth or worse class in a 4 or more NS class structure
Undifferentiated NS	Only 1 NS class
Preferred SM	Best class in a 2 SM class structure
Non-Preferred SM	Second class in a 2 SM class structure
Undifferentiated SM	Only 1 SM class

Risk Class (cont)

Super-Preferred classes experienced the highest shock lapses. This is correlated with premium jump since the post-level premium rates generally do not vary by risk class. Some of the differences across risk classes may also be driven by differences in company-specific experience that is not entirely explained by risk class or premium jump.

Risk Class	Duration 6-9			Duration 10			Duration 11			Duration 12+			Dur 10 Avg Prem Jump Ratio	Dur 10 Avg Issue Age
	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate		
Super-Pref NS	301,248	17,376	5.8%	18,970	13,996	73.8%	3,290	1,846	56.1%	1,793	422	23.5%	6.7	43.8
Preferred NS	1,169,200	73,615	6.3%	150,544	90,056	59.8%	41,586	15,065	36.2%	22,640	3,136	13.9%	4.0	40.3
Non-Pref NS	705,098	44,248	6.3%	89,946	57,851	64.3%	22,091	9,249	41.9%	15,656	2,242	14.3%	3.4	41.9
Undiff/Unknown NS	329,818	26,237	8.0%	54,204	29,742	54.9%	19,031	6,437	33.8%	18,621	1,541	8.3%	3.8	41.0
Preferred SM	85,106	6,327	7.4%	7,989	5,033	63.0%	2,119	1,014	47.9%	1,334	251	18.8%	4.9	41.9
Non-Pref SM	40,266	3,396	8.4%	2,786	1,621	58.2%	772	369	47.8%	444	84	18.9%	4.1	42.5
Undiff/Unknown SM	163,126	13,380	8.2%	24,815	14,229	57.3%	7,594	2,934	38.6%	5,799	597	10.3%	3.2	39.2
Grand Total	2,793,861	184,579	6.6%	349,253	212,528	60.9%	96,483	36,914	38.3%	66,287	8,273	12.5%	3.9	41.0

T10 Lapse Rates by Risk Class



Face Amount

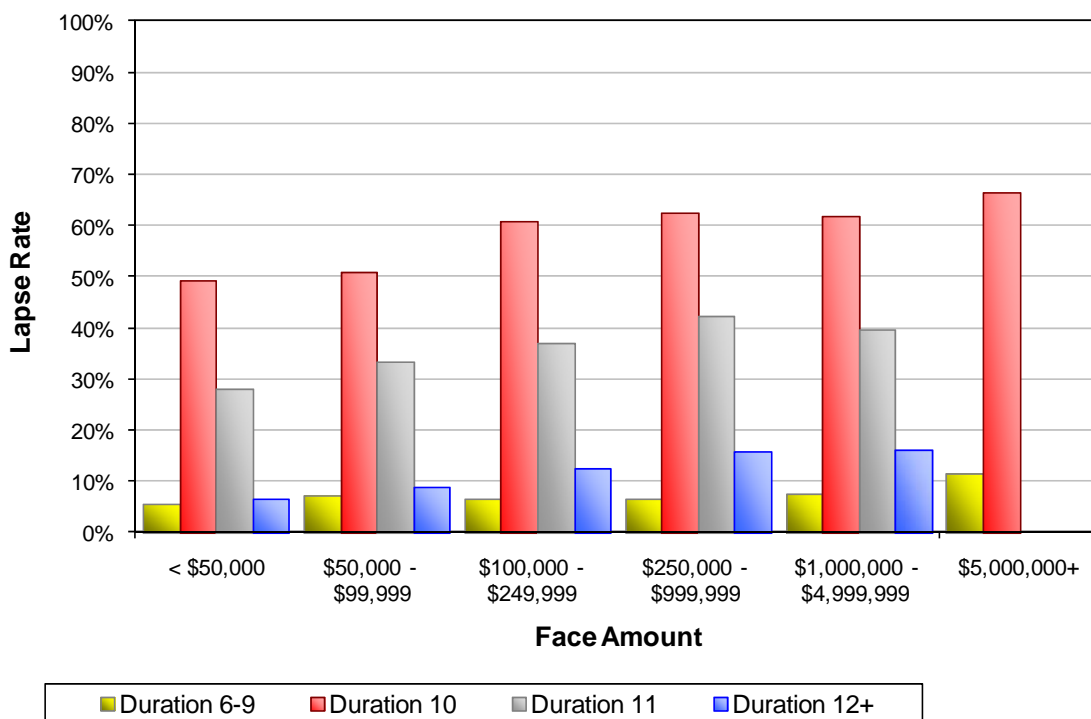
T10

Shock lapse rates and post-level period lapse rates increase slightly by policy size. This is correlated with premium jump ratio because companies generally have lower per \$1000 level period premium rates at higher face amounts with a post-level period scale that doesn't vary by size band. Additionally, larger face amount policies are generally sold at older issue ages.

Policy Face Amount	Duration 6-9			Duration 10			Duration 11			Duration 12+			Dur 10 Avg Prem Jump Ratio	Dur 10 Avg Issue Age
	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate		
< \$50k	12,811	725	5.7%	2,486	1,223	49.2%	1,191	336	28.2%	2,244	147	6.6%	2.7	48.6
\$50k - \$99k	126,846	9,335	7.4%	21,495	10,963	51.0%	8,681	2,890	33.3%	10,795	972	9.0%	3.0	43.6
\$100k - \$249k	1,386,796	90,008	6.5%	190,490	116,207	61.0%	53,830	19,931	37.0%	36,879	4,569	12.4%	3.8	40.8
\$250k - \$999k	1,082,052	70,009	6.5%	119,110	74,415	62.5%	29,186	12,332	42.3%	14,843	2,337	15.7%	4.3	40.9
\$1 M - \$4.9 M	179,302	13,810	7.7%	15,292	9,467	61.9%	3,527	1,394	39.5%	1,508	242	16.1%	4.7	43.8
\$5 M +	6,054	692	11.4%	380	253	66.6%	*	*	*	*	*	*	5.1	47.6
Grand Total	2,793,861	184,579	6.6%	349,253	212,528	60.9%	96,483	36,914	38.3%	66,287	8,273	12.5%	3.9	41.2

* Insufficient Data

T10 Lapse Rates by Face Amount Band



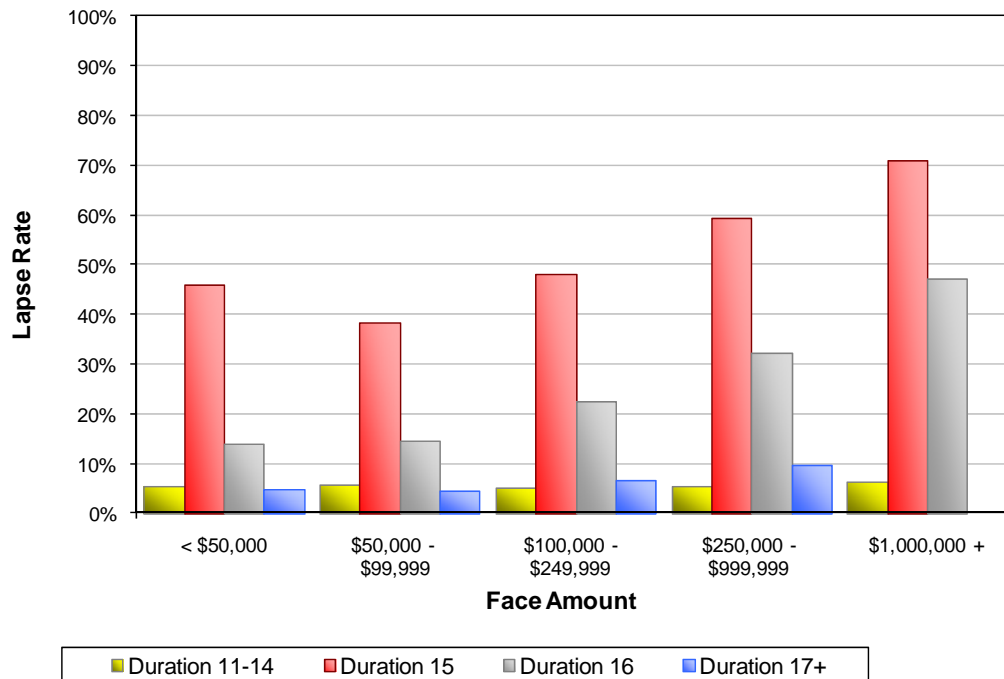
T15

The correlation between face amount and shock lapse is a bit more pronounced on T15 for policies above \$50,000 than for T10.

Policy Face Amount	Duration 11-14			Duration 15			Duration 16			Duration 17+			Dur 15 Avg Issue Age
	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	
< \$50k	8,645	465	5.4%	1,137	524	46.1%	412	58	14.1%	305	15	4.9%	54.4
\$50k - \$99k	14,390	809	5.6%	1,742	667	38.3%	762	112	14.7%	627	29	4.6%	44.6
\$100k - \$249k	120,074	6,308	5.3%	14,121	6,814	48.3%	5,320	1,199	22.5%	3,490	232	6.6%	40.8
\$250k - \$999k	65,943	3,568	5.4%	5,086	3,022	59.4%	1,501	484	32.2%	848	82	9.7%	40.9
\$1 M +	7,075	448	6.3%	384	272	70.9%	76	36	47.4%	*	*	*	42.5
Grand Total	216,132	11,598	5.4%	22,470	11,299	50.3%	8,072	1,889	23.4%	5,307	362	6.8%	41.8

* Insufficient Data

T15 Lapse Rates by Face Amount Band



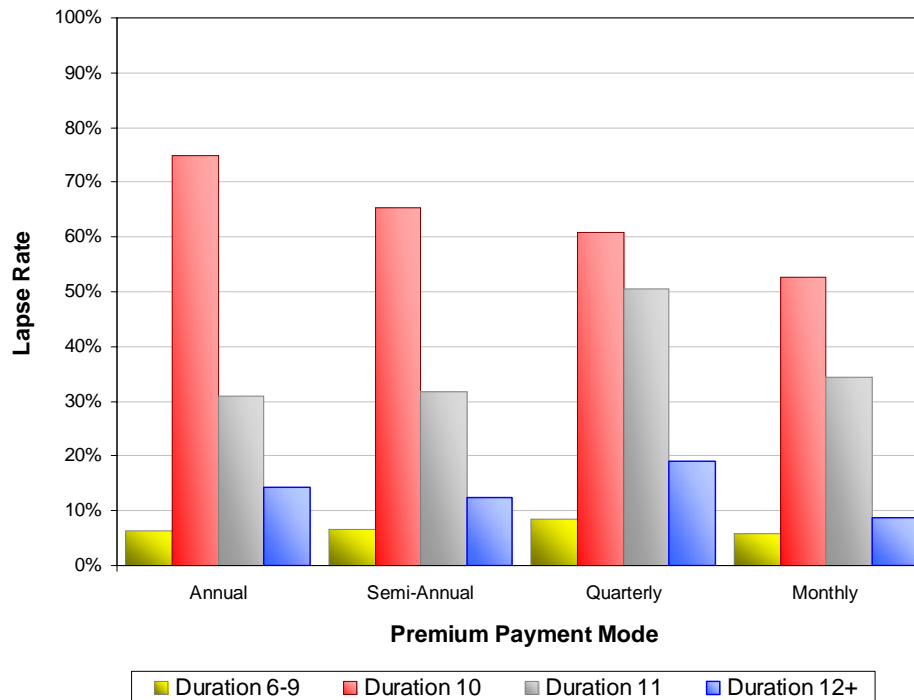
Premium Mode

T10

The initial duration 10 shock lapse seems to decrease with increasing premium payment frequency. This is likely a function of the larger dollar amount increase in premium for the less frequent premium payment options. As discussed earlier, the distribution of lapses within the year varies significantly for different premium payment modes.

Premium Payment Mode	Duration 6-9			Duration 10			Duration 11			Duration 12+			Dur 10 Avg Prem Jump Ratio	Dur 10 Avg Issue Age
	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate		
Annual	778,367	50,324	6.5%	90,635	67,765	74.8%	15,852	4,925	31.1%	12,647	1,809	14.3%	4.4	42.2
Semi-Annual	136,719	9,188	6.7%	16,948	11,060	65.3%	4,615	1,466	31.8%	4,528	558	12.3%	4.2	43.3
Quarterly	561,674	47,788	8.5%	80,549	49,001	60.8%	24,728	12,492	50.5%	14,818	2,824	19.1%	3.6	42.7
Monthly	1,306,231	75,232	5.8%	158,520	83,283	52.5%	50,431	17,325	34.4%	34,068	3,016	8.9%	3.7	39.6
Grand Total	2,793,861	184,579	6.6%	349,253	212,528	60.9%	96,483	36,914	38.3%	66,287	8,273	12.5%	3.9	41.2

T10 Lapse Rates by Premium Payment mode



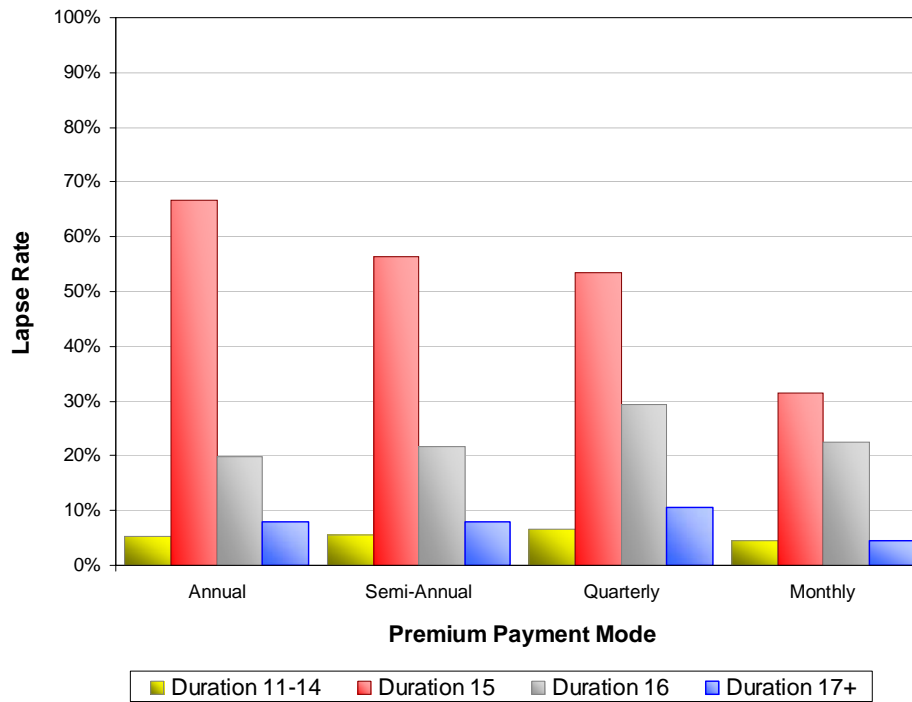
Premium Mode (cont.)

T15

Results for T15 show a very similar pattern as T10. The shock lapse for annual pay business is much larger than for other modes.

Premium Payment Mode	Duration 11-14			Duration 15			Duration 16			Duration 17+			Dur 15 Avg Issue Age
	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	Policy-Years Exposed	Total Lapses	Lapse Rate	
Annual	70,183	3,739	5.3%	7,115	4,747	66.7%	1,714	342	20.0%	1,131	89	7.9%	42.2
Semi-Annual	19,952	1,123	5.6%	2,113	1,192	56.4%	643	139	21.6%	412	33	8.0%	42.3
Quarterly	47,895	3,162	6.6%	5,364	2,873	53.6%	1,814	533	29.4%	1,154	123	10.7%	42.7
Monthly	78,083	3,567	4.6%	7,878	2,487	31.6%	3,901	875	22.4%	2,609	117	4.5%	40.8
Grand Total	216,132	11,598	5.4%	22,470	11,299	50.3%	8,072	1,889	23.4%	5,307	362	6.8%	41.8

T15 Lapse Rates by Premium Payment mode



Mortality Deterioration

Overview

This section will analyze the mortality experience from participating companies with a particular focus on the increase in mortality between the level period and the post-level period. The mortality increase can be primarily attributed to adverse selection of unhealthy policyholders choosing to persist after a large increase in their premium. A secondary component of mortality deterioration, which becomes increasingly significant for higher shock lapse rates, is attributable to normal mortality from policyholders who died during the grace period.

For T10, 24 companies provided experience that included at least one post-level period death claim, 16 companies provided at least 10 death claims, and 6 companies provided at least 50 death claims. Despite the cross-section of companies that contributed experience, the aggregated results are still somewhat dominated by a few individual companies. Post-level period mortality experience for T15 was primarily attributable to one company and is not included in the following displays.

The displays in this section include mortality ratios on three different industry-standard tabular bases: 2008 VBT, 2001 VBT, and SOA 75-80. In addition to this, a relative ratio is provided, which normalizes the 2008 VBT mortality ratio as a percentage of the ratio for durations 6-10. In this way, the post-level period mortality deterioration can be isolated as a multiple of the mortality during the latter part of the level period. These relative mortality ratios are alternatively referred to as “vs LP” or “Mortality Relative to Duration 6-10” on the displays.

There was significantly less anti-selective mortality seen in products with a jump to a new level period. As seen earlier, these products experienced lower shock lapses than products jumping up to an ART scale. In order to provide analysis that is most likely to be relevant to the readers of this report, separate displays will be provided for products with a jump to an ART scale.

Mortality by Duration

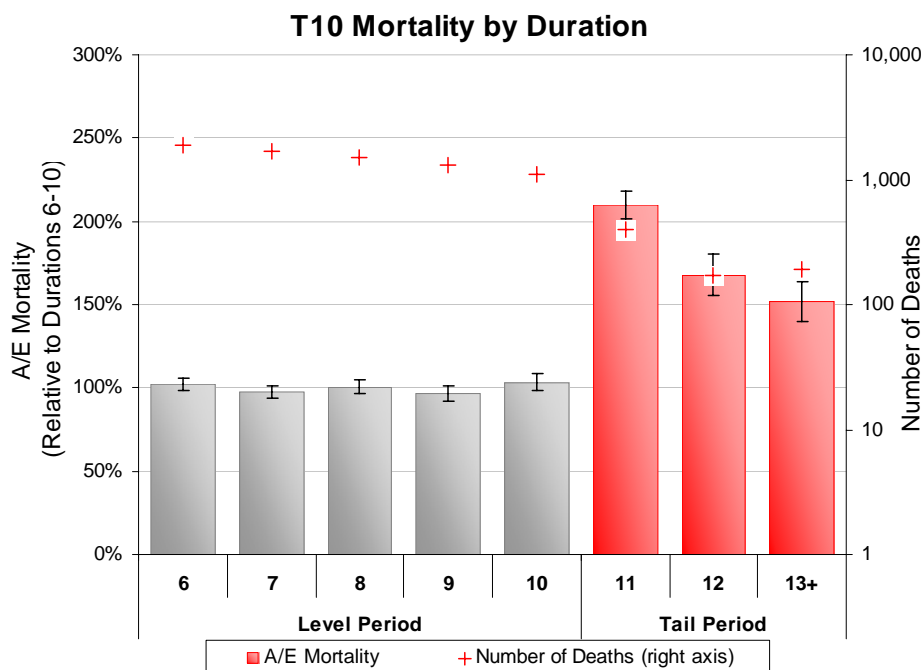
T10 All

In total, the post-level period mortality was roughly 182% of the level period (duration 6-10) mortality. For duration 11 alone, the mortality was 210% of the level period. As will be discussed later, there is significant exposure from a small number of companies with a jump to new level period product structure or with lower than average shock lapses and premium jump ratios. As a result, these aggregated results, while technically accurate, might understate the expected mortality deterioration for most companies – especially for more recently issued products.

Mortality results during durations 6-10 of the level period were very similar to the SOA 2005-2007

Individual Life Mortality Experience Study. For Term Insurance during durations 6-10, that study showed mortality ratios as 100% of 2008 VBT, 69% of 2001 VBT, and 49% of SOA 7580.

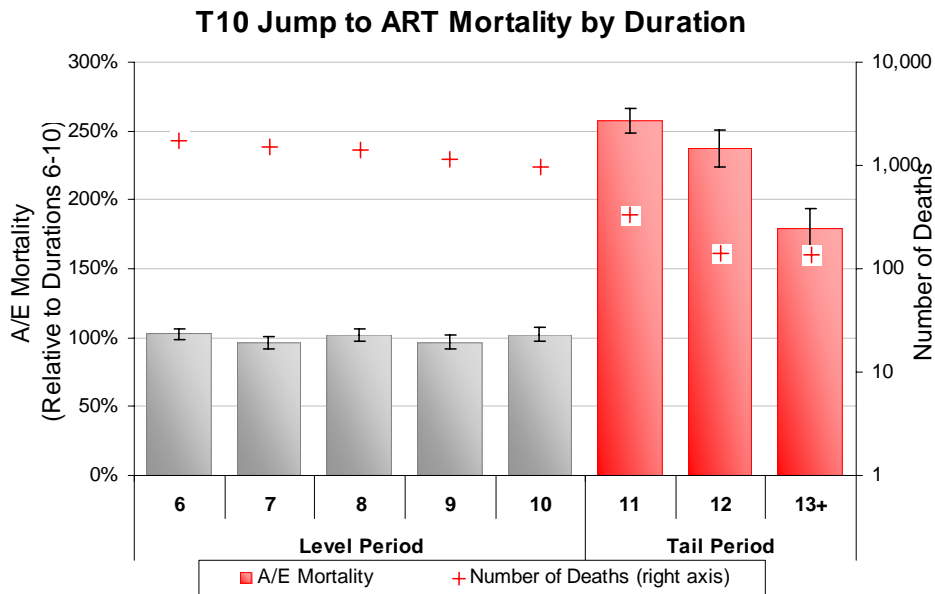
T10 Mortality Experience by Duration						
Policy Duration	Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality			
			08 VBT	01 VBT	SOA 7580	vs LP
6	975,524	1,901	101%	75%	50%	102%
7	814,823	1,663	96%	69%	48%	98%
8	665,348	1,526	99%	70%	51%	101%
9	537,343	1,291	95%	67%	50%	96%
10	395,513	1,104	102%	71%	54%	103%
Subtotal 6-10	3,388,551	7,485	99%	70%	50%	100%
11	89,934	401	207%	139%	104%	210%
12	44,007	170	166%	110%	82%	168%
13+	48,034	192	150%	99%	76%	152%
Subtotal 11+	181,975	763	180%	120%	90%	182%
Grand Total	3,570,525	8,248	103%	73%	53%	104%



T10 Jump to ART

When isolating the experience for the companies with a Jump to ART product structure, the aggregated mortality deterioration is much higher at 230% of the level period. Duration 11 experience alone was 257% of the level period.

T10 Jump to ART Mortality Experience by Duration						
Policy Duration	Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality			
			08 VBT	01 VBT	SOA 7580	vs LP
6	882,936	1,763	103%	76%	52%	102%
7	733,710	1,510	97%	70%	49%	96%
8	595,304	1,405	103%	73%	53%	102%
9	478,104	1,160	97%	69%	51%	97%
10	345,095	950	103%	71%	54%	102%
Subtotal 6-10	3,035,148	6,788	100%	72%	52%	100%
11	62,286	331	258%	177%	134%	257%
12	26,569	142	238%	161%	124%	237%
13+	24,615	137	180%	119%	94%	180%
Subtotal 11+	113,470	610	231%	156%	120%	230%
Grand Total	3,148,618	7,398	105%	75%	54%	105%

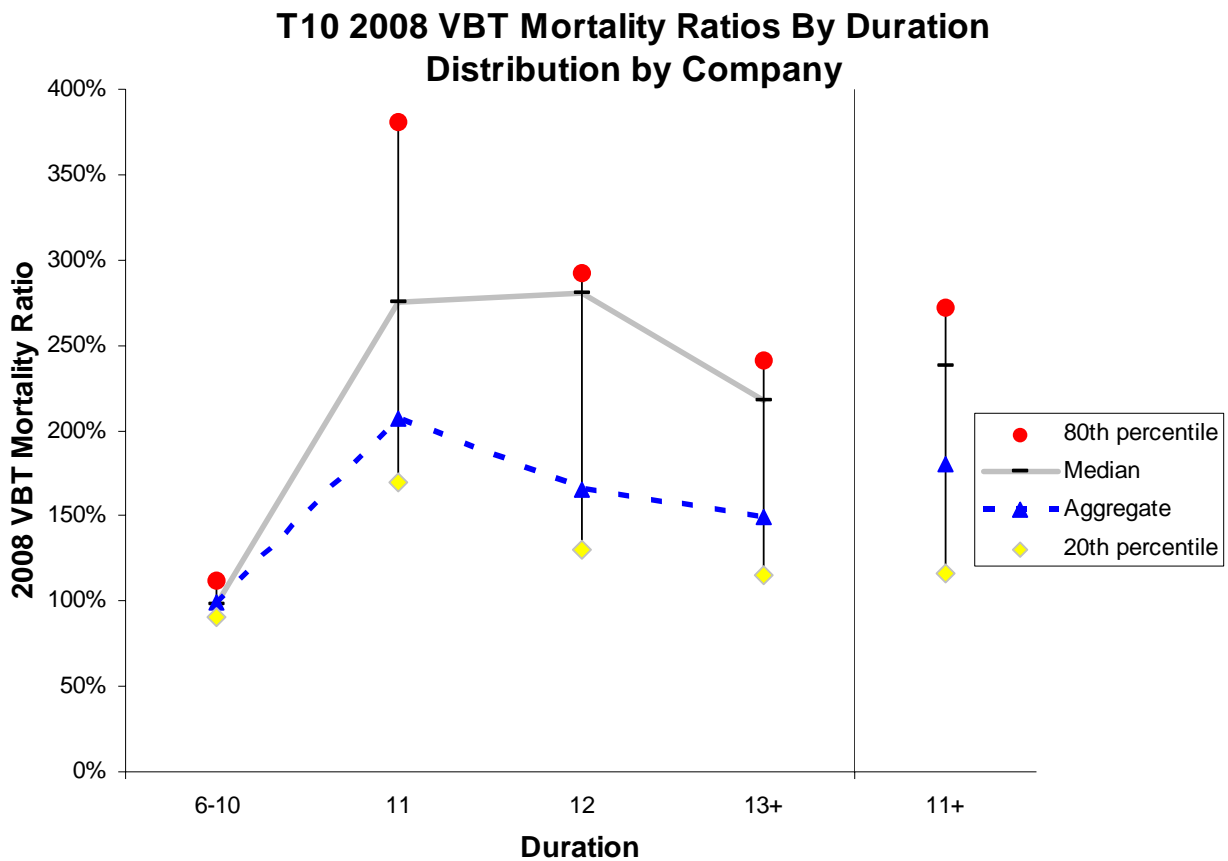


Distribution of Results

T10 All

As has been indicated earlier, there is a wide spread of company-specific mortality experience. The following charts show this distribution for any company that provided at least 10 death claims in a given duration. The aggregated mortality increase is much lower than the median of the individual company results. The median levels might give a more realistic representation of the underlying experience.

2008 VBT Ratio Range	Duration				
	6-10	11	12	13+	11+
# of Companies	26	12	6	7	16
20 th percentile	91%	170%	131%	116%	116%
Median	99%	275%	280%	218%	238%
Aggregate	99%	207%	166%	150%	180%
80 th percentile	113%	381%	292%	241%	272%

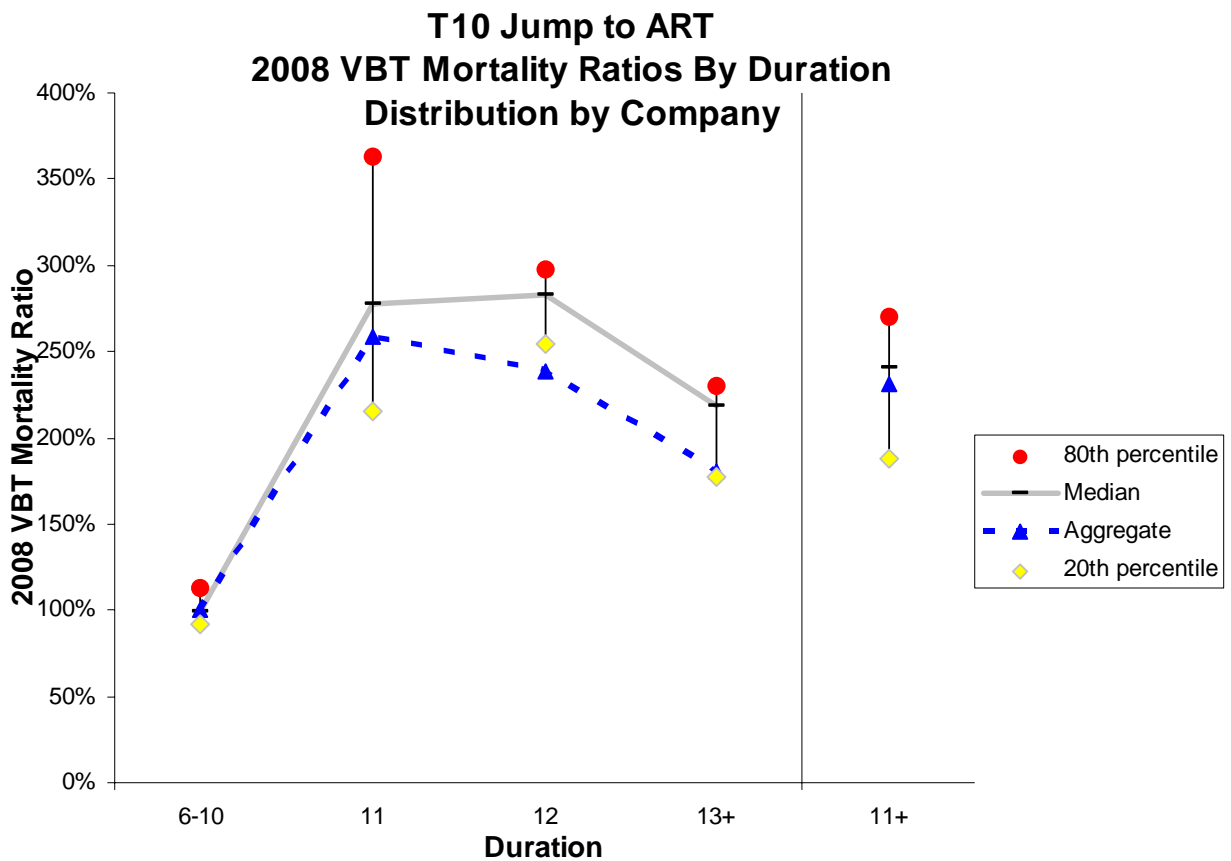


Distribution of Results

T10 Jump to ART

The median results are similar when excluding the products with a jump to a new level period, although the spread between the median and aggregate levels is smaller.

2008 VBT Ratio Range	Duration				
	6-10	11	12	13+	11+
# of Companies	24	9	5	5	12
20 th percentile	92%	215%	254%	177%	188%
Median	99%	277%	283%	218%	241%
Aggregate	100%	258%	238%	180%	231%
80 th percentile	113%	363%	297%	230%	270%



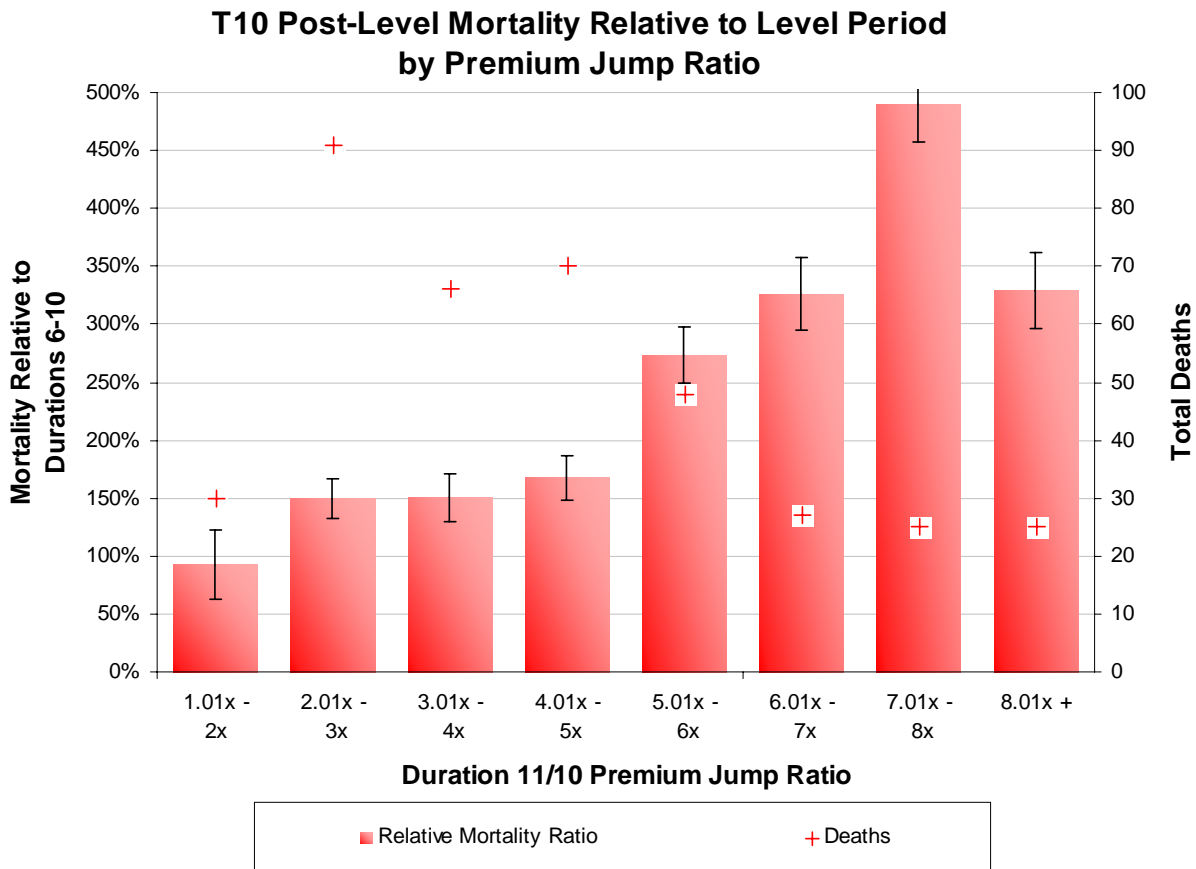
Premium Jump Ratio

T10 All

The lapse rate experience showed a clear link between the size of the jump in premium after the end of the level period and the size of the shock lapse. The next logical question is whether or not this relationship extends to mortality deterioration. The experience results for mortality after the level period suggest a similar increasing relationship.

T10 Post-Level Mortality Experience by Premium Jump Ratio							Average Prem Jump Ratio ⁽¹⁾
Premium Jump Ratio Band	Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality				
			08 VBT	01 VBT	SOA 7580	vs LP	
1.01x - 2x	21,860	30	111%	75%	55%	93%	1.6
2.01x - 3x	22,895	91	169%	113%	89%	150%	2.6
3.01x - 4x	17,490	66	190%	126%	96%	150%	3.6
4.01x - 5x	12,239	70	195%	129%	93%	167%	4.5
5.01x - 6x	3,585	48	300%	198%	147%	274%	5.5
6.01x - 7x	1,236	27	332%	224%	174%	326%	6.4
7.01x - 8x	717	25	459%	329%	270%	490%	7.5
8.01x +	938	25	318%	209%	159%	330%	8.8
Subtotal Prem Data Available	80,962	382	202%	135%	102%	190%	3.1
No Prem Data Available	101,013	381	162%	107%	81%	175%	n/a
Grand Total	181,975	763	180%	120%	90%	182%	n/a

(1) Weighted Average by duration 11+ exposure for policies with premium data available



Premium Jump Ratio

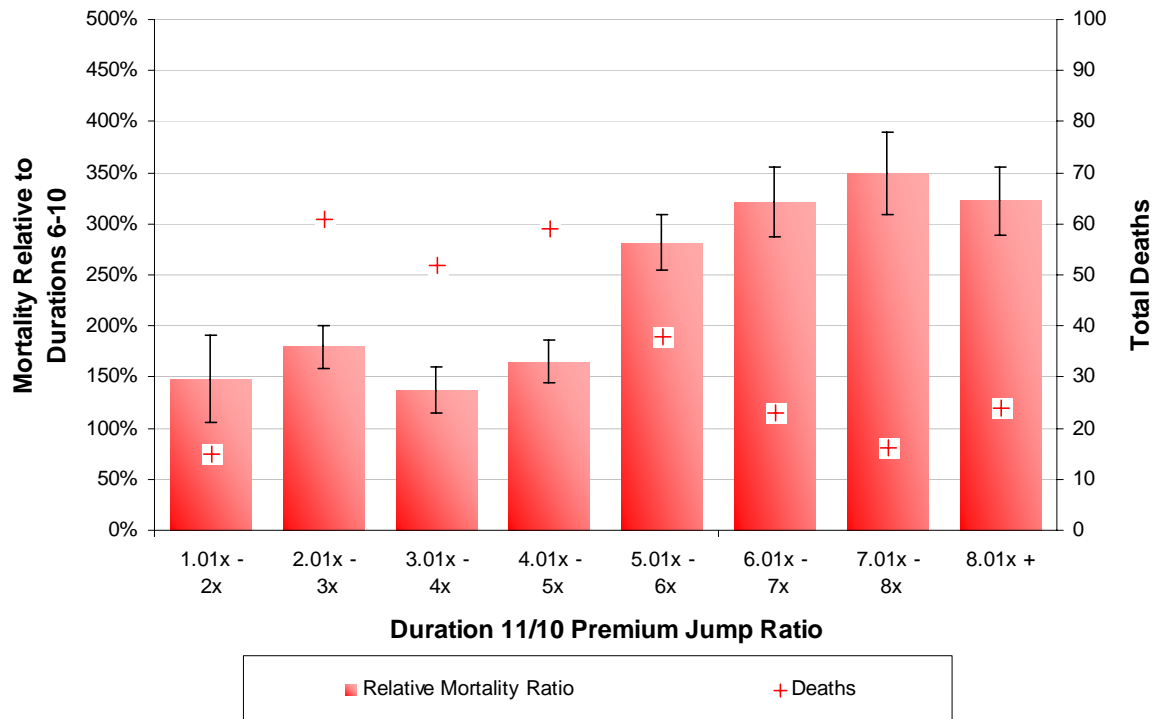
T10 Jump to ART

Mortality also increases by premium jump ratio when looking just at the jump to ART products.

T10 Jump to ART Post-Level Mortality Experience by Premium Jump Ratio							Average Prem Jump Ratio ⁽¹⁾
Premium Jump Ratio Band	Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality				
			08 VBT	01 VBT	SOA 7580	vs LP	
1.01x - 2x	7,002	15	168%	114%	79%	148%	1.5
2.01x - 3x	14,279	61	201%	137%	112%	180%	2.7
3.01x - 4x	16,319	52	175%	116%	87%	137%	3.6
4.01x - 5x	11,463	59	190%	126%	89%	165%	4.5
5.01x - 6x	3,239	38	298%	195%	142%	282%	5.5
6.01x - 7x	1,154	23	325%	216%	167%	321%	6.4
7.01x - 8x	672	16	343%	243%	195%	349%	7.5
8.01x +	916	24	316%	206%	157%	323%	8.8
Subtotal Prem Data Available	55,044	288	218%	146%	109%	205%	3.6
No Prem Data Available	58,426	322	245%	167%	132%	256%	n/a
Grand Total	113,470	610	231%	156%	120%	230%	n/a

(1) Weighted Average by duration 11+ exposure for policies with premium data available

T10 Jump to ART
Post-Level Mortality Relative to Level Period
by Premium Jump Ratio



Issue Age

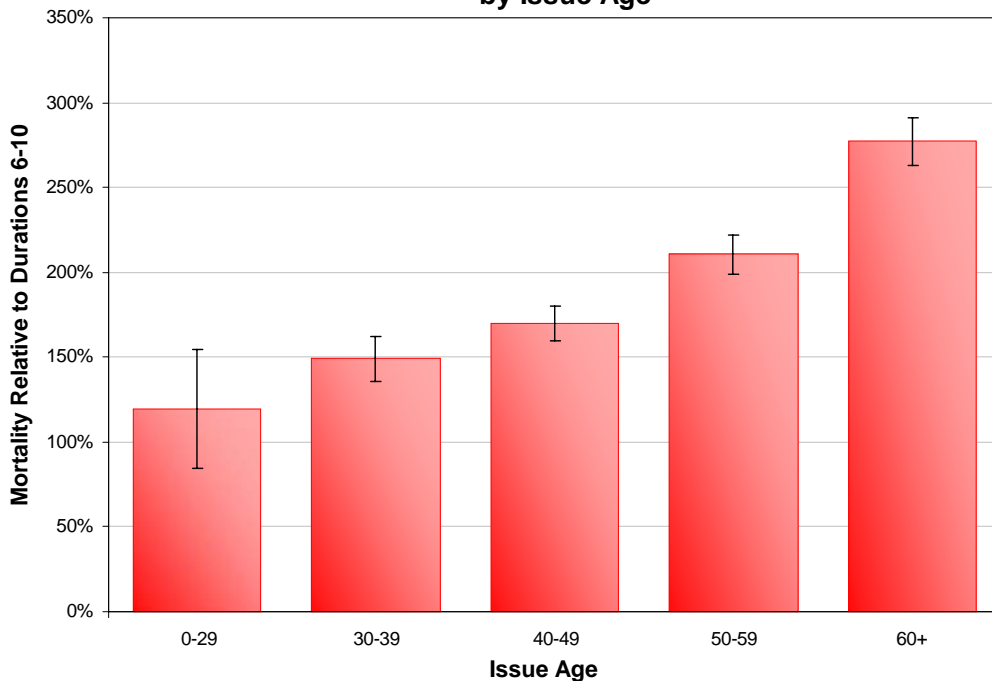
T10 All

During the level period, mortality is a fairly level percentage of 2008 VBT by issue age. Slope issues with the 2001 VBT and SOA 75-80 contribute to the increasing A/E patterns by issue age during the level period on those bases.

Mortality during the post-level period increases by issue age. A corresponding trend was also seen in the shock lapse experience results, which is also correlated with premium jump ratio. The impact of grace period mortality will also be more pronounced for older ages since the baseline mortality rates are higher.

Issue Age	Duration 6-10					Duration 11+					Average Prem Jump Ratio	
	Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality			Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality				
			08 VBT	01 VBT	SOA 7580			08 VBT	01 VBT	SOA 7580		vs LP
0-29	332,709	132	97%	64%	51%	27,903	22	116%	83%	65%	119%	2.2
30-39	1,151,893	791	96%	63%	40%	82,098	152	143%	99%	68%	149%	2.9
40-49	1,094,047	1,767	97%	64%	44%	53,816	247	164%	106%	79%	170%	3.5
50-59	615,301	2,309	96%	67%	48%	15,887	203	202%	126%	98%	211%	4.5
60+	194,599	2,486	104%	86%	65%	2,271	139	288%	215%	197%	277%	5.5
Grand Total	3,388,551	7,485	99%	70%	50%	181,975	763	180%	120%	90%	182%	3.1

T10 Post-Level Mortality Relative to Level Period by Issue Age



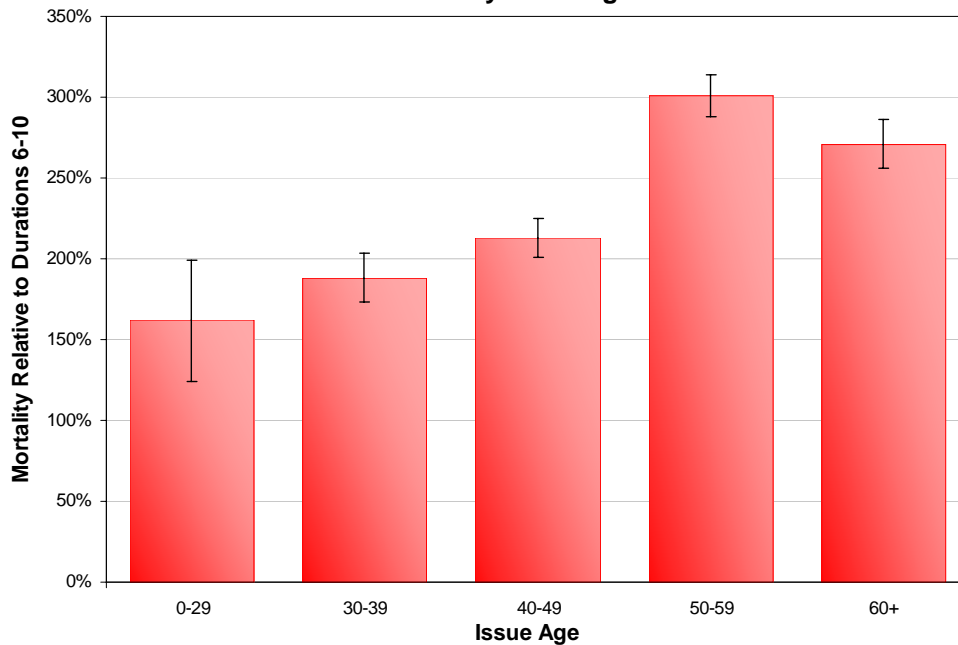
Issue Age

T10 Jump to ART

Results for the “Jump to ART” products only show a similar increasing trend in post-level mortality by issue age, although the pattern is not quite as consistent.

Issue Age	Duration 6-10					Duration 11+						Average Prem Jump Ratio
	Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality			Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality				
			08 VBT	01 VBT	SOA 7580			08 VBT	01 VBT	SOA 7580	vs LP	
0-29	314,177	126	98%	65%	51%	18,814	19	159%	114%	89%	162%	2.7
30-39	1,053,138	735	97%	64%	41%	53,096	122	183%	128%	88%	188%	3.5
40-49	955,595	1,595	99%	65%	46%	31,193	185	211%	138%	105%	213%	3.8
50-59	533,144	2,050	98%	68%	50%	8,477	167	295%	187%	150%	301%	4.6
60+	179,095	2,282	105%	86%	65%	1,890	117	283%	212%	195%	271%	5.5
Grand Total	3,035,148	6,788	100%	72%	52%	113,470	610	231%	156%	120%	230%	3.6

**T10 Jump to ART
Post-Level Mortality Relative to Level Period
by Issue Age**

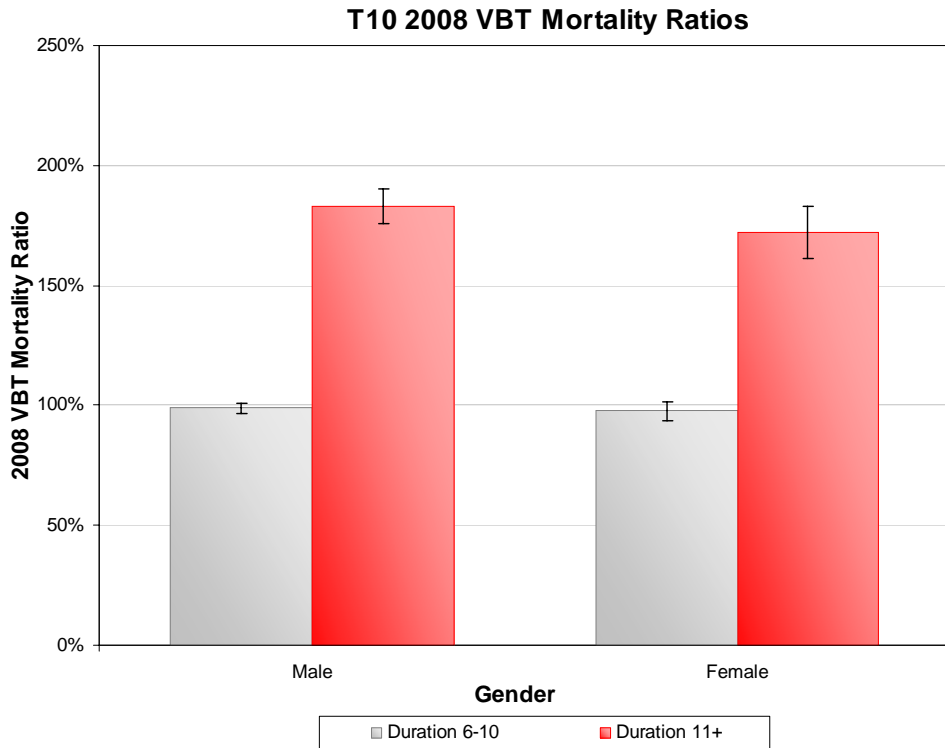


Gender

T10 All

Post-level period mortality deterioration for males is slightly higher than females, which is consistent with the shock lapse experience. Males and females have similar mortality experience relative to their own mortality tables during the level period.

Gender	Duration 6-10					Duration 11+					Average Prem Jump Ratio	
	Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality			Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality				
			08 VBT	01 VBT	SOA 7580			08 VBT	01 VBT	SOA 7580		vs LP
Male	2,212,417	5,882	99%	71%	50%	107,019	545	183%	123%	90%	185%	3.3
Female	1,176,134	1,603	98%	69%	53%	74,956	218	172%	112%	92%	176%	2.9
Grand Total	3,388,551	7,485	99%	70%	50%	181,975	763	180%	120%	90%	182%	3.1

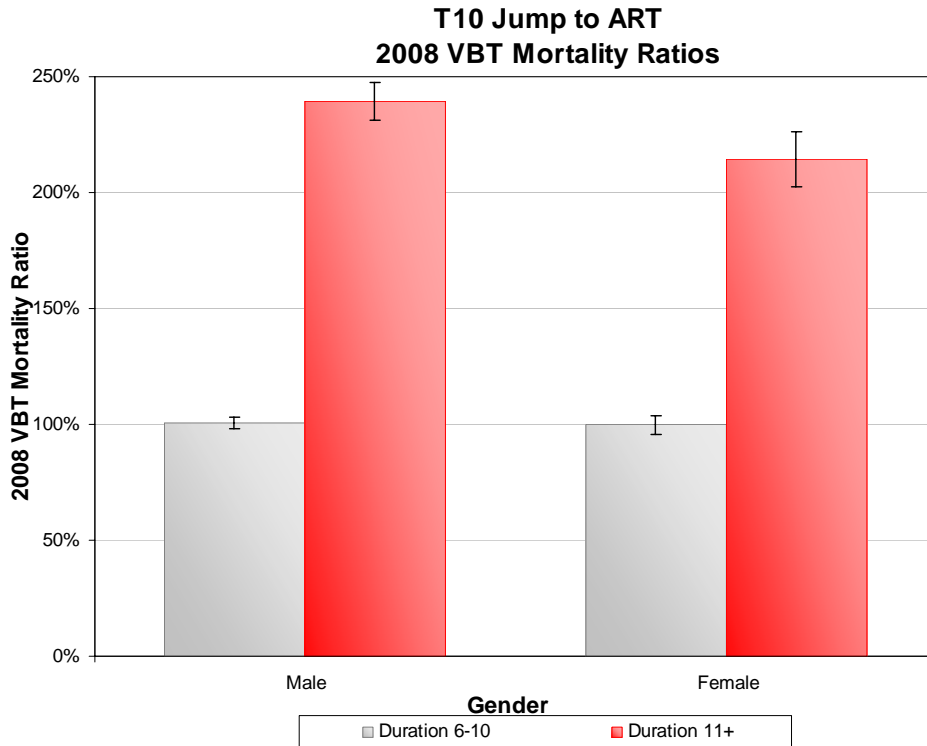


Gender

T10 Jump to ART

Results are similar when excluding the jump to new level period products with a larger mortality deterioration for males than females.

Gender	Duration 6-10					Duration 11+					Average Prem Jump Ratio	
	Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality			Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality				
			08 VBT	01 VBT	SOA 7580			08 VBT	01 VBT	SOA 7580		vs LP
Male	1,962,141	5,293	101%	72%	51%	64,343	426	239%	163%	121%	238%	3.7
Female	1,073,007	1,495	100%	71%	54%	49,127	184	214%	142%	118%	215%	3.4
Grand Total	3,035,148	6,788	100%	72%	52%	113,470	610	231%	156%	120%	230%	3.6



Risk Class

The following pages will display mortality results by underwriting risk class. For a description of the mapping process used, see page 29.

T10 All

During the level period, the results by risk class show the expected trend of lower mortality for preferred classes. The distribution of business by risk class is driven by the companies contributing to the study and isn't necessarily representative of the current risk class structures of the broader industry.

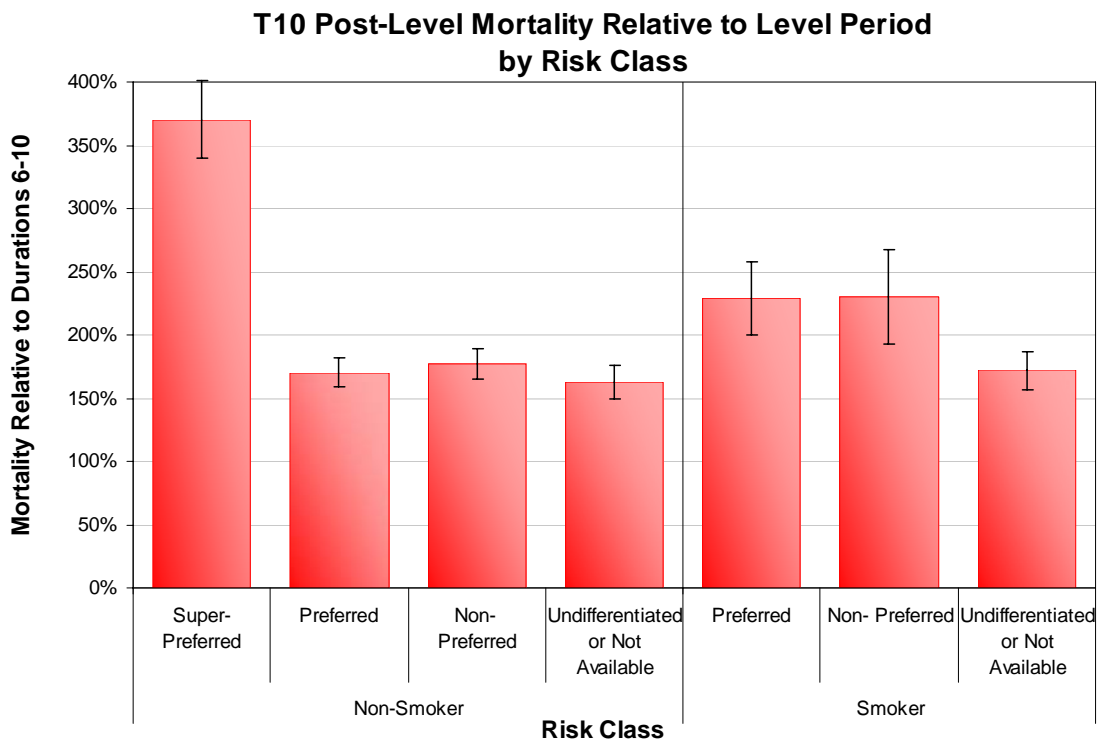
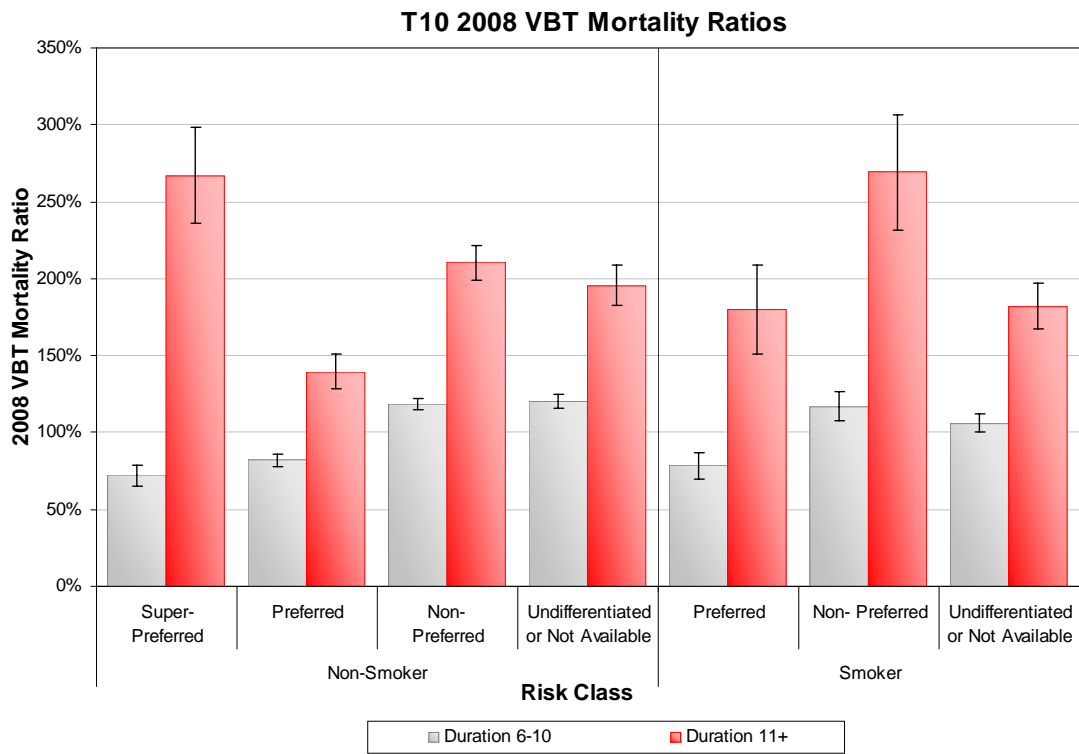
Specifically, we expect that the products with only 1 or 2 NS classes are overrepresented in this study relative to currently issued products.

Super-Preferred classes (best NS out of 3 or more NS) have the lowest level period mortality and the highest post-level mortality deterioration, although the post-level period credibility is thin. Super preferred products generally have the highest premium jump ratios since the post-level period rates generally don't vary by risk class.

Risk Class	Duration 6-10					Duration 11+						Average Prem Jump Ratio
	Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality			Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality				
			08 VBT	01 VBT	SOA 7580			08 VBT	01 VBT	SOA 7580	vs LP	
Super-Pref NS	372,657	590	72%	50%	33%	4,867	28	267%	174%	120%	370%	5.7
Preferred NS	1,407,563	1,926	82%	55%	35%	72,398	205	140%	89%	60%	170%	3.7
Non-Pref NS	864,150	2,186	119%	81%	54%	39,284	198	210%	136%	95%	177%	3.3
Undiff/Unknown NS	393,251	1,310	120%	87%	59%	45,757	163	196%	127%	86%	162%	2.7
Preferred SM	102,401	365	79%	67%	92%	3,540	32	180%	138%	196%	229%	4.2
Non-Pref SM	49,560	296	117%	103%	141%	1,292	19	269%	210%	303%	230%	3.8
Undiff/Unknown SM	198,969	812	106%	89%	121%	14,837	118	182%	139%	197%	172%	2.6
Grand Total	3,388,551	7,485	99%	70%	50%	181,975	763	180%	120%	90%	182%	3.1

Risk Class (cont.)

T10 All



Risk Class (cont.)

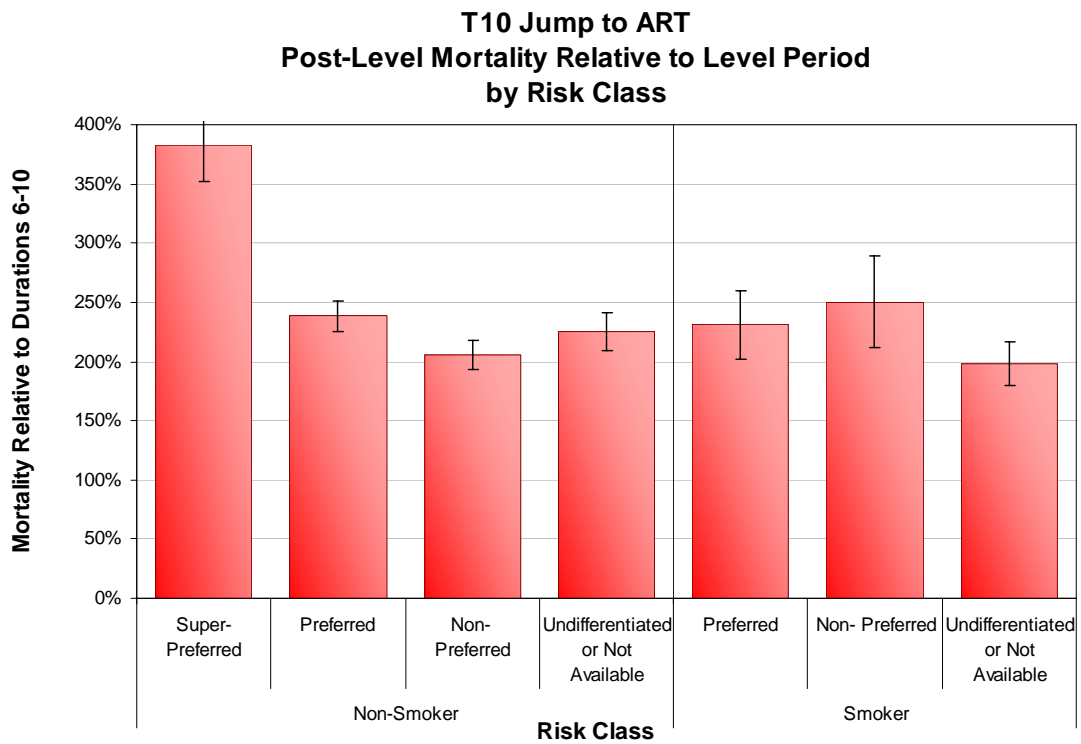
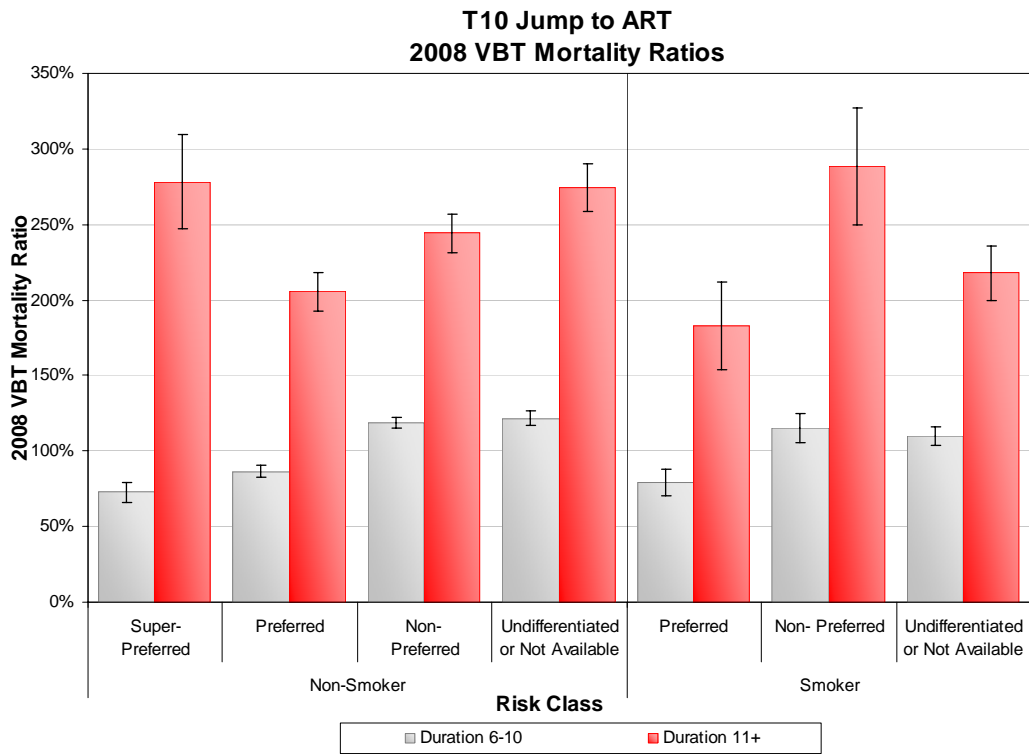
T10 Jump to ART

Similar experience is seen when looking just at the jump to ART plans. The preferred classes (Super-Pref NS and Preferred NS) have significantly better mortality during the level period, but show the highest post-level period mortality deterioration.

Risk Class	Duration 6-10					Duration 11+						Average Prem Jump Ratio
	Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality			Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality				
			08 VBT	01 VBT	SOA 7580			08 VBT	01 VBT	SOA 7580	vs LP	
Super-Pref NS	364,181	575	73%	51%	33%	4,633	28	278%	181%	125%	383%	5.9
Preferred NS	1,190,680	1,726	86%	58%	38%	44,677	168	206%	133%	90%	238%	3.8
Non-Pref NS	798,762	2,010	119%	82%	54%	30,205	175	244%	158%	112%	206%	3.5
Undiff/Unknown NS	358,261	1,142	122%	88%	59%	20,565	109	274%	180%	124%	226%	3.3
Preferred SM	101,395	363	79%	68%	92%	3,487	32	183%	140%	199%	231%	4.3
Non-Pref SM	46,973	273	115%	101%	138%	1,136	18	288%	224%	325%	250%	4.3
Undiff/Unknown NS	174,895	699	110%	91%	124%	8,766	80	218%	169%	240%	198%	2.9
Grand Total	3,035,148	6,788	100%	72%	52%	113,470	610	231%	156%	120%	230%	3.6

Risk Class (cont.)

T10 Jump to ART (cont.)



Face Amount

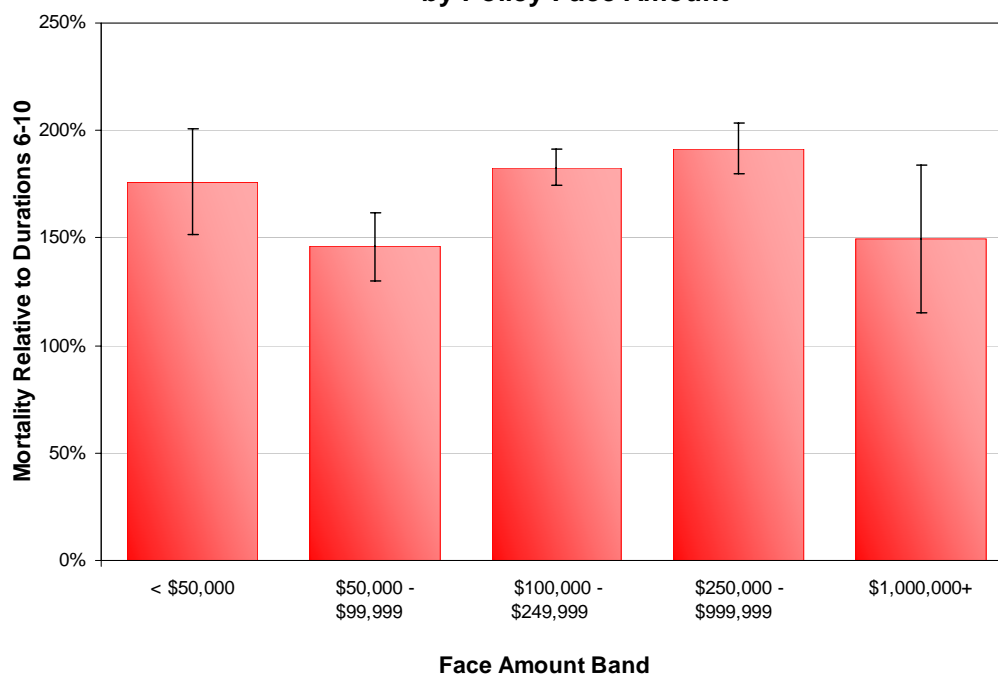
T10 All

During the level period, the smallest policy sizes have the highest mortality levels due to looser underwriting requirements and lower socio-economic conditions. As policy size increases, mortality generally improves, although the mortality is slightly higher above \$1 million.

During the post-level period, the extra mortality does not seem to show any clear trends by policy face amount.

Policy Face Amount	Duration 6-10					Duration 11+						Average Prem Jump Ratio
	Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality			Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality				
			08 VBT	01 VBT	SOA 7580			08 VBT	01 VBT	SOA 7580	vs LP	
< \$50k	16,890	124	137%	110%	93%	4,061	45	241%	165%	150%	176%	2.4
\$50k - \$99k	160,327	903	125%	99%	81%	21,891	107	182%	126%	108%	146%	2.4
\$100k - \$249k	1,669,416	3,729	98%	70%	52%	101,949	400	179%	119%	90%	183%	3.2
\$250k - \$999k	1,314,306	2,233	91%	63%	42%	48,282	188	175%	114%	80%	192%	3.7
\$1 M +	227,612	496	99%	68%	45%	5,792	23	148%	95%	65%	150%	4.1
Grand Total	3,388,551	7,485	99%	70%	50%	181,975	763	180%	120%	90%	182%	3.1

T10 Post-Level Mortality Relative to Level Period by Policy Face Amount



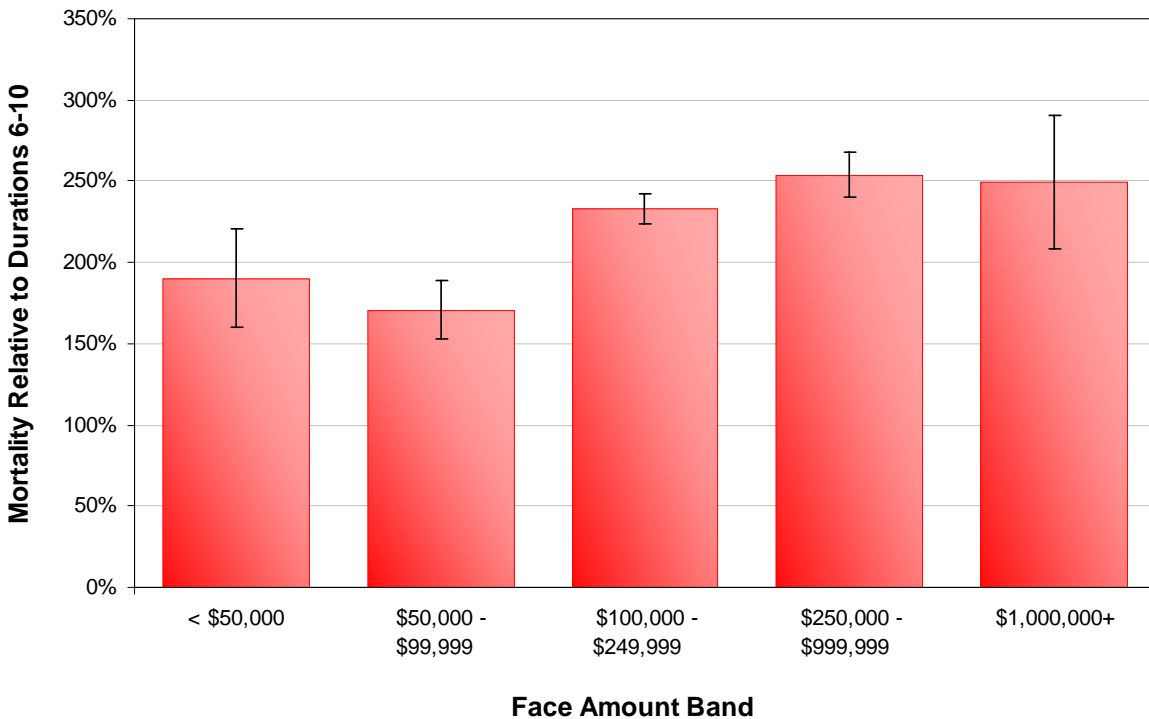
Face Amount

T10 Jump to ART

For the Jump to ART products, post level mortality is higher for larger policy sizes.

Policy Face Amount	Duration 6-10					Duration 11+					Average Prem Jump Ratio	
	Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality			Policy-Years Exposed	Total Deaths	Actual/Tabular Mortality				
			08 VBT	01 VBT	SOA 7580			08 VBT	01 VBT	SOA 7580		vs LP
< \$50k	15,701	119	137%	110%	93%	1,837	29	260%	182%	170%	190%	2.6
\$50k - \$99k	146,797	861	125%	100%	82%	10,953	81	214%	150%	136%	171%	2.8
\$100k - \$249k	1,515,761	3,358	99%	71%	52%	68,637	340	230%	155%	118%	233%	3.6
\$250k - \$999k	1,164,623	2,008	93%	64%	43%	29,474	144	237%	158%	111%	254%	4.0
\$1 M +	192,266	442	102%	70%	46%	2,569	16	254%	168%	116%	250%	4.3
Grand Total	3,035,148	6,788	100%	72%	52%	113,470	610	231%	156%	120%	230%	3.6

**T10 Jump to ART
Post-Level Mortality Relative to Level Period
by Policy Face Amount**

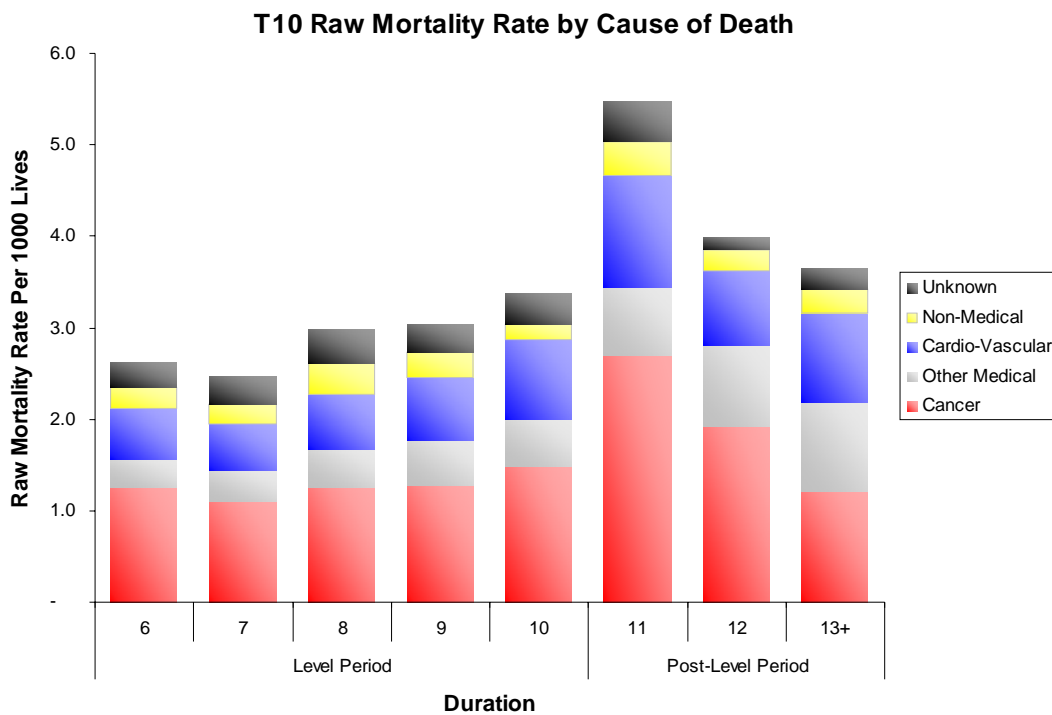


Cause of Death

T10 All

Companies were asked to provide the cause of death if available. This data was provided for roughly 37% of all deaths in the study and 36% of post-level period deaths. Cause of death codes were mapped into common groupings in order to aggregate across companies. The following chart shows the raw cause-specific mortality rates by duration for the companies that were able to provide cause of death. Since these rates are not age/duration adjusted, they generally increase by duration even during the level period.

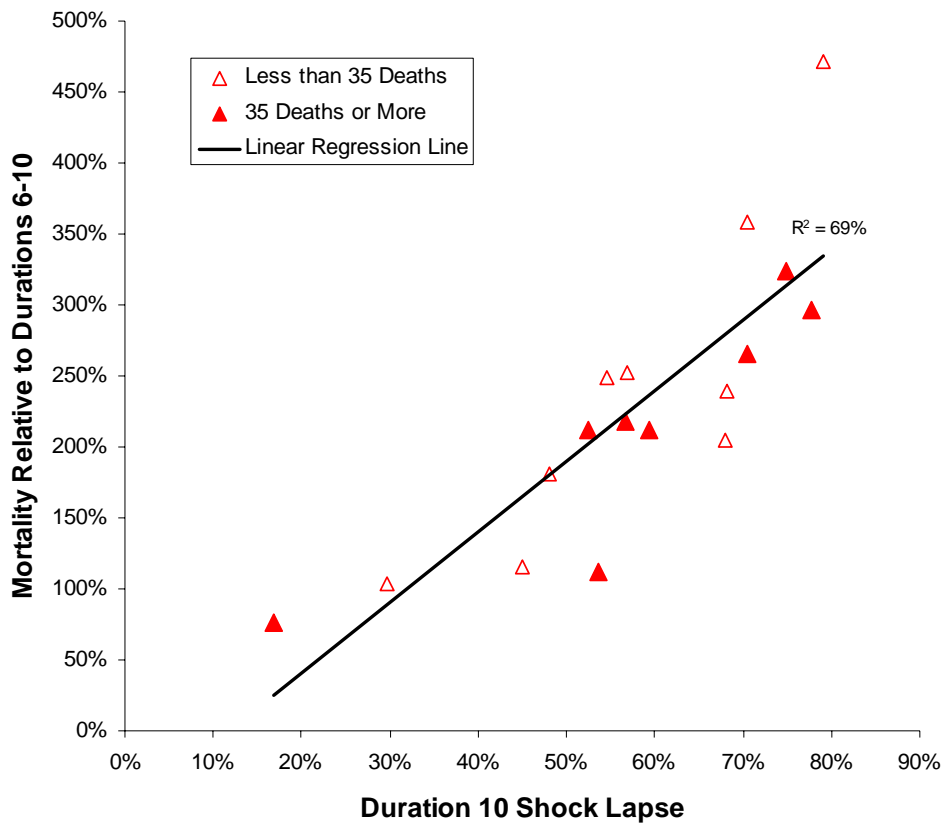
The expectation is that policyholders with known impairments (such as cancer) might be more likely to anti-selectively persist beyond the level period. The data lends support to this hypothesis: the cause-specific mortality rate for cancer increases by more than any of the other medical causes of death.



Shock Lapse vs. Mortality Deterioration

Throughout this document, it has been suggested that there is a strong relationship between the size of the shock lapse at the end of the level period and the amount of mortality deterioration beyond the level period. The clearest way to illustrate this relationship is by looking at both of these metrics for each company on an XY scatter plot. The following chart shows the shock lapse in duration 10 and the 2008 VBT mortality ratio for durations 11+ for each company with at least 10 post-level period deaths.

Shock Lapse vs. Mortality Deterioration by Company



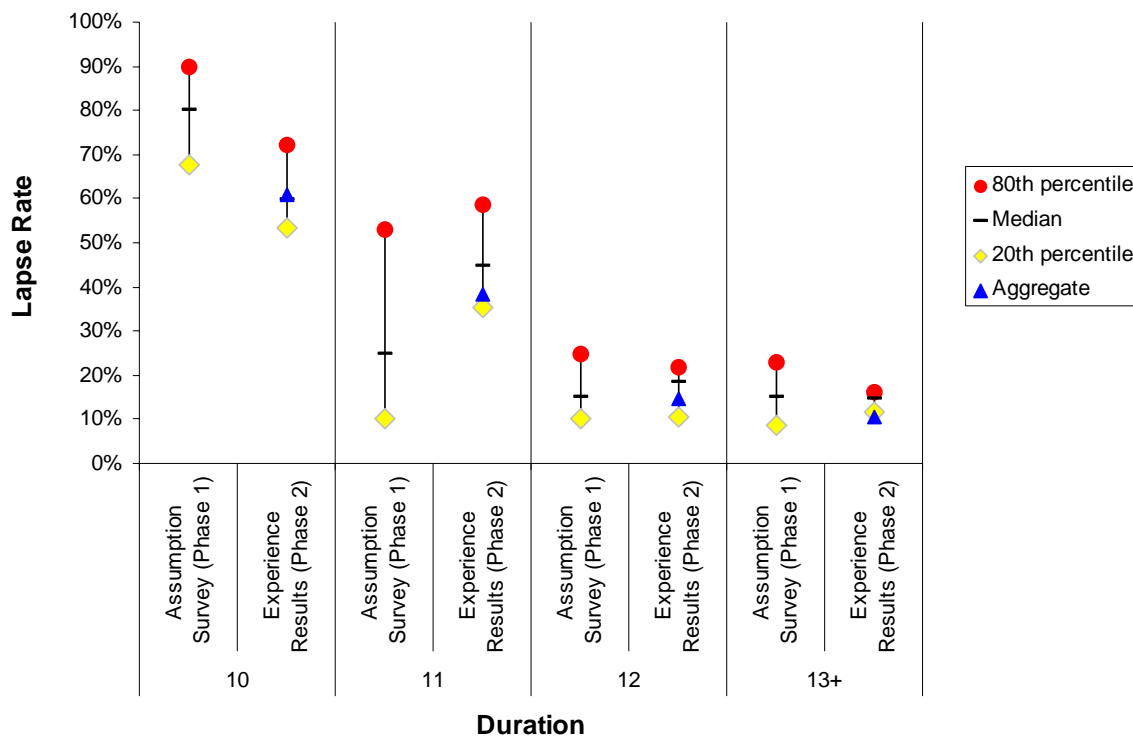
Comparisons to Phase 1 Assumption Survey

The following pages will provide a side-by-side comparison of the Phase 1 assumption survey results to the Phase 2 experience results. When comparing these results, it is important to note that there are significant differences between the product design characteristics of level term products issued today versus those contributing experience to the Phase 2 study that were issued over 10 years ago – particularly as it relates to the size of the premium jump at the end of the level period.

Shock Lapse

In total, the average shock lapse at the end of the level period for T10 was higher in the assumption survey than the experience results. This is in line with the expectation that newer products with larger premium jumps will exhibit higher shock lapses. The results in duration 11 are flipped the other way with the experience results showing higher average lapse rates than the pricing assumptions.

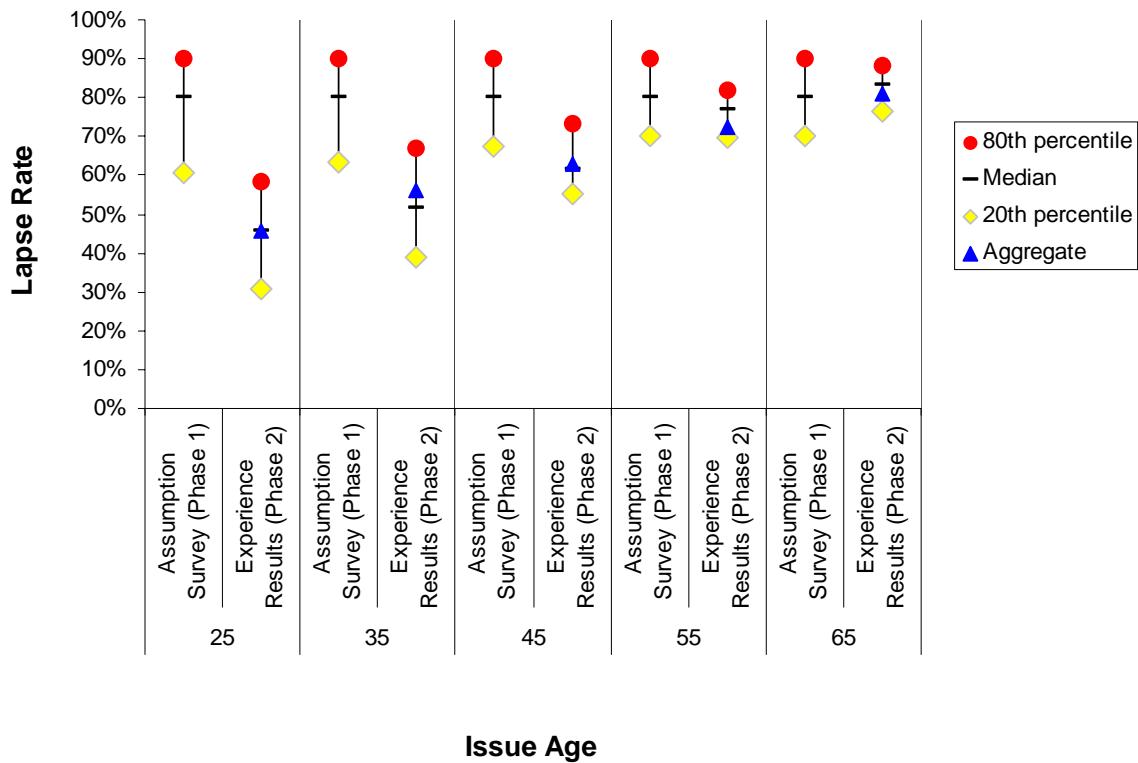
**T10 Annual Total Lapse Rates
Phase 1 vs. Phase 2**



Shock Lapse by Issue Age

The most significant difference between the Phase 1 assumptions and the Phase 2 experience results seems to be in the shape of the shock lapse by issue age. Most company responses did not directly vary pricing assumptions by issue age, while the experience study results show a significant increase in shock lapse rates by issue age.

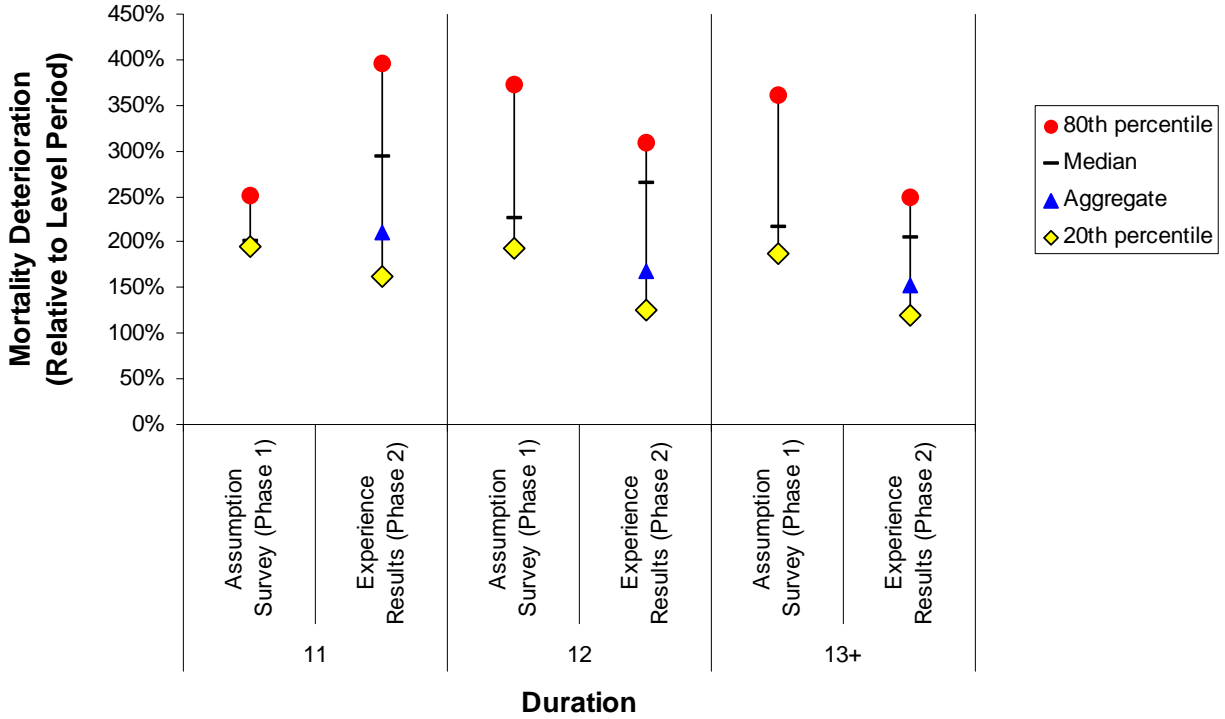
T10 Duration 10 Lapse Rates By Issue Age Phase 1 vs. Phase 2



Mortality Deterioration

The median level of mortality deterioration was higher in the experience study than in the assumption survey, although a small number of larger companies experienced lower mortality deterioration.

**T10 Mortality Deterioration
Phase 1 vs. Phase 2**

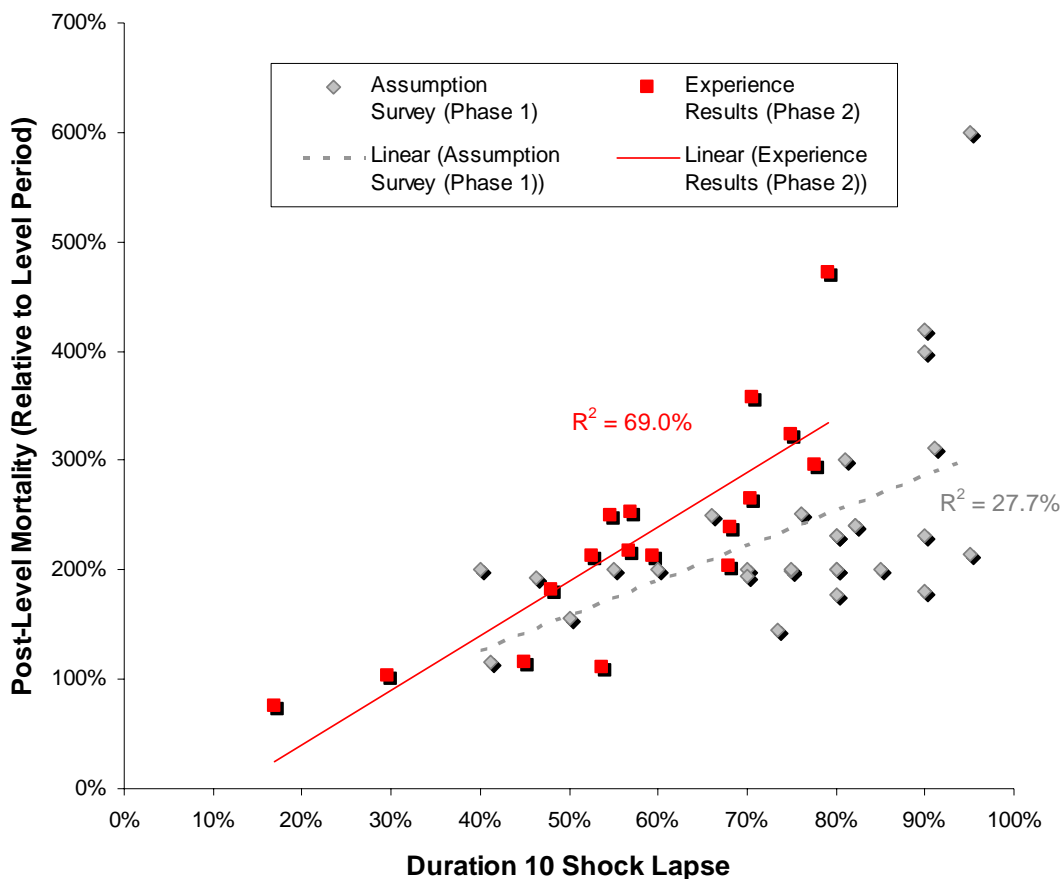


Shock Lapse vs. Mortality Deterioration

Both the assumption survey and the experience results showed a generally positive correlation between the size of the shock lapse and the amount of mortality deterioration. The relationship is much stronger in the experience results since several survey participants used a level 200% mortality deterioration assumption.

In general, it appears that for a given level of shock lapse, the average Phase 2 mortality deterioration experience is higher than the corresponding Phase 1 pricing assumptions.

T10 Shock Lapse vs. Mortality Deterioration Phase 1 vs. Phase 2



Shock Lapse Model

This study has demonstrated that the shock lapse at the end of the level period varies by a number of factors including, but not limited to, company, premium jump ratio, premium mode, product structure, issue age, and risk class. A complicating factor is that many of these variables are correlated. For example, older issue ages have higher premium jump ratios because of the exponential shape of the mortality curve. Preferred non-smoker products tend to have higher premium jump ratios because post-level period rates often don't vary by risk class. Issue age is similarly correlated with risk class and policy size. Clearly this creates a complex web of potential interdependencies. As a first step toward unraveling this puzzle, the authors have developed a rudimentary logistic regression model to help control for each variable independently. None of the authors are statisticians by training or by practice; we are merely trying to suggest a first step toward a more robust approach to actuarial experience analysis. We hope that the research community is able to build and improve upon the simple methods that we have utilized.

Overview

A logistic regression model is a generalized linear model used to model the probability of the occurrence of a binomial event.

The probability of the event (i.e. T10 duration 10 shock lapse) is modeled as

$$f(z) = 1 / (1 + e^{-z}) \text{ where } z = \beta_0 + \beta_1X_1 + \beta_2X_2 + \dots + \beta_nX_n.$$

The models developed were fit through a random sample of 70% of the policies with T10 duration 10 lapse rate exposure. Sampling was done on a policy-by-policy basis, so a similar mix of results by company should be seen in both samples. The remaining 30% sample was held back for the purposes of checking the predictive power of the model and to avoid over-fitting. For the sake of consistency and likely relevance to modern products, only policies with a "Jump to ART" structure were included.

Predictors Included

The first model was fit to the entire 70% sample and included the following predictors:

- Issue Age (0-29, 30-39, 40-49, 50-59, 60+)
- Super-Preferred NS Indicator (Y for Super-Preferred NS classes)
- Premium Mode (Annual, Semi-Annual, Quarterly, Monthly)
- Face Amount Band (\$0-\$49k, \$50k-\$99k, \$100k-\$249k, \$250k-\$999k, \$1m+)

The second model was developed just for companies within the 70% sample where the premium jump ratio was provided. This model included the previous predictors as well as:

- Premium Jump Ratio (1.01x-2.00x, 2.01x-3.00x, ... , 10.01x+)

The x_i values used in this model are indicator variables that are set to 1 or 0 for each predictor. In other words, z is the sum of the coefficients associated with each specific policy attribute modeled.

Model Results

The following pages will provide the results from the regression model. The following items should be noted regarding these displays:

- The “Model Coefficient” column provides the β_i values at each attribute level for each predictor. These can be used to calculate the predicted shock lapse rate for a given model cell.
 - As an example, the predicted shock lapse rate from the first model for a \$500,000 annual pay policy issued to a 45 year old, super-preferred non-smoker would be calculated as follows:
 - $z = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 = -0.278 + 0.848 + 0.095 + 0.984 + 0.077 = 1.727$
 - Predicted Lapse Rate = $f(z) = 1 / (1 + e^{-z}) = 84.9\%$
- The “Odds Ratio” provides the ratio of the modeled odds relative to the “reference level” for each predictor after controlling for other modeled variables.
 - As an example from the first model, the raw odds ratio for issue age 50-59 is the ratio of the odds of lapse for a 50-59 year old to the odds of lapse for someone less than 30 years old: $(.787/(1-.787)) / (.483/(1-.483)) = 3.96$. The model odds ratio of 3.76 represents a similar concept, except that the value has been controlled for other modeled predictors.
- The “70% Sample” columns show the exposure proportions and empirical lapse rates for the data that was used to fit the model. As expected, the empirical lapse rates from the data exactly match the predicted rates from the model at the levels of aggregation shown.
- The “30% Sample” columns show the proportions and empirical lapse rates for the 30% of the data that was randomly held back from the model. Note the close fit from the empirical lapse rates and modeled lapse rates for the 30% sample.

Model 1

The following table provides the model coefficients and validation for the first model. This model does not include premium jump ratio as a separate predictor since that data was not available for all policies. From this model, issue age is the most important predictor of shock lapse rates, but other variables are still significant.

Model Parameters				70% Sample			30% Sample		
Predictor	Model Coeff β_i	Std Error	Odds Ratio	Data Prop-ortion	Actual Lapse Rate	Modeled Lapse Rate	Data Prop-ortion	Actual Lapse Rate	Modeled Lapse Rate
Constant	(0.278)	0.01							
Issue Age									
<30*	-		1.00	10.5%	48.3%	48.3%	10.3%	47.6%	48.3%
30-39	0.427	0.02	1.53	38.8%	60.7%	60.7%	38.8%	60.4%	60.7%
40-49	0.848	0.02	2.34	32.1%	70.0%	70.0%	32.5%	69.6%	70.0%
50-59	1.326	0.02	3.76	14.5%	78.7%	78.7%	14.2%	78.5%	78.7%
60+	1.651	0.03	5.21	4.1%	82.1%	82.1%	4.1%	82.0%	82.2%
Risk Class									
Not Super-Pref NS*	-		1.00	94.2%	65.3%	65.3%	94.2%	65.1%	65.3%
Super-Pref NS	0.095	0.02	1.10	5.8%	74.7%	74.7%	5.8%	73.2%	74.5%
Premium Mode									
Monthly*	-		1.00	46.0%	57.9%	57.9%	46.0%	57.6%	57.9%
Quarterly	0.191	0.01	1.21	23.7%	64.8%	64.8%	23.8%	64.9%	64.9%
Semi-Ann	0.477	0.02	1.61	4.7%	71.8%	71.8%	4.8%	70.7%	71.7%
Annual	0.984	0.01	2.68	25.6%	80.1%	80.1%	25.4%	79.4%	80.1%
Face Amount									
<50k	(1.033)	0.06	0.36	0.7%	51.7%	51.7%	0.7%	54.5%	51.0%
50k-99k	(0.624)	0.02	0.54	6.2%	54.3%	54.3%	6.1%	54.0%	54.2%
100k-249k*	-		1.00	55.7%	65.2%	65.2%	55.8%	64.7%	65.3%
250k-999k	0.077	0.01	1.08	33.4%	68.6%	68.6%	33.5%	68.8%	68.6%
1m+	(0.069)	0.03	0.93	4.1%	72.1%	72.1%	4.0%	68.9%	71.8%
Grand Total				100.0%	65.9%	65.9%	100.0%	65.5%	65.9%

* Reference Level for Predictor

Model 2

The following table provides the model coefficients and validation for the second model. This model uses only the data from companies that provided premium information and uses premium jump ratio as a separate predictor. The overall shock lapse rate for these companies was lower, but the model shows the importance of premium jump as a predictor. Interestingly, the model suggests that the difference in lapse rates seen at super-preferred classes is driven by other modeled predictors since the Beta parameter for Super-Pref NS is negative even though the empirical shock lapse rates are much higher.

Model Parameters				70% Sample			30% Sample		
Predictor	Model Coeff β_i	Std Error	Odds Ratio	Data Prop-ortion	Actual Lapse Rate	Modeled Lapse Rate	Data Prop-ortion	Actual Lapse Rate	Modeled Lapse Rate
Constant	(1.461)	0.03							
Issue Age									
<30*	-		1.00	10.6%	35.7%	35.7%	10.3%	35.5%	35.6%
30-39	0.228	0.03	1.26	36.3%	47.4%	47.4%	36.4%	47.7%	47.5%
40-49	0.717	0.03	2.05	31.2%	59.8%	59.8%	31.5%	59.9%	59.9%
50-59	1.241	0.04	3.46	16.3%	74.8%	74.8%	15.9%	74.4%	75.0%
60+	1.594	0.05	4.93	5.7%	82.5%	82.5%	5.8%	83.1%	82.8%
Risk Class									
Not Super-Pref NS*	-		1.00	94.7%	55.4%	55.4%	94.7%	55.7%	55.6%
Super-Pref NS	(0.061)	0.05	0.94	5.3%	75.4%	75.4%	5.3%	72.5%	74.7%
Premium Mode									
Monthly*	-		1.00	43.2%	42.8%	42.8%	43.0%	43.0%	42.8%
Quarterly	0.853	0.02	2.35	26.9%	61.4%	61.4%	26.7%	61.6%	61.4%
Semi-Ann	1.036	0.03	2.82	6.7%	69.3%	69.3%	6.8%	69.0%	69.6%
Annual	1.149	0.02	3.15	23.2%	72.6%	72.6%	23.5%	72.2%	72.7%
Face Amount									
<50k	(0.338)	0.07	0.71	1.3%	48.0%	48.0%	1.3%	52.0%	47.2%
50k-99k	(0.209)	0.03	0.81	11.2%	47.1%	47.1%	10.9%	48.2%	47.5%
100k-249k*	-		1.00	53.4%	53.9%	53.9%	53.5%	53.9%	54.1%
250k-999k	0.178	0.02	1.19	30.1%	62.8%	62.8%	30.1%	63.0%	62.7%
1m+	0.187	0.05	1.21	4.0%	71.8%	71.8%	4.1%	68.7%	71.3%
Premium Jump Ratio									
1.01x - 2x*	-		1.00	11.7%	42.9%	42.9%	11.8%	42.0%	42.9%
2.01x - 3x	0.329	0.03	1.39	21.7%	44.4%	44.4%	21.5%	45.8%	44.7%
3.01x - 4x	0.556	0.03	1.74	25.8%	51.4%	51.4%	25.3%	51.3%	51.3%
4.01x - 5x	0.819	0.03	2.27	23.4%	63.4%	63.4%	24.0%	63.6%	63.5%
5.01x - 6x	0.939	0.04	2.56	8.6%	74.6%	74.6%	8.5%	72.6%	74.5%
6.01x - 7x	1.120	0.06	3.07	3.6%	82.4%	82.4%	3.7%	81.5%	81.6%
7.01x - 8x	1.177	0.08	3.24	2.4%	84.2%	84.2%	2.4%	84.0%	84.3%
8.01x - 10x	0.939	0.07	2.56	2.3%	80.5%	80.5%	2.3%	81.2%	80.7%
10.01x+	1.933	0.17	6.91	0.6%	89.4%	89.4%	0.6%	86.8%	88.9%
Grand Total				100.0%	56.5%	56.5%	100.0%	56.6%	56.6%

* Reference Level for Predictor

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 the experience results for term shock lapse rates and mortality rates beyond the level premium period.

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Finally, the authors express our sincere thanks to Jason McKinley of RGA for his significant contributions during both phases of this research project.

Appendix A: Companies Contributing Data

Allstate	North American Company for Life and Health
American National	Northwestern Mutual
Americo	Ohio National
Aviva USA	Pekin
AXA - Equitable	Principal
Banner Life	Protective
Empire General	Prudential
John Hancock	RiverSource
Kansas City Life	Security Mutual
Lincoln Benefit	State Farm
Massachusetts Mutual	United Farm Family
Modern Woodmen of America	West Coast Life
New York Life	William Penn

Appendix B: Grace Period Adjustment

In order to develop a consistent approach to displaying lapse study results, an adjustment was made to some companies' data submissions to account for grace period processing. Each individual lapse was adjusted X days where X varied by company (many companies were not adjusted at all.) The number of days used for this adjustment was based on each company's specific grace period and was confirmed with contributing companies. An illustration of the impact of this is shown below. Notice for example Companies B, I, and K which would have had significantly lower duration 10 lapse rates and higher duration 11 lapse rates if calculated based on the termination dates provided. The cumulative lapse in duration 10-11 is relatively unchanged.

