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Research Report

Lapse Experience under Universal Life Level Cost of Insurance Policies

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Experience Research Committee

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Author's Note

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1 Introduction

1.1 Overview

This is the fourth lapse experience study covering universal life level cost of insurance policies (referred to as "LCOI"; "UL" is used to refer to all types of universal life policies). Lapses have a significant impact on the financial results of this product. This study covers calendar years 2013–2019; the prior study covered 2005–2012. The previous studies have been useful to establish a benchmark for the possible level of the ultimate lapse rates.

Overall, compared to the prior study, lapse rates are lower at most policy years than those observed before; on average, about 20% lower.

1.2 Data in study

The scope of this study is limited to UL LCOI and similar products. This study includes all data received, but there are few data after the first 25 policy years. Only 2.4% of exposure is after the 25th anniversary, and 0.2% after the 30th.

Companies contributed data for the seven calendar years of the study, except that one company contributed its data on a policy-year basis, rather than calendar-year. Some companies were not able to contribute data for all requested fields. For example, some lacked information on funds and premiums. For most, fund information was missing or poor in quality. Accordingly, this report contains no reporting by fund values.

Some records were rejected for reasons such as being outside the study period and missing essential information, like date of birth.

A pivot table is available based on the data – see Section 8.

1.3 Issue age, duration, and policy year

Data were submitted with dates of birth[1] and issue, and if appropriate dates of termination and conversion. The age used throughout this report is age nearest birthday. In the case of a conversion, issue age is the age at time of conversion, and not at the issue of the underlying policy.

"Policy year" and "duration" are often used as if synonyms. In this report a policy year is taken as starting on a policy anniversary and ending just before the next anniversary, a closed-open interval. By tradition, policy years are referred to by ordinals: first, second, third, etc., relative to the issue date. Duration is the exact number of years since issue and may be fractional. "Duration" can also refer to a year-long interval beginning at an integral number of years since issue; in that case, duration is referred to by cardinals: 0,

[1] Two companies submitted issue age rather than date of birth in accordance with company policy of not disclosing date of birth. In those cases issue age was used directly.

1, 2, etc. Both[2] terms are used in this report. Generally, "policy year" is used to refer to a one-year time interval, and "duration" to an exact time.

1.4 Table of lapse rates (LapseLCOI)

This study, like the prior one, compares lapse experience to that of a table developed from the submitted data, called LapseT100. This table is the same one as in the prior study; that is, the table has not been updated for experience since 2012. Note that the table was developed on experience for issue ages 0–70 and the first 30 policy years. The rates are extrapolated for another 10 policy years. Rates for issue age 70 are used for older issue ages, and similarly rates for the 40th policy year are used for later policy years. There are separate rates for males and females, and for non-smokers, smokers, and smoking unknown.

LapseLCOI is used to calculate actual-to-expected ratios that appear throughout the report. The actual-to-expected ratios are helpful in quantifying the variation in lapse rates between various subsets of the data and in highlighting the differences between this report and the prior one.

1.5 Data by subset

Table 1 shows a summary of all valid data for guaranteed policies and various subsets of them. Records that did not conform to the specifications for the study are excluded. Records for adjustable policies are also excluded because too few companies submitted data for this category. Policies with "limited pay" LCOI were to be excluded, but some were submitted; they are excluded from the study after the end of the "payment" period.

In most cases in this report, the subset used, referred to as the "standard subset of data", is all policies that are not paid-up or on waiver of premium (or COI); have guaranteed rates; are single life; were issued as standard, and not as a result of a conversion or a guaranteed insurability election (GIE); and are base policies as opposed to riders or increases. However, conversions from UL yearly renewable term (YRT) to UL LCOI are included in the standard subset. Although the standard subset is only about 70% of all guaranteed policies, it is more useful to consider because it is more homogeneous. Additional comparisons in Section 5 of this report extend beyond the standard subset.

Table 1 includes columns of aggregate lapse rates; however, these columns should be used with care. The distribution by age and duration may differ substantially between the various subsets.

[2] Policy years are sometimes referred to by cardinals, but not in this report. Thus, the experience underlying the calculation of $q_{[x]+2}$, for example, might be referred to as "duration 2", "third policy year", or "policy year 3". To avoid confusion, this report uses the second form almost exclusively.

Table 1. Summary of valid records submitted by category. Volume in thousands.						
	Exposure		Lapses		Agg Lapse Rate	
	Count	Vol (000)	Count	Vol (000)	Count	Vol (000)
All valid records	10,021,400	1,670,437,926	184,314	24,096,993	1.8%	1.4%
*less*Paid-up	9,167	1,276,922	26	2,811	0.3%	0.2%
LCOI "paying"	10,012,234	1,669,161,003	184,288	24,094,182	1.8%	1.4%
less Adjustable	299,584	33,068,480	4,131	387,811	1.4%	1.2%
Guaranteed policies	9,712,650	1,636,092,523	180,157	23,706,371	1.9%	1.4%
less Riders	698,234	50,440,068	16,157	1,020,885	2.3%	2.0%
Guaranteed, Base records	9,014,415	1,585,652,455	164,000	22,685,486	1.8%	1.4%
less Joint	537,264	233,644,064	6,651	1,846,442	1.2%	0.8%
Single, Gtd, Base records	8,477,152	1,352,008,391	157,349	20,839,044	1.9%	1.5%
less Substd, Conv, GIE	1,329,015	214,290,780	23,987	3,674,934	1.8%	1.7%
Standard subset of data	7,148,137	1,137,717,611	133,362	17,164,111	1.9%	1.5%

1.6 Contributing companies

On behalf of the CIA, we wish to thank the companies that contributed data to the study. We acknowledge their work and diligence in ensuring that their data were accurate.

There were eight contributing companies[3] – see Table 2. The distribution of data by company differs from that of the prior study, as is to be expected with a seven-year gap in-between. In order to protect the confidentiality of company-specific experience, no comments will be made on the impact of the change.

Table 2. Distribution of exposure by volume by contributing company within the standard subset of data.	
Company	Distribution
Canada Life	13.2%
Desjardins	3.3%
Empire Life	4.0%
Industrial Alliance	15.3%
ivari	13.4%
Manulife	32.7%
RBC Insurance	6.9%
Sun Life	11.2%
All	100.0%

[3] In the previous report, Great-West Life and London Life were shown separately, but here are combined with Canada Life; Standard Life was distinguished, but it has been merged into Manulife; and ivari was known as Transamerica Life.

The overall ratio of actual to expected lapses varies considerably by company. Most have lower ratios in this study than in the prior one. After dropping the two highest and two lowest ratios, the remaining ones are 61%, 69%, 70%, and 95%. The standard deviations in the actual-to-expected ratios for most companies are near 2%, but some are lower and some much higher. Further information is not provided in order to keep company-specific information confidential.

1.7 Standard deviation

Standard deviations are important in experience studies because they indicate how much fluctuation one might expect in the mean. Very approximately one might expect the "true" actual-to-expected ratio to be within one standard deviation either side of the observed mean two-thirds of the time, and within two standard deviations 95% of the time. If two ratios differ by more than the sum of their standard deviations, it is very likely that the difference is statistically significant. If the difference is more than double the sum of the standard deviations, the difference is highly significant.

It is important to note that the standard deviations calculated for this report are accurate if the underlying true lapse rates are those of LapseLCOI and if policies are independent of each other with respect to their risk of lapsing. The formula for standard deviation is the one for the binomial distribution. To the extent that factors are at play other than age, duration, gender, and smoking, the actual standard deviation could be different from that calculated. For example, the variation in the overall actual-to-expected ratio by calendar year is greater than can be accounted for solely by statistical fluctuation; the volatility needs to be explained by some additional factors, such as changes in the economic environment. Nonetheless, the standard deviation is useful in assessing how much credibility to attach to a particular observation.

1.8 Calculating exposure and standard deviation

Exposure commences when a policy enters the study, either on January 1, 2013, or at issue if later, and continues until December 31, 2019, or the date of termination if earlier. The exception is that for a lapse, under the Balducci hypothesis, exposure continues to the next policy anniversary even if it is after December 31, 2019. Exposure by volume of insurance or premium is obtained by multiplying the exposure by policy by the relevant amount.

Standard deviations in the actual-to-expected ratios are calculated by the following formula,[4] where K represents the relevant amount (volume of insurance or simply 1 if used for policy count) for a policy and n is the exposure by policy for that duration. The amounts are summed over all the policies included in the calculation. The formula assumes that the lapse amount is a linear combination of binomial distributions within each sex–smoking–age–duration cell.

[4] A more precise formula could have been used instead, as was done in the recently published individual life mortality study, but LapseLCOI was considered to be close enough to the observed experience that the simpler formula is sufficiently accurate.

Standard deviation of A/E by relevant amount = $\frac{\left(\sum_i K_i^2 n_i p_i q_i\right)^{0.5}}{\sum_i K_i n_i q_i}$

2 Overall Results and Comparison with 2005–2012

Table 3 shows the overall exposure and lapse rates for guaranteed policies by policy count and by volume[5] of insurance in thousands of dollars. The numbers for both the current and prior study use the standard subset of data.

[5] In this report "volume" is synonymous with "sum assured" and "face amount".

Table 3. Ungraduated lapse rates by policy year for the current and prior studies for the standard subset of data. Volume is sum assured in thousands of dollars.

Study of 2013–2019				Policy Year	Study of 2005–2012			
Exposure		Lapse Rates			Exposure		Lapse Rates	
Count	Vol (000)	Count	Volume		Count	Vol (000)	Count	Volume
240,407	35,104,302	7.4%	6.2%	1st	632,942	100,544,065	7.7%	5.3%
262,277	39,426,264	5.5%	4.6%	2nd	582,576	93,941,599	5.9%	4.6%
287,475	45,953,680	4.4%	3.7%	3rd	534,324	84,337,116	5.3%	4.4%
300,046	47,928,426	3.3%	2.9%	4th	488,118	76,355,543	4.3%	3.4%
308,540	49,863,711	2.5%	2.0%	5th	452,207	70,776,996	3.6%	2.8%
321,967	53,738,562	2.1%	1.7%	6th	421,318	65,328,173	3.3%	2.5%
334,137	57,260,820	1.8%	1.5%	7th	397,959	60,360,266	3.0%	2.3%
339,732	59,415,380	1.6%	1.2%	8th	383,265	56,451,685	2.8%	2.1%
334,150	59,446,338	1.5%	1.2%	9th	370,314	53,734,560	2.5%	2.1%
329,613	57,511,834	1.5%	1.2%	10th	354,691	51,236,911	2.4%	1.9%
330,295	56,647,434	1.9%	1.5%	11th	331,380	48,055,538	2.6%	2.1%
328,952	55,740,375	1.3%	1.1%	12th	302,855	44,119,865	2.1%	1.7%
326,533	54,097,686	1.2%	0.9%	13th	272,165	39,451,805	1.8%	1.5%
326,006	53,156,161	1.1%	0.9%	14th	237,974	34,190,971	1.6%	1.2%
328,602	51,873,040	1.0%	0.8%	15th	200,430	28,857,943	1.6%	1.2%
327,824	50,162,223	0.9%	0.7%	16th	160,908	23,548,776	1.4%	1.0%
316,160	47,628,583	0.9%	0.7%	17th	126,134	18,504,645	1.4%	1.0%
298,139	44,689,325	0.8%	0.6%	18th	93,875	13,678,886	1.4%	1.0%
272,233	41,162,154	0.9%	0.7%	19th	70,645	10,006,224	1.4%	0.9%
245,731	37,297,919	0.8%	0.7%	20th	52,006	6,906,018	1.4%	1.0%
217,172	32,612,121	0.9%	0.7%	21st	35,678	4,351,919	1.5%	1.0%
183,645	27,601,643	0.8%	0.5%	22nd	23,596	2,583,887	1.5%	1.3%
148,771	22,299,140	0.8%	0.6%	23rd	15,748	1,551,785	1.2%	1.0%
118,008	17,423,057	0.7%	0.5%	24th	10,380	882,804	1.2%	1.0%
89,013	12,876,590	0.8%	0.5%	25th	7,218	570,114	1.3%	0.9%
69,435	9,507,232	0.7%	0.5%	26th	4,579	356,667	1.9%	1.6%
53,226	6,670,221	0.8%	0.6%	27th	2,693	214,743	1.6%	1.2%
37,599	4,260,816	0.8%	0.6%	28th	1,891	136,327	1.5%	2.0%
25,395	2,553,710	0.8%	0.7%	29th	1,100	61,959	2.1%	2.0%
17,233	1,574,032	0.8%	0.7%	30th	570	28,966	1.6%	0.9%
29,821	2,234,831	0.8%	0.8%	>30th	168	7,835	0.6%	0.3%
7,148,137	1,137,717,611	1.9%	1.5%	All	6,569,705	991,134,591	3.6%	2.8%

One thing is immediately apparent. The lapse rates for the current study are lower for every policy year except for the first and those after the 30th policy year (for which there was very little data in the prior study), and many of the decreases are substantial.

Table 4 shows exposure and lapse rates by policy year for the standard subset of data for ages 18 and up, for non-smokers only, separately for males and females, and Table 5 similarly for smokers only. Policies classified as aggregate (not smoker-distinct) or issued under age 18 are excluded from both tables.

Table 4. Ungraduated lapse rates by policy year for the standard subset of data, for non-smokers only, issue ages 18+. Volume is sum assured in thousands of dollars.

Adult Male Non-Smokers				Policy Year	Adult Female Non-Smokers			
Exposure		Lapse Rates			Exposure		Lapse Rates	
Count	Vol (000)	Count	Volume		Count	Vol (000)	Count	Volume
85,772	15,597,145	6.8%	5.3%	1st	102,536	14,136,915	7.3%	6.7%
94,546	17,910,672	5.0%	4.1%	2nd	111,657	15,680,411	5.4%	4.7%
104,891	21,357,625	4.1%	3.5%	3rd	122,161	18,264,363	4.3%	3.6%
109,710	22,494,010	3.1%	2.9%	4th	127,815	19,030,200	3.2%	2.6%
113,904	23,715,448	2.4%	1.9%	5th	131,404	19,747,470	2.3%	1.9%
120,387	25,917,599	2.0%	1.5%	6th	136,731	21,220,020	2.0%	1.7%
126,494	27,807,122	1.7%	1.3%	7th	141,295	22,594,603	1.6%	1.4%
130,266	29,070,507	1.5%	1.1%	8th	143,071	23,373,125	1.5%	1.2%
129,219	29,318,398	1.4%	1.2%	9th	139,602	23,106,366	1.3%	1.1%
128,055	28,623,703	1.4%	1.1%	10th	136,477	21,944,358	1.3%	1.0%
129,406	28,495,881	2.0%	1.5%	11th	135,489	21,349,229	1.6%	1.3%
129,873	28,306,989	1.2%	1.1%	12th	133,932	20,786,029	1.2%	1.0%
129,502	27,696,791	1.1%	0.8%	13th	131,964	19,837,327	1.0%	0.8%
129,747	27,582,157	1.0%	0.9%	14th	130,347	19,099,322	0.9%	0.8%
130,717	27,092,179	1.0%	0.8%	15th	129,849	18,378,145	0.8%	0.7%
130,697	26,420,370	0.8%	0.7%	16th	127,718	17,558,998	0.7%	0.6%
127,344	25,390,905	0.8%	0.7%	17th	121,192	16,339,540	0.7%	0.6%
121,760	24,251,554	0.7%	0.6%	18th	111,858	14,887,190	0.6%	0.6%
112,595	22,742,002	0.7%	0.6%	19th	100,014	13,299,079	0.7%	0.6%
103,405	20,978,799	0.7%	0.6%	20th	88,269	11,718,070	0.6%	0.6%
93,192	18,655,022	0.8%	0.6%	21st	76,153	9,924,900	0.7%	0.6%
80,885	16,209,103	0.6%	0.5%	22nd	62,449	8,014,818	0.6%	0.5%
66,743	13,380,670	0.6%	0.5%	23rd	49,451	6,208,718	0.6%	0.5%
53,458	10,566,271	0.6%	0.5%	24th	38,725	4,754,706	0.5%	0.4%
40,622	7,858,255	0.6%	0.4%	25th	28,968	3,456,478	0.6%	0.4%
31,607	5,797,482	0.6%	0.4%	26th	22,507	2,522,968	0.5%	0.4%
24,020	4,054,295	0.7%	0.5%	27th	17,086	1,753,261	0.6%	0.5%
16,987	2,591,748	0.6%	0.5%	28th	11,919	1,096,930	0.7%	0.5%
11,573	1,524,023	0.7%	0.6%	29th	8,014	662,952	0.5%	0.5%
8,022	944,991	0.8%	0.6%	30th	5,363	395,767	0.6%	0.6%
14,758	1,390,352	0.7%	0.7%	>30th	8,753	511,056	0.9%	0.8%
2,830,159	583,742,065	1.7%	1.3%	All	2,832,769	411,653,315	1.7%	1.5%

Table 5. Ungraduated lapse rates by policy year for the standard subset of data, for smokers only, issue ages 18+. Volume is sum assured in thousands of dollars.

Adult Male Smokers				Policy Year	Adult Female Smokers			
Exposure		Lapse Rates			Exposure		Lapse Rates	
Count	Vol (000)	Count	Volume		Count	Vol (000)	Count	Volume
12,814	1,339,547	12.1%	10.4%	1st	8,905	777,143	11.6%	10.2%
13,765	1,476,666	8.9%	7.7%	2nd	9,827	873,883	8.4%	7.1%
14,802	1,666,125	6.9%	7.0%	3rd	11,031	980,486	6.4%	5.6%
15,623	1,728,708	5.5%	5.0%	4th	11,919	1,004,236	4.8%	4.2%
16,279	1,813,127	4.1%	4.2%	5th	12,956	1,083,484	3.7%	3.0%
17,128	1,925,666	3.3%	3.2%	6th	14,023	1,186,900	3.2%	3.5%
17,851	2,018,728	3.3%	3.4%	7th	14,915	1,276,078	3.0%	2.9%
18,237	2,089,807	2.9%	2.5%	8th	15,516	1,389,701	2.3%	2.1%
18,190	2,145,633	2.5%	2.1%	9th	15,782	1,473,668	2.1%	1.7%
18,407	2,156,556	2.5%	2.8%	10th	16,208	1,486,960	2.1%	2.3%
19,017	2,189,871	3.0%	2.3%	11th	17,105	1,524,098	2.5%	2.1%
19,562	2,199,629	2.1%	2.2%	12th	17,728	1,516,357	1.6%	1.6%
20,113	2,215,522	1.8%	1.6%	13th	18,456	1,529,619	1.6%	1.6%
20,870	2,298,235	1.9%	1.6%	14th	19,181	1,576,123	1.3%	1.2%
21,879	2,330,744	1.4%	1.4%	15th	20,240	1,589,879	1.3%	1.1%
22,461	2,310,046	1.4%	1.3%	16th	20,763	1,539,446	1.2%	1.2%
22,068	2,249,213	1.2%	1.0%	17th	20,219	1,511,225	1.1%	1.0%
21,051	2,146,489	1.1%	1.1%	18th	19,184	1,452,969	0.9%	0.8%
19,241	1,995,908	1.1%	1.0%	19th	17,414	1,357,279	0.8%	0.8%
17,319	1,849,642	1.1%	1.2%	20th	15,432	1,250,391	0.8%	0.9%
15,410	1,658,632	1.2%	1.1%	21st	13,441	1,086,828	0.9%	0.9%
12,869	1,407,487	0.9%	0.8%	22nd	10,981	899,177	0.6%	0.7%
10,295	1,146,771	0.8%	0.7%	23rd	8,686	719,235	0.8%	0.6%
8,111	896,489	1.0%	0.7%	24th	6,840	547,818	0.9%	0.9%
6,130	667,092	1.0%	0.7%	25th	5,069	393,570	0.9%	0.8%
4,896	504,493	1.2%	1.4%	26th	3,980	283,611	0.8%	0.7%
3,880	349,460	1.3%	0.9%	27th	3,127	198,685	0.8%	0.6%
2,752	215,254	0.7%	0.6%	28th	2,259	126,667	0.8%	0.6%
1,933	133,321	1.0%	0.9%	29th	1,585	82,906	0.8%	0.8%
1,362	88,662	0.9%	1.0%	30th	1,136	52,679	0.7%	0.8%
2,323	127,119	1.1%	0.8%	>30th	1,867	74,991	1.0%	0.6%
436,641	47,340,639	2.7%	2.5%	All	375,774	30,846,093	2.3%	2.1%

Tables 6 and 7 are based on the same data as tables 4 and 5, but by volume of insurance only. The columns are exposure, lapse rates, the ratio of actual to expected lapses, and the standard deviation in the actual-to-expected ratios. The volume of expected lapses and the standard deviations are calculated on LapseLCOI.

Table 6. Ungraduated lapse rates by policy year for the standard subset of data, for non-smokers only, issue ages 18+. Expected on LapseLCOI. Volume is sum assured in thousands of dollars.

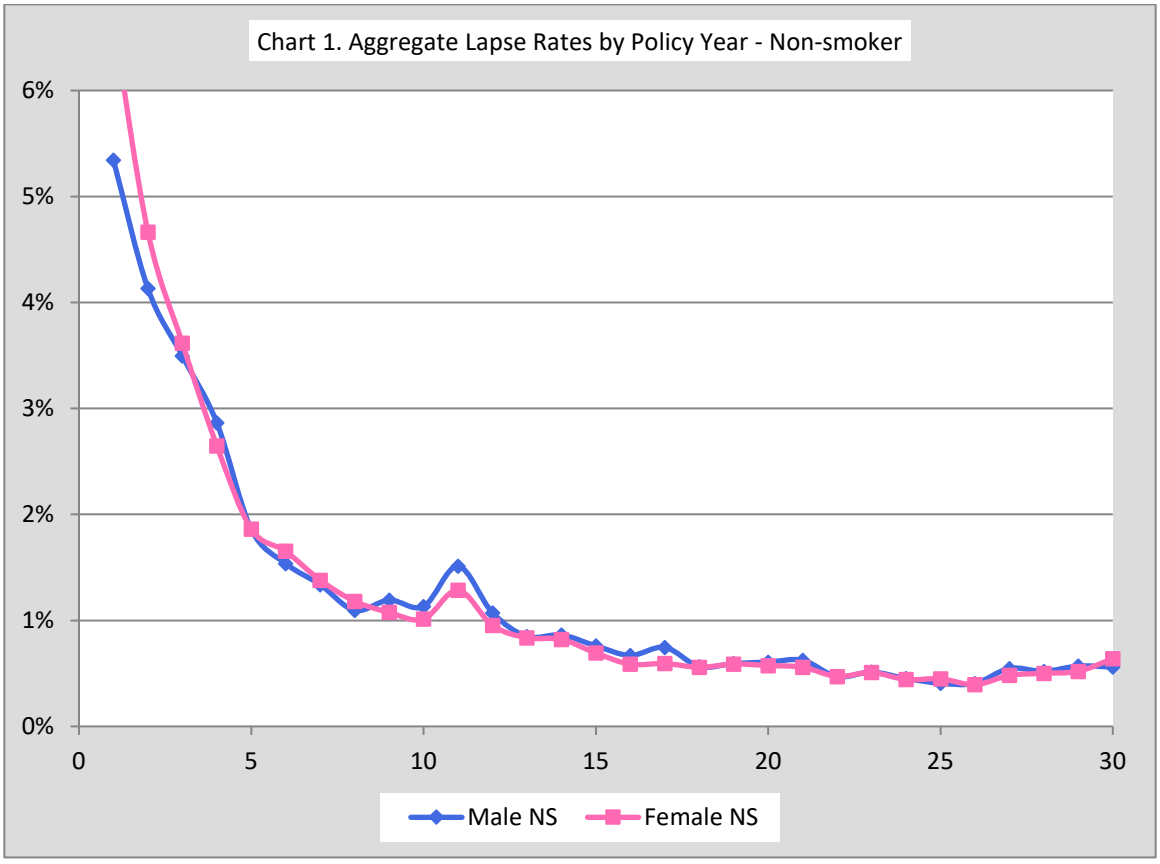
Adult Male Non-Smokers				Policy Year	Adult Female Non-Smokers			
Vol (000)	Lapse rate	A/E	Std Dev		Vol (000)	Lapse rate	A/E	Std Dev
15,597,145	5.3%	130%	6%	1st	14,136,915	6.7%	128%	4%
17,910,672	4.1%	107%	6%	2nd	15,680,411	4.7%	105%	4%
21,357,625	3.5%	99%	6%	3rd	18,264,363	3.6%	97%	5%
22,494,010	2.9%	91%	7%	4th	19,030,200	2.6%	85%	6%
23,715,448	1.9%	68%	7%	5th	19,747,470	1.9%	71%	6%
25,917,599	1.5%	64%	7%	6th	21,220,020	1.7%	73%	6%
27,807,122	1.3%	62%	7%	7th	22,594,603	1.4%	69%	7%
29,070,507	1.1%	55%	7%	8th	23,373,125	1.2%	63%	7%
29,318,398	1.2%	63%	7%	9th	23,106,366	1.1%	61%	7%
28,623,703	1.1%	63%	6%	10th	21,944,358	1.0%	59%	7%
28,495,881	1.5%	89%	6%	11th	21,349,229	1.3%	79%	7%
28,306,989	1.1%	69%	6%	12th	20,786,029	1.0%	64%	7%
27,696,791	0.8%	62%	7%	13th	19,837,327	0.8%	62%	8%
27,582,157	0.9%	71%	7%	14th	19,099,322	0.8%	68%	7%
27,092,179	0.8%	70%	7%	15th	18,378,145	0.7%	63%	8%
26,420,370	0.7%	68%	8%	16th	17,558,998	0.6%	58%	8%
25,390,905	0.7%	81%	8%	17th	16,339,540	0.6%	63%	8%
24,251,554	0.6%	64%	8%	18th	14,887,190	0.6%	63%	8%
22,742,002	0.6%	69%	8%	19th	13,299,079	0.6%	71%	9%
20,978,799	0.6%	72%	8%	20th	11,718,070	0.6%	73%	10%
18,655,022	0.6%	75%	9%	21st	9,924,900	0.6%	75%	11%
16,209,103	0.5%	57%	9%	22nd	8,014,818	0.5%	64%	11%
13,380,670	0.5%	63%	10%	23rd	6,208,718	0.5%	67%	12%
10,566,271	0.5%	56%	11%	24th	4,754,706	0.4%	57%	14%
7,858,255	0.4%	51%	12%	25th	3,456,478	0.4%	56%	17%
5,797,482	0.4%	51%	14%	26th	2,522,968	0.4%	49%	18%
4,054,295	0.5%	68%	17%	27th	1,753,261	0.5%	60%	21%
2,591,748	0.5%	65%	20%	28th	1,096,930	0.5%	63%	25%
1,524,023	0.6%	71%	21%	29th	662,952	0.5%	65%	31%
944,991	0.6%	70%	24%	30th	395,767	0.6%	80%	34%
1,390,352	0.7%	86%	15%	>30th	511,056	0.8%	104%	19%
583,742,065	1.3%	78%	1%	All	411,653,315	1.5%	80%	1%

Table 7. Ungraduated lapse rates by policy year for the standard subset of data, for smokers only, issue ages 18+. Expected on LapseLCOI. Volume is sum assured in thousands of dollars.

Adult Male Smokers				Policy Year	Adult Female Smokers			
Vol (000)	Lapse rate	A/E	Std Dev		Vol (000)	Lapse rate	A/E	Std Dev
1,339,547	10.4%	96%	6%	1st	777,143	10.2%	106%	18%
1,476,666	7.7%	83%	7%	2nd	873,883	7.1%	89%	18%
1,666,125	7.0%	88%	8%	3rd	980,486	5.6%	84%	18%
1,728,708	5.0%	75%	9%	4th	1,004,236	4.2%	74%	16%
1,813,127	4.2%	75%	10%	5th	1,083,484	3.0%	63%	13%
1,925,666	3.2%	69%	10%	6th	1,186,900	3.5%	83%	13%
2,018,728	3.4%	84%	11%	7th	1,276,078	2.9%	78%	13%
2,089,807	2.5%	71%	11%	8th	1,389,701	2.1%	62%	18%
2,145,633	2.1%	64%	12%	9th	1,473,668	1.7%	58%	25%
2,156,556	2.8%	90%	11%	10th	1,486,960	2.3%	82%	25%
2,189,871	2.3%	76%	10%	11th	1,524,098	2.1%	81%	27%
2,199,629	2.2%	78%	10%	12th	1,516,357	1.6%	67%	28%
2,215,522	1.6%	62%	11%	13th	1,529,619	1.6%	77%	30%
2,298,235	1.6%	71%	11%	14th	1,576,123	1.2%	63%	32%
2,330,744	1.4%	69%	11%	15th	1,589,879	1.1%	66%	28%
2,310,046	1.3%	68%	12%	16th	1,539,446	1.2%	74%	15%
2,249,213	1.0%	58%	12%	17th	1,511,225	1.0%	64%	16%
2,146,489	1.1%	66%	13%	18th	1,452,969	0.8%	52%	16%
1,995,908	1.0%	65%	13%	19th	1,357,279	0.8%	57%	17%
1,849,642	1.2%	83%	14%	20th	1,250,391	0.9%	64%	19%
1,658,632	1.1%	75%	15%	21st	1,086,828	0.9%	62%	18%
1,407,487	0.8%	59%	16%	22nd	899,177	0.7%	48%	20%
1,146,771	0.7%	46%	18%	23rd	719,235	0.6%	41%	23%
896,489	0.7%	51%	21%	24th	547,818	0.9%	58%	25%
667,092	0.7%	46%	24%	25th	393,570	0.8%	53%	30%
504,493	1.4%	91%	27%	26th	283,611	0.7%	45%	26%
349,460	0.9%	58%	27%	27th	198,685	0.6%	40%	22%
215,254	0.6%	37%	27%	28th	126,667	0.6%	38%	26%
133,321	0.9%	61%	28%	29th	82,906	0.8%	56%	33%
88,662	1.0%	68%	35%	30th	52,679	0.8%	53%	30%
127,119	0.8%	55%	24%	>30th	74,991	0.6%	43%	23%
47,340,639	2.5%	76%	2%	All	30,846,093	2.1%	74%	4%

It was observed in the prior study that LapseLCOI fit the experience reasonably well to the 20th policy year, but that the fit was not as good after where there were few data. Now, with lapse rates having come down markedly, the fit is poor for most policy years.

Charts 1 and 2 show the raw aggregate lapse rates for non-smokers and smokers, respectively. The information is taken from tables 6 and 7. The blue lines are for males and the pink for females.



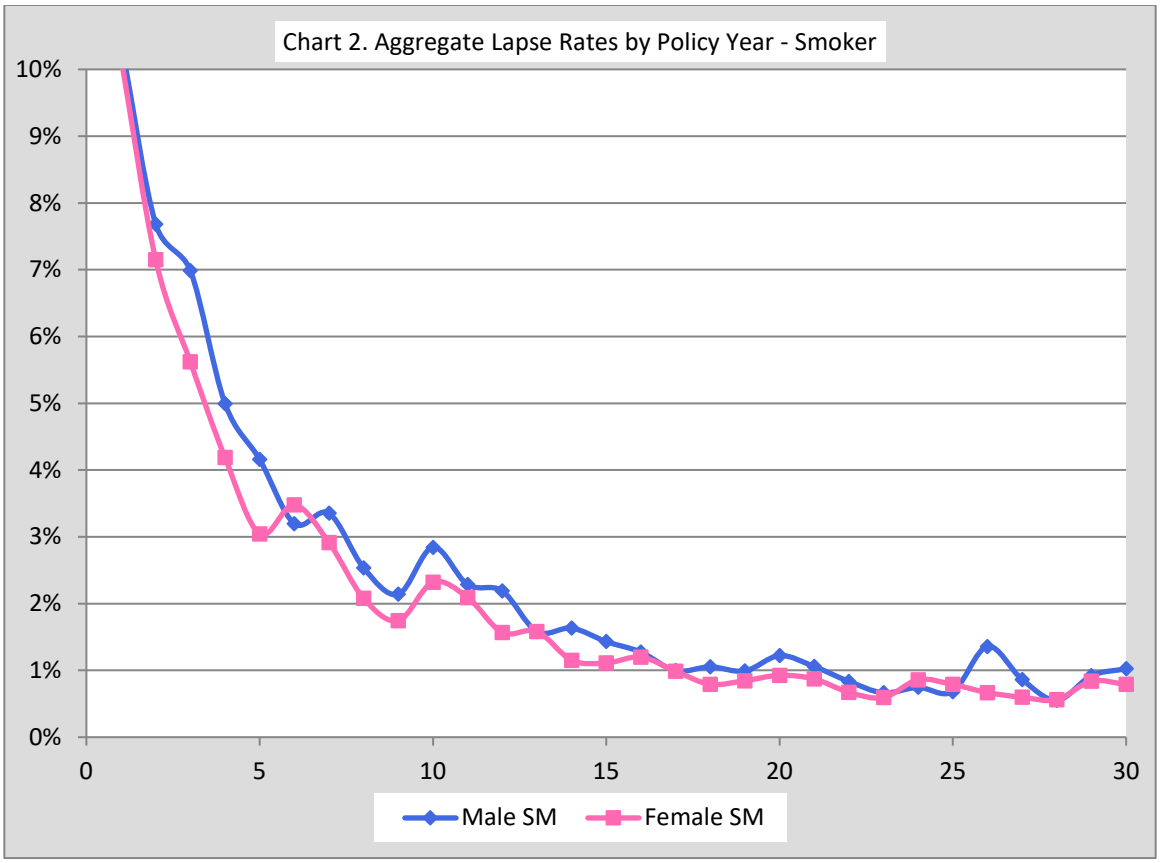


Table 8 shows the ratio of actual lapses to tabular lapses on male non-smoker LapseLCOI; that is, the male non-smoker table is used to calculate the tabular lapses for all four subsets. (The word "tabular" is used rather than "expected" because one does not expect lapses to be consistent with rates for male non-smokers in the other three cases.) The same tabular is used for all to emphasize the variation in lapse rates across sex and smoking status. For those who relate better to lapse rates than actual-to-tabular ratios, Table 9 presents the same data as Table 8 but with the aggregate lapse rates for each cell.

Table 8. Ratio of actual to tabular lapses for issue ages 18+, using LapseLCOI male non-smoker.					**Table 9. Aggregate lapse rates for issue ages 18+, measured by volume.**				
PolYr	M NS	M Sm	F NS	F Sm	PolYr	M NS	M Sm	F NS	F Sm
1–5th	99%	188%	107%	167%	1–5th	3.4%	6.6%	3.7%	5.8%
6–10th	62%	131%	61%	117%	6–10th	1.3%	2.8%	1.3%	2.5%
11–15th	73%	125%	67%	104%	11–15th	1.0%	1.8%	0.9%	1.5%
16–20th	71%	121%	64%	105%	16–20th	0.6%	1.1%	0.6%	1.0%
21–25th	63%	102%	61%	93%	21–25th	0.5%	0.8%	0.5%	0.8%
26–30th	61%	128%	58%	82%	26–30th	0.5%	1.0%	0.5%	0.7%
>25th	63%	126%	61%	82%	>25th	0.5%	1.0%	0.5%	0.7%
>15th	68%	116%	63%	100%	>15th	0.6%	1.0%	0.6%	0.9%
All	78%	147%	80%	127%	All	1.3%	2.5%	1.5%	2.1%

The differentials between male and female are relatively small, particularly for non-smokers. The differentials between smoker and non-smokers are consistently large.

3 Experience by Calendar Year

Table 10 shows ratios of actual to expected lapses by volume of insurance for each calendar year included in the study. The last column shows the standard deviation in the actual-to-expected ratio for 2019 only; the standard deviations for other years are fairly similar. There is little variation by calendar year.

Table 10. Actual-to-expected ratios for the standard subset of data by calendar year of experience. Expected is calculated on LapseLCOI.

Policy Year	Calendar Year of Experience								
	2013	2014	2015	2016	2017	2018	2019	2013–19	Std Dev 2019
1–5th	84%	92%	101%	108%	96%	101%	101%	96%	5%
6–10th	63%	68%	67%	64%	58%	58%	68%	64%	6%
11–15th	73%	71%	74%	73%	66%	66%	63%	69%	6%
16–20th	73%	66%	70%	74%	58%	62%	60%	66%	6%
21–25th	71%	68%	69%	61%	64%	55%	60%	62%	6%
26–30th	83%	105%	51%	76%	66%	65%	45%	60%	9%
>25th	85%	105%	52%	75%	67%	68%	46%	62%	8%
>15th	73%	68%	69%	70%	61%	61%	58%	65%	4%
All	75%	79%	82%	83%	73%	73%	74%	77%	3%

Table 11 is based on the same data as Table 10, but it shows the aggregate lapse rate each year for the ranges of policy years shown. The variation in lapse rate is not as reliable as the variation in actual-to-expected ratios because the distribution by policy year, age, gender, and smoking can vary between cells. The actual-to-expected ratios are better able to compensate for changes in distribution.

Table 11. Aggregate lapse rates for the standard subset of data by calendar year of experience.									
Policy Year	Calendar Year of Experience								Std Dev 2019
	2013	2014	2015	2016	2017	2018	2019	2013–19	
1–5th	3.3%	3.5%	3.8%	4.2%	3.8%	3.9%	3.7%	3.7%	0.18%
6–10th	1.4%	1.5%	1.4%	1.4%	1.2%	1.2%	1.4%	1.4%	0.13%
11–15th	1.1%	1.1%	1.1%	1.1%	1.0%	1.0%	1.0%	1.1%	0.09%
16–20th	0.8%	0.7%	0.7%	0.8%	0.6%	0.7%	0.6%	0.7%	0.06%
21–25th	0.7%	0.6%	0.6%	0.6%	0.6%	0.5%	0.6%	0.6%	0.06%
26–30th	0.8%	1.0%	0.5%	0.7%	0.6%	0.6%	0.4%	0.6%	0.09%
>25th	0.8%	1.0%	0.5%	0.7%	0.6%	0.6%	0.4%	0.6%	0.08%
>15th	0.8%	0.7%	0.7%	0.7%	0.6%	0.6%	0.6%	0.6%	0.04%
All	1.7%	1.7%	1.7%	1.6%	1.4%	1.3%	1.2%	1.5%	0.04%

4 Experience by Age and Policy Year

Tables 12–15 show actual-to-expected ratios of lapses by volume for quinquennial groups of policy years and decennial groups of adult issue ages. There is a separate table for each of male non-smoker, female non-smoker, male smoker, and female smoker. To provide a wider range of information each table also includes a section with standard deviations of the actual-to-expected ratios and the aggregate lapse rates.

We see lapse rates tend to decrease with increasing issue age within each duration group, with the possible exception of male smokers. The trend in actual-to-expected ratios is less clear, but there appears to be a general downward trend in the ratios with increasing issue age; that implies that the negative slope in lapse rates by age is somewhat steeper in 2013–2019 than in 2005–2012.

Table 12. Actual-to-expected ratios, standard deviations and lapse rates for the standard subset of data by groups of issue ages and policy years. Expected is calculated on LapseLCOI.

	Policy Year	Male Non-Smoker by Issue Age Group						
		18–29	30–39	40–49	50–59	60–69	70+	18+
Actual-to-Expected	1–5th	98%	107%	95%	90%	102%	110%	99%
	6–10th	54%	59%	65%	67%	83%	65%	62%
	11–15th	60%	68%	82%	86%	96%	46%	73%
	16–20th	83%	62%	80%	66%	44%	22%	71%
	21–25th	62%	65%	67%	45%	49%	4%	63%
	26–30th	81%	61%	55%	54%	12%	0%	61%
	>25th	81%	61%	56%	69%	12%	0%	63%
	>15th	76%	63%	74%	60%	44%	19%	68%
	All	76%	76%	79%	78%	90%	83%	78%
Standard Deviation	1–5th	4%	5%	8%	7%	8%	20%	3%
	6–10th	5%	5%	8%	8%	12%	43%	3%
	11–15th	6%	4%	6%	10%	24%	68%	3%
	16–20th	7%	5%	7%	11%	29%	67%	4%
	21–25th	10%	7%	8%	15%	41%	135%	4%
	26–30th	16%	12%	16%	37%	77%	385%	8%
	>25th	15%	11%	16%	35%	77%	385%	8%
	>15th	5%	4%	5%	8%	23%	60%	3%
	All	3%	2%	4%	4%	6%	18%	1%
Aggregate Lapse Rate	1–5th	4.4%	3.6%	3.0%	2.7%	2.9%	2.9%	3.4%
	6–10th	1.4%	1.2%	1.3%	1.2%	1.2%	0.6%	1.3%
	11–15th	1.0%	1.0%	1.1%	1.1%	0.8%	0.3%	1.0%
	16–20th	0.8%	0.6%	0.7%	0.6%	0.4%	0.2%	0.6%
	21–25th	0.5%	0.5%	0.5%	0.4%	0.4%	0.0%	0.5%
	26–30th	0.6%	0.5%	0.4%	0.4%	0.1%	0.0%	0.5%
	>25th	0.7%	0.5%	0.4%	0.6%	0.1%	0.0%	0.5%
	>15th	0.7%	0.5%	0.6%	0.5%	0.4%	0.2%	0.6%
	All	1.7%	1.2%	1.2%	1.3%	1.4%	1.1%	1.3%

Table 13. Actual-to-expected ratios, standard deviations and lapse rates for the standard subset of data by groups of issue ages and policy years. Expected is calculated on LapseLCOI.

	Policy Year	Female Non-Smoker by Issue Age Group						
		18–29	30–39	40–49	50–59	60–69	70+	18+
Actual-to-Expected	1–5th	99%	105%	100%	88%	91%	135%	99%
	6–10th	56%	62%	76%	71%	119%	37%	65%
	11–15th	62%	71%	67%	81%	75%	30%	68%
	16–20th	75%	68%	75%	39%	24%	24%	64%
	21–25th	88%	63%	56%	78%	12%	22%	66%
	26–30th	76%	61%	46%	35%	2%	0%	58%
	>25th	80%	62%	51%	39%	2%	0%	61%
	>15th	79%	66%	69%	48%	21%	24%	65%
	All	78%	81%	82%	78%	84%	71%	80%
Standard Deviation	1–5th	3%	4%	5%	9%	10%	25%	2%
	6–10th	4%	4%	8%	14%	20%	40%	3%
	11–15th	4%	5%	8%	14%	23%	39%	3%
	16–20th	7%	6%	8%	14%	21%	36%	4%
	21–25th	10%	9%	12%	22%	41%	73%	6%
	26–30th	14%	17%	27%	57%	98%	229%	11%
	>25th	13%	15%	25%	56%	98%	229%	10%
	>15th	5%	5%	6%	12%	18%	33%	3%
	All	2%	2%	3%	6%	8%	17%	1%
Aggregate Lapse Rate	1–5th	4.8%	4.3%	3.4%	2.6%	1.9%	1.8%	3.7%
	6–10th	1.5%	1.3%	1.3%	1.0%	1.0%	0.2%	1.3%
	11–15th	1.1%	1.0%	0.9%	0.8%	0.5%	0.2%	0.9%
	16–20th	0.7%	0.6%	0.7%	0.3%	0.2%	0.2%	0.6%
	21–25th	0.7%	0.5%	0.4%	0.6%	0.1%	0.2%	0.5%
	26–30th	0.6%	0.5%	0.4%	0.3%	0.0%	0.0%	0.5%
	>25th	0.6%	0.5%	0.4%	0.3%	0.0%	0.0%	0.5%
	>15th	0.7%	0.6%	0.6%	0.4%	0.2%	0.2%	0.6%
	All	2.0%	1.6%	1.4%	1.2%	1.0%	0.6%	1.5%

Table 14. Actual-to-expected ratios, standard deviations and lapse rates for the standard subset of data by groups of issue ages and policy years. Expected is calculated on LapseLCOI.

	Policy Year	Male Smoker by Issue Age Group						
		18–29	30–39	40–49	50–59	60–69	70+	18+
Actual-to-Expected	1–5th	88%	76%	88%	95%	79%	83%	84%
	6–10th	69%	79%	90%	55%	98%	215%	76%
	11–15th	67%	74%	71%	72%	120%	0%	71%
	16–20th	85%	61%	63%	54%	72%	102%	67%
	21–25th	68%	51%	65%	52%	40%	0%	58%
	26–30th	81%	57%	84%	30%	0%	-	68%
	>25th	80%	57%	81%	28%	0%	-	67%
	>15th	80%	57%	65%	52%	65%	99%	64%
	All	78%	72%	80%	75%	85%	93%	76%
Standard Deviation	1–5th	4%	7%	8%	11%	18%	97%	3%
	6–10th	7%	10%	11%	14%	20%	91%	5%
	11–15th	8%	8%	10%	21%	37%	124%	5%
	16–20th	12%	8%	10%	25%	41%	151%	6%
	21–25th	12%	12%	16%	40%	74%	288%	8%
	26–30th	19%	20%	38%	67%	271%	-	14%
	>25th	17%	19%	35%	63%	265%	-	13%
	>15th	9%	7%	8%	21%	36%	147%	4%
	All	3%	4%	5%	7%	13%	72%	2%
Aggregate Lapse Rate	1–5th	8.4%	6.2%	6.5%	5.9%	4.0%	2.5%	6.6%
	6–10th	3.0%	2.7%	3.1%	2.1%	2.6%	2.6%	2.8%
	11–15th	2.0%	1.8%	1.7%	1.6%	1.4%	0.0%	1.8%
	16–20th	1.5%	1.0%	1.0%	0.9%	1.1%	1.5%	1.1%
	21–25th	1.0%	0.7%	0.9%	0.7%	0.6%	0.0%	0.8%
	26–30th	1.2%	0.9%	1.3%	0.5%	0.0%	-	1.0%
	>25th	1.2%	0.8%	1.2%	0.4%	0.0%	-	1.0%
	>15th	1.3%	0.9%	1.0%	0.8%	1.0%	1.5%	1.0%
	All	3.1%	2.3%	2.4%	2.7%	2.7%	1.9%	2.5%

Table 15. Actual-to-expected ratios, standard deviations and lapse rates for the standard subset of data by groups of issue ages and policy years. Expected is calculated on LapseLCOI.

	Policy Year	Female Smoker by Issue Age Group						
		18–29	30–39	40–49	50–59	60–69	70+	18+
Actual-to-Expected	1–5th	77%	94%	84%	98%	60%	103%	85%
	6–10th	61%	69%	89%	76%	172%	31%	73%
	11–15th	70%	81%	58%	91%	76%	81%	71%
	16–20th	74%	65%	66%	31%	15%	0%	63%
	21–25th	68%	56%	39%	43%	0%	0%	53%
	26–30th	42%	46%	44%	33%	53%	0%	44%
	>25th	43%	44%	46%	30%	53%	0%	44%
	>15th	69%	61%	57%	34%	11%	0%	58%
	All	70%	77%	74%	82%	70%	68%	74%
Standard Deviation	1–5th	8%	12%	30%	12%	44%	152%	8%
	6–10th	8%	14%	31%	16%	47%	120%	9%
	11–15th	8%	13%	46%	29%	48%	108%	13%
	16–20th	12%	9%	19%	30%	55%	94%	7%
	21–25th	11%	10%	34%	36%	103%	182%	10%
	26–30th	15%	17%	48%	62%	277%	1879%	13%
	>25th	14%	16%	45%	60%	277%	1879%	12%
	>15th	8%	7%	16%	24%	49%	84%	6%
	All	4%	6%	16%	9%	26%	81%	4%
Aggregate Lapse Rate	1–5th	7.6%	7.3%	5.2%	4.5%	1.7%	1.4%	5.8%
	6–10th	2.9%	2.6%	2.6%	1.5%	1.9%	0.3%	2.5%
	11–15th	2.0%	1.7%	1.1%	1.1%	0.8%	0.8%	1.5%
	16–20th	1.2%	1.0%	1.0%	0.5%	0.2%	0.0%	1.0%
	21–25th	1.0%	0.8%	0.6%	0.6%	0.0%	0.0%	0.8%
	26–30th	0.6%	0.7%	0.7%	0.5%	0.8%	0.0%	0.7%
	>25th	0.7%	0.7%	0.7%	0.5%	0.8%	0.0%	0.7%
	>15th	1.1%	0.9%	0.8%	0.5%	0.2%	0.0%	0.9%
	All	2.7%	2.2%	1.9%	1.9%	1.2%	0.8%	2.1%

Table 16 completes the picture of tables 12–15 by showing quinquennial issue age groups for juveniles. Neither gender nor smoking status is distinguished.

Table 16. Actual-to-expected ratios, standard deviations and lapse rates for the standard subset of data by groups of issue ages andpolicy years. Expected is calculated on LapseLCOI.

	Policy Year	Male and Female, All Smoking Types			
		0–4	5–9	10–17	0–17
Actual-to-Expected	1–5th	77%	79%	100%	87%
	6–10th	49%	59%	64%	56%
	11–15th	49%	55%	54%	52%
	16–20th	57%	43%	50%	51%
	21–25th	68%	65%	50%	59%
	26–30th	66%	78%	46%	59%
	>25th	64%	78%	46%	58%
	>15th	61%	52%	49%	54%
	All	61%	64%	71%	66%
Standard Deviation	1–5th	3%	6%	6%	3%
	6–10th	3%	12%	14%	6%
	11–15th	4%	12%	15%	7%
	16–20th	6%	10%	8%	5%
	21–25th	6%	8%	7%	4%
	26–30th	12%	14%	11%	7%
	>25th	11%	13%	10%	7%
	>15th	4%	7%	6%	3%
	All	2%	4%	5%	2%
Aggregate Lapse Rate	1–5th	3.0%	4.0%	4.3%	3.7%
	6–10th	1.6%	1.6%	1.6%	1.6%
	11–15th	1.6%	1.6%	1.4%	1.5%
	16–20th	1.6%	1.3%	1.4%	1.5%
	21–25th	1.9%	1.8%	1.4%	1.7%
	26–30th	1.9%	2.2%	1.3%	1.7%
	>25th	1.8%	2.2%	1.3%	1.7%
	>15th	1.7%	1.5%	1.4%	1.5%
	All	2.1%	2.2%	2.2%	2.1%

Table 17 is organized similarly to the five tables above. However, it shows numbers by groups of attained ages for experience after the first 15 policy years. The section for lapse rates shows that smoker lapse rates continue to be higher than non-smoker. There is a general downward trend as attained age increases.

Table 17. Actual-to-expected ratios, standard deviations and lapse rates for the standard subset of data by groups of attained age. Expected is calculated on LapseLCOI.

	Risk Class	Attained Ages, Excluding First 15 Policy Years						
		18–39	40–49	50–59	60–69	70–79	80+	18+
Act/Exp	M NS	86%	71%	70%	69%	57%	38%	68%
	M Sm	68%	73%	63%	60%	53%	65%	64%
	F NS	87%	71%	68%	68%	47%	22%	65%
	F Sm	56%	75%	64%	46%	29%	3%	58%
Std Dev	M NS	11%	6%	4%	5%	8%	23%	3%
	M Sm	27%	8%	7%	9%	17%	35%	4%
	F NS	13%	5%	5%	6%	11%	18%	3%
	F Sm	28%	7%	7%	15%	34%	49%	6%
Lapse Rate	M NS	0.9%	0.6%	0.6%	0.6%	0.5%	0.3%	0.6%
	M Sm	1.2%	1.2%	1.0%	0.9%	0.8%	1.0%	1.0%
	F NS	0.9%	0.6%	0.6%	0.6%	0.4%	0.2%	0.6%
	F Sm	0.9%	1.1%	0.9%	0.7%	0.4%	0.0%	0.9%

5 Experience for Other Subsets

5.1 Joint type

Records submitted distinguish between single life policies, joint first-to-die, joint last-to-die, and other or unknown joint policies. (Because not many companies classified records as Other or Unknown, and because the experience could vary considerably by the actual joint type, these records are excluded from this report and from the pivot table.) The lapse experience varies markedly between these joint types. Note that LapseLCOI was constructed on single life policies only.

Table 18 shows the actual-to-expected ratios for the various joint types for issue ages 18 and higher. The table is based on the standard subset of data expanded to include joint policies. There is one note of caution for the expected lapses for joint policies. The expected lapses are calculated on LapseLCOI for sex and smoking status of the older life in the case of joint policies. The reason is that the records for joint policies show only the older life. Nothing is known of the other life.

Table 18. Experience by joint type for ages 18+ for standard subset expanded for joint. Expected lapses are calculated on LapseLCOI. Volume in thousands.

Policy Year	Joint Type	Exposure		Actual/Expected	
		Count	Vol (000)	Count	Volume
All	Single	6,479,311	1,073,858,276	93%	78%
	First to die	169,299	25,777,616	115%	105%
	Last to die	296,818	161,108,731	57%	42%
	All	6,945,428	1,260,744,623	93%	75%
1–15th	Single	4,235,724	728,433,831	97%	81%
	First to die	96,918	16,072,754	127%	112%
	Last to die	189,843	102,040,536	62%	46%
	All	4,522,485	846,547,120	96%	78%
>15th	Single	2,243,587	345,424,445	77%	66%
	First to die	72,382	9,704,863	80%	78%
	Last to die	106,975	59,068,195	39%	28%
	All	2,422,943	414,197,502	76%	61%
All	Other	5,243	1,236,000	63%	49%
1–15th	Other	974	223,172	96%	73%
>15th	Other	4,268	1,012,828	54%	41%

The actual-to-expected ratios for joint first-to-die are markedly higher than for single life for the first 15 policy years. The ratios for joint last-to-die are markedly lower than for single life.

5.2 Base/rider/increase

Records distinguish between base coverages, riders, and increases to the policy. The riders and increases must also have LCOI. LapseLCOI was constructed using records for base coverages only. Table 19 shows summaries for base coverages compared to riders. The table is based on the standard subset expanded to include riders and increases.

Table 19. Experience by base, rider or increase for standard subset expanded for coverage type. Expected lapses are calculated on LapseLCOI. Volume is sum assured in thousands.

Policy Year	Coverage Type	Exposure		Actual/Expected	
		Count	Vol (000)	Count	Volume
All	Base	7,148,137	1,137,717,611	91%	77%
	Rider/Incr	615,011	42,661,673	99%	91%
	All	7,763,147	1,180,379,285	92%	78%
1–15th	Base	4,698,731	777,164,014	95%	80%
	Rider/Incr	408,811	29,743,181	105%	95%
	All	5,107,542	806,907,195	95%	80%
>15th	Base	2,449,406	360,553,597	76%	65%
	Rider/Incr	206,199	12,918,492	77%	68%
	All	2,655,605	373,472,089	76%	65%

Riders experience higher termination rates than base plans for the first 15 policy years. Thereafter, the difference is not statistically significant.

5.3 Rating

Most companies indicated the mortality rating on each record. Two could not distinguish, and all records were marked as standard. LapseLCOI was constructed from records marked as standard only.

Table 20 compares the lapse experience of standard policies and two bands of substandard ratings. The table is based on the standard subset expanded to include all ratings.

Table 20. Experience by mortality rating for standard subset expanded for all ratings. Expected lapses are calculated on LapseLCOI. Volume is sum assured in thousands.

Policy Year	Rating	Exposure		Actual/Expected	
		Count	Vol (000)	Count	Volume
All	Standard	7,148,137	1,137,717,611	91%	77%
	101–200%	180,417	30,805,820	125%	115%
	>200%	35,603	3,935,497	153%	144%
	All	7,364,158	1,172,458,929	92%	79%
1–15th	Standard	4,698,731	777,164,014	95%	80%
	101–200%	159,632	27,209,170	126%	117%
	>200%	28,766	3,212,304	160%	147%
	All	4,887,129	807,585,489	96%	81%
>15th	Standard	2,449,406	360,553,597	76%	65%
	101–200%	20,786	3,596,650	95%	80%
	>200%	6,837	723,193	91%	111%
	All	2,477,029	364,873,440	76%	65%

The actual-to-expected ratios for substandard business increase with increasing rating, except by count after the first 15 policy years.

5.4 Preferred class

The specifications for data provided distinct codes for not preferred (that is, no preferred underwriting for that plan), residual of preferred classes (that is, preferred rates were available, but the policy did not qualify), and various preferred classes as defined by the company (that is, preferred rates were available, and the policy qualified). There was also a code in this field for policies issued by GIE. Only two companies were able to distinguish GIE. Four companies were able to distinguish preferred classes, but there is no consistency in the use of preferred classes between companies, and not necessarily even within companies. Accordingly, all preferred classes other than the residual class are combined for this report. Because there is little exposure for business with preferred underwriting after the 15th policy year, Table 21 shows only the first 15 policy years for adult issue ages. Smokers and non-smokers are distinguished. LapseLCOI was constructed on data that did not distinguish the preferred class but excluded GIE. The table is based on the standard subset. GIE is not shown because too few companies distinguished it.

Table 21. Experience by preferred class for the standard subset of data, for issue ages 18+ and the first 15 policy years. Expected lapses are calculated on LapseLCOI. Volume in thousands.

Smoking	Preferred Class	Exposure		Actual/Expected	
		Count	Vol (000)	Count	Volume
No	Not pref	1,999,209	337,213,742	82%	70%
	Residual	1,006,924	114,596,831	139%	130%
	Preferred	740,686	227,723,535	85%	67%
	All	3,746,819	679,534,109	99%	81%
Yes	Not pref	242,099	24,233,812	72%	69%
	Residual	193,978	13,132,087	107%	105%
	Preferred	52,254	11,497,280	72%	61%
	All	488,331	48,863,179	87%	78%

Actual-to-expected ratios for the first 15 policy years are higher for the residual class than either of the other two. The difference between non-preferred and preferred may not be statistically significant.

5.5 Conversion type

Some companies were able identify conversion type. The allowed types were “group”, “term”, “UL YRT”, and “Other”. Because few companies reported conversions, all conversion types are reported here combined. Table 22 shows the experience for not converted, converted, and both. For this purpose, a conversion from UL YRT is considered “not converted”; “converted” then means group, term, and other conversions. The table is based on the standard subset expanded to include conversions. Note that “No” may include unidentified conversions. The data underlying LapseLCOI included policies that were not converted and those that were converted from UL YRT; other conversion types were excluded.

Table 22. Experience by conversion type for standard subset expanded for conversion from another type of policy. Expected lapses are calculated on LapseLCOI. Volume is sum assured in thousands.

Policy Year	Converted	Exposure		Actual/Expected	
		Count	Vol (000)	Count	Volume
All	No	7,148,137	1,137,717,611	91%	77%
	Yes	1,073,038	173,133,603	75%	74%
	All	8,221,174	1,310,851,215	89%	77%
1–15th	No	4,698,731	777,164,014	95%	80%
	Yes	805,291	135,734,844	75%	74%
	All	5,504,022	912,898,858	92%	79%
>15th	No	2,449,406	360,553,597	76%	65%
	Yes	267,747	37,398,760	74%	78%
	All	2,717,153	397,952,357	76%	66%

Converted policies show lower actual-to-expected ratios than normal issues for the first 15 policy years, and higher thereafter. Both differences appear to be statistically significant.

5.6 Volume of insurance

Table 23 summarizes experience into several ranges of volume of insurance. The table is based on the standard subset of data.

Table 23. Experience by ranges of volume of insurance for the standard subset of data. Expected lapses are calculated on LapseLCOI. Volume is sum assured in thousands.

Policy Year	Range of Volume	Exposure		Actual/Expected	
		Count	Vol (000)	Count	Volume
All	0–49K	1,300,666	30,318,172	101%	100%
	50–99K	1,599,280	85,231,861	97%	97%
	100–249K	3,149,505	377,235,131	87%	86%
	250–499K	646,721	180,778,964	88%	88%
	500–999K	291,386	157,677,149	77%	76%
	1–2M	115,982	125,640,617	66%	64%
	2M+	44,596	180,835,718	55%	41%
	All	7,148,137	1,137,717,611	91%	77%
1–15th	0–49K	844,471	18,851,782	103%	103%
	50–99K	1,050,282	55,292,278	102%	102%
	100–249K	2,025,099	243,331,894	91%	90%
	250–499K	465,257	128,736,906	91%	90%
	500–999K	202,535	108,854,692	79%	78%
	1–2M	79,011	85,446,198	68%	66%
	2M+	32,075	136,650,264	58%	43%
	All	4,698,731	777,164,014	95%	80%
>15th	0–49K	456,196	11,466,390	93%	93%
	50–99K	548,998	29,939,583	76%	76%
	100–249K	1,124,405	133,903,236	69%	69%
	250–499K	181,464	52,042,059	72%	71%
	500–999K	88,851	48,822,457	70%	69%
	1–2M	36,971	40,194,418	55%	55%
	2M+	12,520	44,185,454	37%	27%
	All	2,449,406	360,553,597	76%	65%

There is a downward trend in actual-to-expected ratios with increasing volume. The ratios for 1–2M and especially for 2M+ are much lower than for smaller amounts.

5.7 Premium amount

The premium amount is unknown for many records, including almost half in the first 15 policy years. Given that UL can allow considerable flexibility in premiums, it may be unwise to infer too much from the relationship between lapse rates and premium. Table 24 shows the experience for ranges of annualized premium and for “unknown”. The table is based on the standard subset of data.

Table 24. Experience by ranges of annualized premium for the standard subset of data. Expected lapses are calculated on LapseLCOI. Volume is sum assured in thousands.

	Annualized Premium	Exposure		Actual/Expected	
		Count	Vol (000)	Count	Volume
All	Unknown	2,859,387	522,002,384	73%	62%
	None	749,921	150,611,096	102%	79%
	1–249	336,749	18,248,771	98%	88%
	250–499	965,451	65,059,918	98%	92%
	500–999	1,143,960	107,010,642	98%	97%
	1000–1999	687,462	95,326,200	106%	105%
	2000+	405,208	179,458,600	104%	79%
	All	7,148,137	1,137,717,611	91%	77%
1–15th	Unknown	1,702,353	339,738,237	71%	61%
	None	669,038	124,508,240	103%	82%
	1–249	228,929	13,433,724	104%	92%
	250–499	587,850	39,404,718	105%	100%
	500–999	737,565	68,188,019	105%	104%
	1000–1999	487,227	65,670,993	112%	111%
	2000+	285,770	126,220,083	108%	81%
	All	4,698,731	777,164,014	95%	80%
>15th	Unknown	1,157,034	182,264,147	79%	68%
	None	80,883	26,102,856	90%	52%
	1–249	107,820	4,815,047	74%	67%
	250–499	377,602	25,655,200	75%	62%
	500–999	406,395	38,822,624	68%	61%
	1000–1999	200,235	29,655,207	71%	67%
	2000+	119,438	53,238,517	79%	60%
	All	2,449,406	360,553,597	76%	65%

5.8 Policy fund

Five of the eight companies provided some information on the amount of the fund in the LCOI policies. It seemed reasonable to study the impact of the size of fund on lapse, not by the absolute amount of the fund, but by the ratio of the fund to the volume of insurance. Since it has already been observed that lapse rates are lower for high-volume policies, a study of lapse by fund amount done in the same manner may simply reflect the difference by volume because the larger funds would tend to be with the larger policies. Table 25 shows lapse experience for various ranges in the ratio of the current fund to the current volume of insurance.

Current means the effective date chosen for the record; typically that would be the end of 2019 for policies in force and the prior year-end value for those that terminated during the study period. The first category is "0/unknown" because a record may show a zero fund either because the fund is zero or because the fund is not provided. The table is based on the standard subset of data.

Table 25. Experience by ranges of fund to sum assured for the standard subset of data. Expected lapses are calculated on LapseLCOI. Volume is sum assured in thousands.

Policy Year	Ratio of Fund to Ins	Exposure		Actual/Expected	
		Count	Vol (000)	Count	Volume
All	0/unknown	2,981,911	423,115,501	155%	147%
	0-1%	2,283,827	365,718,736	39%	29%
	1-2%	471,288	73,884,271	25%	16%
	2-5%	609,258	103,139,401	24%	16%
	5-10%	363,198	69,795,605	21%	12%
	10%+	438,655	102,064,098	25%	14%
	All	7,148,137	1,137,717,611	91%	77%
1–15th	0/unknown	2,305,450	340,318,031	148%	141%
	0-1%	1,724,402	275,856,888	39%	29%
	1-2%	198,768	35,786,201	29%	18%
	2-5%	221,825	47,206,632	28%	17%
	5-10%	115,695	31,088,246	26%	12%
	10%+	132,591	46,908,016	32%	14%
	All	4,698,731	777,164,014	95%	80%
>15th	0/unknown	676,458	82,797,201	209%	219%
	0-1%	559,420	89,861,509	38%	29%
	1-2%	272,520	38,098,070	19%	13%
	2-5%	387,426	55,932,582	19%	13%
	5-10%	247,494	38,706,938	18%	11%
	10%+	306,064	55,156,082	20%	14%
	All	2,449,381	360,552,382	76%	65%

Clearly the actual-to-expected ratios are substantially lower when the fund is positive, even if quite small compared to the volume of insurance. However, it is possible that the "0/unknown" category is artificially high and others artificially low because some contributing companies may have been unable to access the fund just prior to lapse, and therefore show zero.

5.9 Adjustability

The record specifications distinguished between guaranteed policies, those for which premiums are adjustable, those for which benefits are adjustable, and those for which both are adjustable. No records were submitted for the last category. Too few companies submitted data for adjustable policies to justify displaying results in this report.

6 Main Observations

The most significant observations from the study are:

1. Lapse rates, except for male smokers, for virtually all issue ages and policy years over 15 are under 1% and generally below 0.5% beyond attained ages of 70+.
2. Lapse rates decrease noticeably as duration increases for approximately the first 15 policy years, after which there is a slight downward trend.
3. Lapse rates are markedly lower than those reported in the prior studies.
4. Smoking status is much more important than gender for lapse rates.
5. Joint type is an important factor.
6. Lapse rates tend to decrease with increasing issue age.
7. Lapse rates generally decrease with increasing volume of insurance and strongly so for policies of at least $1 million.

7 Limitations

These observations are based on this industry study, which covers a range of product designs from different companies and different issue years with different target markets. The observations here may not be valid for a particular product and company.

Note that LapseLCOI reflects the experience contributed in the 2005–2012 study. LapseLCOI is not a table officially endorsed by the CIA. It may not be appropriate as a best estimate assumption for any particular company. It may be unwise for a company to adopt LapseLCOI, as is, for its own use. It is likely to be more appropriate for a company to develop its own lapse table or to modify LapseLCOI to fit its own business and experience.

8 Pivot tables

Pivot tables of the UL LCOI data are available on the CIA website. The pivot data include policies and volume, exposure, actual lapses and expected lapses, by sex, smoking, preferred, size group, and by issue age and policy year. More categories are available with groups of issue ages and policy years. The pivot data do not include adjustable policies and joint policies classified as "Other". See the worksheet "Describe". A sample pivot table is shown below.

PolYr	(All)
Age Group	40–44
Issue Age	(All)
Smoking	NS
Sex	(All)
Vol Band	(All)
Preferred	(All)

	Policy count					Volume in thousands				
PolYrGrp	**Pol Exposed**	**Pol Lapsed**	**P Lap Rate**	**P A/E Ratio**	**StdDev P A/E**	**Vol Exposed**	**Vol Lapsed**	**V Lap Rate**	**V A/E Ratio**	**StdDev V A/E**
01–05	125,430	5,652	4.5%	130%	1.5%	23,184,846	792,246	3.4%	101%	7.1%
06–10	166,456	2,618	1.6%	83%	1.8%	35,524,291	486,653	1.4%	72%	7.4%
11–15	181,618	2,223	1.2%	89%	2.0%	36,691,687	374,036	1.0%	75%	5.8%
16–20	172,172	1,272	0.7%	82%	2.5%	33,201,407	228,967	0.7%	77%	7.3%
21–25	93,182	625	0.7%	85%	3.7%	17,664,057	92,615	0.5%	66%	9.2%
26–30	24,856	152	0.6%	76%	7.1%	3,856,126	16,264	0.4%	53%	18.9%
31+	3,295	23	0.7%	87%	19.4%	278,789	2,140	0.8%	96%	35.1%
Total	**767,010**	**12,565**	**1.6%**	**101%**	**.9%**	**150,401,203**	**1,992,920**	**1.3%**	**82%**	**3.5%**

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