

AMERICAN ACADEMY OF ACTUARIES' LONG-TERM CARE (LTC) VALUATION WORK GROUP

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Presentation to NAIC LTC Actuarial Working Group - August 4, 2020

Requests of the LTC Valuation Work Group

- Develop a replacement mortality table for LTC active life reserves
 - Based on the 2012 Annuitant Mortality Table
 - Recommend a margin for conservatism
- Develop a replacement lapse table
 - Recommend a margin for conservatism
- Consider developing tables for valuation on total lives basis as well as active lives basis



Progress Since Fall National Meeting

- ❑ Completed review of actual-to-expected lapse on total lives basis
- ❑ Completed review of reasonableness of total terminations on total lives basis
- ❑ Developed mortality improvement from mid-point of exposure period, 2008 – 2011, to 2020 using scale G2
- ❑ Developed margins for lapse and mortality
- ❑ Developed lapse tables on an active lives basis



Remaining Tasks

- Develop mortality tables on an active lives basis
- Complete Report



Recommended Mortality Tables (Total Lives)



Death Counts (Total Lives)

By Sex, Risk Class, Attained Age, and Marital Status

Attained Age	Female: Preferred Risk			Female: Standard Risk			Male: Preferred Risk			Male: Standard Risk		
	Married	Single	Total	Married	Single	Total	Married	Single	Total	Married	Single	Total
Under 60	217	113	330	373	184	557	180	69	249	384	113	497
60-64	393	194	587	708	357	1,065	407	106	513	887	192	1,079
65-69	670	346	1,016	1,329	839	2,168	795	177	972	1,720	425	2,145
70-74	1,022	716	1,738	2,402	1,670	4,072	1,375	370	1,745	3,331	934	4,265
75	270	252	522	650	520	1,170	414	115	529	938	293	1,231
76	266	288	554	717	562	1,279	454	148	602	1,112	332	1,444
77	272	296	568	786	675	1,461	515	132	647	1,167	342	1,509
78	243	304	547	868	779	1,647	485	190	675	1,261	460	1,721
79	330	415	745	937	904	1,841	527	163	690	1,436	520	1,956
80	304	442	746	951	999	1,950	527	186	713	1,426	594	2,020
81	313	459	772	984	1,129	2,113	542	169	711	1,541	652	2,193
82	338	509	847	999	1,224	2,223	527	218	745	1,534	666	2,200
83	337	591	928	1,008	1,290	2,298	546	228	774	1,557	748	2,305
84	307	602	909	925	1,345	2,270	526	208	734	1,549	762	2,311
85	344	694	1,038	954	1,395	2,349	515	241	756	1,451	735	2,186
86	316	757	1,073	868	1,506	2,374	487	276	763	1,460	756	2,216
87	308	727	1,035	791	1,520	2,311	434	254	688	1,302	799	2,101
88	258	803	1,061	725	1,452	2,177	397	208	605	1,184	733	1,917
89	248	745	993	624	1,362	1,986	356	198	554	964	589	1,553
90-94	590	2,605	3,195	1,543	4,483	6,026	943	625	1,568	2,467	1,911	4,378
95 and over	112	914	1,026	266	1,542	1,808	199	171	370	360	463	823
Total	7,458	12,772	20,230	19,408	25,737	45,145	11,151	4,452	15,603	29,031	13,019	42,050



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Recommended Marital Status Adjustment Factors for Mortality Table (Total Lives)

Representative rates shown

Issue Age	Married Adjustment Factors														Ultimate	Attained Age
	Duration															
	1	2	3	4	5	*	*	*	26	27	28	29	30			
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
45	0.90	0.90	0.90	0.90	0.90	*	*	*	0.95	0.96	0.97	0.98	0.99	1.00	75	
46	0.90	0.90	0.90	0.90	0.90	*	*	*	0.95	0.96	0.97	0.98	0.99	1.00	76	
47	0.90	0.90	0.90	0.90	0.90	*	*	*	0.95	0.96	0.97	0.98	0.99	1.00	77	
48	0.90	0.90	0.90	0.90	0.90	*	*	*	0.95	0.96	0.97	0.98	0.99	1.00	78	
49	0.90	0.90	0.90	0.90	0.90	*	*	*	0.95	0.96	0.97	0.98	0.99	1.00	79	
50	0.90	0.90	0.90	0.90	0.90	*	*	*	0.95	0.96	0.97	0.98	0.99	1.00	80	
51	0.90	0.90	0.90	0.90	0.90	*	*	*	0.95	0.96	0.97	0.98	0.99	1.00	81	
52	0.90	0.90	0.90	0.90	0.90	*	*	*	0.95	0.96	0.97	0.98	0.99	1.00	82	
53	0.90	0.90	0.90	0.90	0.90	*	*	*	0.95	0.96	0.97	0.98	0.99	1.00	83	
54	0.90	0.90	0.90	0.90	0.90	*	*	*	0.95	0.96	0.97	0.98	0.99	1.00	84	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
80	0.95	0.95	0.95	0.95	0.95	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	110	
81	0.96	0.96	0.96	0.96	0.96	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	111	
82	0.96	0.96	0.96	0.96	0.96	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	112	
83	0.97	0.97	0.97	0.97	0.97	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	113	
84	0.97	0.97	0.97	0.98	0.98	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	114	
85	0.98	0.98	0.98	0.98	0.99	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	115	
86	0.98	0.98	0.98	0.99	0.99	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	116	
87	0.99	0.99	0.99	0.99	0.99	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	117	
88	0.99	0.99	0.99	0.99	0.99	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	118	
89	1.00	1.00	1.00	1.00	1.00	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	119	
90	1.00	1.00	1.00	1.00	1.00	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	120	

Issue Age	Not Married Adjustment Factors														Ultimate	Attained Age
	Duration															
	1	2	3	4	5	*	*	*	26	27	28	29	30			
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
45	1.28	1.28	1.28	1.28	1.28	*	*	*	1.14	1.11	1.08	1.06	1.03	1.00	75	
46	1.28	1.28	1.28	1.28	1.28	*	*	*	1.14	1.11	1.08	1.06	1.03	1.00	76	
47	1.28	1.28	1.28	1.28	1.28	*	*	*	1.14	1.11	1.08	1.06	1.03	1.00	77	
48	1.28	1.28	1.28	1.28	1.28	*	*	*	1.14	1.11	1.08	1.06	1.03	1.00	78	
49	1.28	1.28	1.28	1.28	1.28	*	*	*	1.14	1.11	1.08	1.06	1.03	1.00	79	
50	1.28	1.28	1.28	1.28	1.28	*	*	*	1.14	1.11	1.08	1.06	1.03	1.00	80	
51	1.28	1.28	1.28	1.28	1.28	*	*	*	1.14	1.11	1.08	1.06	1.03	1.00	81	
52	1.28	1.28	1.28	1.28	1.28	*	*	*	1.14	1.11	1.08	1.06	1.03	1.00	82	
53	1.28	1.28	1.28	1.28	1.28	*	*	*	1.14	1.11	1.08	1.06	1.03	1.00	83	
54	1.28	1.28	1.28	1.28	1.28	*	*	*	1.14	1.11	1.08	1.06	1.03	1.00	84	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
80	1.00	1.00	1.00	1.00	1.00	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	110	
81	1.00	1.00	1.00	1.00	1.00	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	111	
82	1.00	1.00	1.00	1.00	1.00	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	112	
83	1.00	1.00	1.00	1.00	1.00	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	113	
84	1.00	1.00	1.00	1.00	1.00	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	114	
85	1.00	1.00	1.00	1.00	1.00	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	115	
86	1.00	1.00	1.00	1.00	1.00	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	116	
87	1.00	1.00	1.00	1.00	1.00	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	117	
88	1.00	1.00	1.00	1.00	1.00	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	118	
89	1.00	1.00	1.00	1.00	1.00	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	119	
90	1.00	1.00	1.00	1.00	1.00	*	*	*	1.00	1.00	1.00	1.00	1.00	1.00	120	

Recommended Lapse Tables

(Total Lives and Active Lives)



Recommended Individual Lapse Table (Total Lives)

Policy Year	Issue Age Group						Marital Status Adjustment Factor			Underwriting Class Adjustment Factor		
	Under 55	55-59	60-64	65-69	70-74	75 & Over	Married	Single	Unknown	Preferred	Standard	Sub-standard
1	5.2%	2.9%	3.9%	3.7%	4.6%	6.6%	0.89	1.47	1.00	1.04	0.88	1.16
2	4.5%	2.6%	2.5%	2.6%	3.2%	4.7%	0.88	1.49	1.00	1.07	0.84	1.14
3	3.9%	2.2%	2.0%	2.1%	2.6%	3.8%	0.87	1.52	1.00	1.08	0.82	1.12
4	3.4%	2.0%	1.6%	1.9%	2.2%	3.2%	0.86	1.53	1.00	1.09	0.82	1.11
5	2.9%	1.7%	1.4%	1.6%	2.0%	2.9%	0.85	1.54	1.00	1.09	0.82	1.09
6	2.6%	1.5%	1.3%	1.5%	1.9%	2.6%	0.84	1.55	1.00	1.09	0.84	1.07
7	2.2%	1.3%	1.1%	1.4%	1.7%	2.5%	0.83	1.55	1.00	1.07	0.88	1.05
8	1.9%	1.2%	1.0%	1.3%	1.6%	2.3%	0.82	1.54	1.00	1.05	0.92	1.03
9	1.6%	1.0%	0.9%	1.2%	1.5%	2.1%	0.82	1.53	1.00	1.03	0.98	1.02
10	1.4%	0.9%	0.9%	1.2%	1.4%	2.0%	0.81	1.52	1.00	0.99	1.06	1.00
11	1.2%	0.8%	0.9%	1.1%	1.4%	2.0%	0.81	1.50	1.00	0.95	1.14	0.98
12	1.0%	0.7%	0.8%	1.0%	1.3%	1.9%	0.80	1.48	1.00	0.95	1.14	0.98
13	0.9%	0.6%	0.8%	1.0%	1.3%	1.8%	0.80	1.45	1.00	0.95	1.14	0.98
14	0.8%	0.5%	0.8%	0.9%	1.2%	1.7%	0.79	1.41	1.00	0.95	1.14	0.98
15	0.7%	0.4%	0.7%	0.9%	1.1%	1.7%	0.79	1.37	1.00	0.95	1.14	0.98
16 & Over	0.6%	0.4%	0.7%	0.9%	1.1%	1.6%	0.79	1.33	1.00	0.95	1.14	0.98



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Recommended Group Lapse Table (Total Lives)

Policy Year	Issue Age Group						
	Under 35	35-39	40-44	45-49	50-54	55-59	60 & Over
1	19.4%	13.8%	11.2%	9.0%	7.8%	8.0%	6.9%
2	16.7%	11.4%	9.4%	7.6%	6.5%	6.5%	5.6%
3	14.2%	9.5%	7.8%	6.4%	5.4%	5.2%	4.5%
4	12.0%	7.9%	6.5%	5.4%	4.5%	4.2%	3.6%
5	9.9%	6.5%	5.5%	4.5%	3.8%	3.4%	2.9%
6	8.1%	5.4%	4.6%	3.8%	3.1%	2.8%	2.3%
7	6.5%	4.5%	3.8%	3.2%	2.6%	2.2%	1.9%
8	5.2%	3.7%	3.2%	2.7%	2.2%	1.8%	1.5%
9	4.0%	3.1%	2.7%	2.3%	1.8%	1.5%	1.2%
10	3.1%	2.5%	2.2%	1.9%	1.5%	1.2%	1.0%
11	2.4%	2.1%	1.9%	1.6%	1.3%	1.0%	0.8%
12	2.4%	2.1%	1.9%	1.6%	1.3%	1.0%	0.8%
13	2.4%	2.1%	1.9%	1.6%	1.3%	1.0%	0.8%
14	2.4%	2.1%	1.9%	1.6%	1.3%	1.0%	0.8%
15	2.4%	2.1%	1.9%	1.6%	1.3%	1.0%	0.8%
16 & Over	1.9%	1.7%	1.5%	1.4%	1.1%	0.8%	0.6%



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Recommended Individual Lapse Table (Active Lives)

Policy Year	Issue Age Group						Marital Status Adjustment Factor			Underwriting Class Adjustment Factor		
	Under 55	55-59	60-64	65-69	70-74	75 & Over	Married	Single	Unknown	Preferred	Standard	Sub-standard
1	5.2%	2.9%	3.9%	3.7%	4.6%	6.6%	0.89	1.47	1.00	1.04	0.88	1.16
2	4.5%	2.6%	2.5%	2.6%	3.2%	4.8%	0.88	1.49	1.00	1.07	0.84	1.14
3	3.9%	2.2%	2.0%	2.1%	2.6%	4.1%	0.87	1.52	1.00	1.08	0.82	1.12
4	3.4%	2.0%	1.6%	1.9%	2.3%	3.6%	0.86	1.53	1.00	1.09	0.82	1.11
5	2.9%	1.7%	1.4%	1.7%	2.1%	3.2%	0.85	1.54	1.00	1.09	0.82	1.09
6	2.6%	1.5%	1.3%	1.5%	2.0%	3.0%	0.84	1.55	1.00	1.09	0.84	1.07
7	2.2%	1.4%	1.2%	1.4%	1.8%	2.8%	0.83	1.55	1.00	1.07	0.88	1.05
8	1.9%	1.2%	1.1%	1.4%	1.7%	2.6%	0.82	1.54	1.00	1.05	0.92	1.03
9	1.6%	1.0%	1.0%	1.3%	1.6%	2.6%	0.82	1.53	1.00	1.03	0.98	1.02
10	1.4%	0.9%	0.9%	1.2%	1.5%	2.4%	0.81	1.52	1.00	0.99	1.06	1.00
11	1.3%	0.8%	0.9%	1.2%	1.4%	2.3%	0.81	1.50	1.00	0.95	1.14	0.98
12	1.1%	0.7%	0.9%	1.1%	1.4%	2.2%	0.80	1.48	1.00	0.95	1.14	0.98
13	0.9%	0.6%	0.8%	1.1%	1.4%	2.1%	0.80	1.45	1.00	0.95	1.14	0.98
14	0.8%	0.5%	0.8%	1.0%	1.3%	2.0%	0.79	1.41	1.00	0.95	1.14	0.98
15	0.7%	0.5%	0.8%	1.0%	1.3%	2.0%	0.79	1.37	1.00	0.95	1.14	0.98
16 & Over	0.6%	0.4%	0.7%	0.9%	1.2%	2.0%	0.79	1.33	1.00	0.95	1.14	0.98



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Recommended Group Lapse Table (Active Lives)

Policy Year	Issue Age Group						
	Under 35	35-39	40-44	45-49	50-54	55-59	60 & Over
1	19.4%	13.8%	11.2%	9.0%	7.8%	8.0%	6.9%
2	16.7%	11.5%	9.4%	7.6%	6.5%	6.5%	5.6%
3	14.2%	9.5%	7.8%	6.4%	5.4%	5.2%	4.5%
4	12.0%	7.9%	6.5%	5.4%	4.5%	4.3%	3.7%
5	9.9%	6.5%	5.5%	4.5%	3.8%	3.5%	3.0%
6	8.1%	5.4%	4.6%	3.8%	3.2%	2.8%	2.5%
7	6.5%	4.5%	3.8%	3.2%	2.6%	2.3%	2.0%
8	5.2%	3.7%	3.2%	2.7%	2.2%	1.9%	1.7%
9	4.0%	3.1%	2.7%	2.3%	1.8%	1.5%	1.4%
10	3.1%	2.6%	2.2%	1.9%	1.5%	1.3%	1.1%
11	2.4%	2.1%	1.9%	1.6%	1.3%	1.0%	0.9%
12	2.4%	2.1%	1.9%	1.6%	1.3%	1.0%	0.9%
13	2.4%	2.1%	1.9%	1.6%	1.3%	1.0%	0.9%
14	2.4%	2.1%	1.9%	1.6%	1.3%	1.0%	0.9%
15	2.4%	2.1%	1.9%	1.6%	1.3%	1.0%	0.9%
16 & Over	1.9%	1.8%	1.5%	1.4%	1.1%	0.8%	0.7%

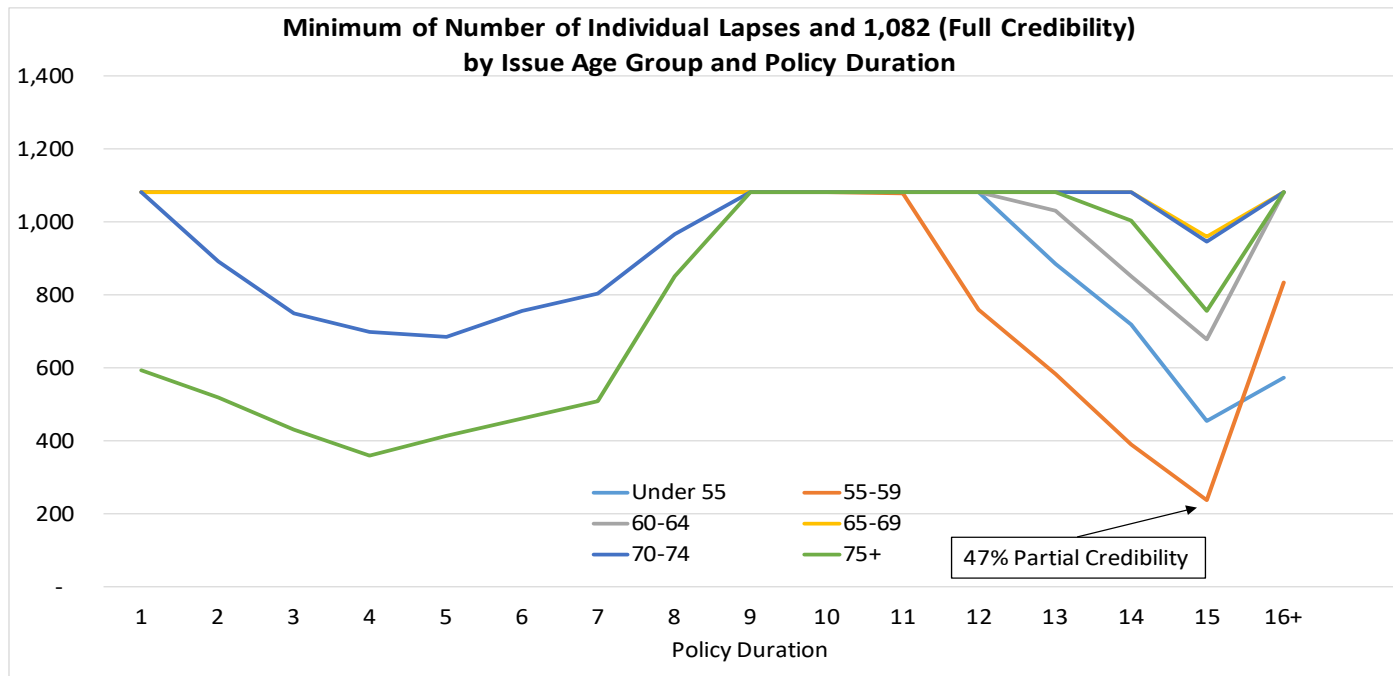


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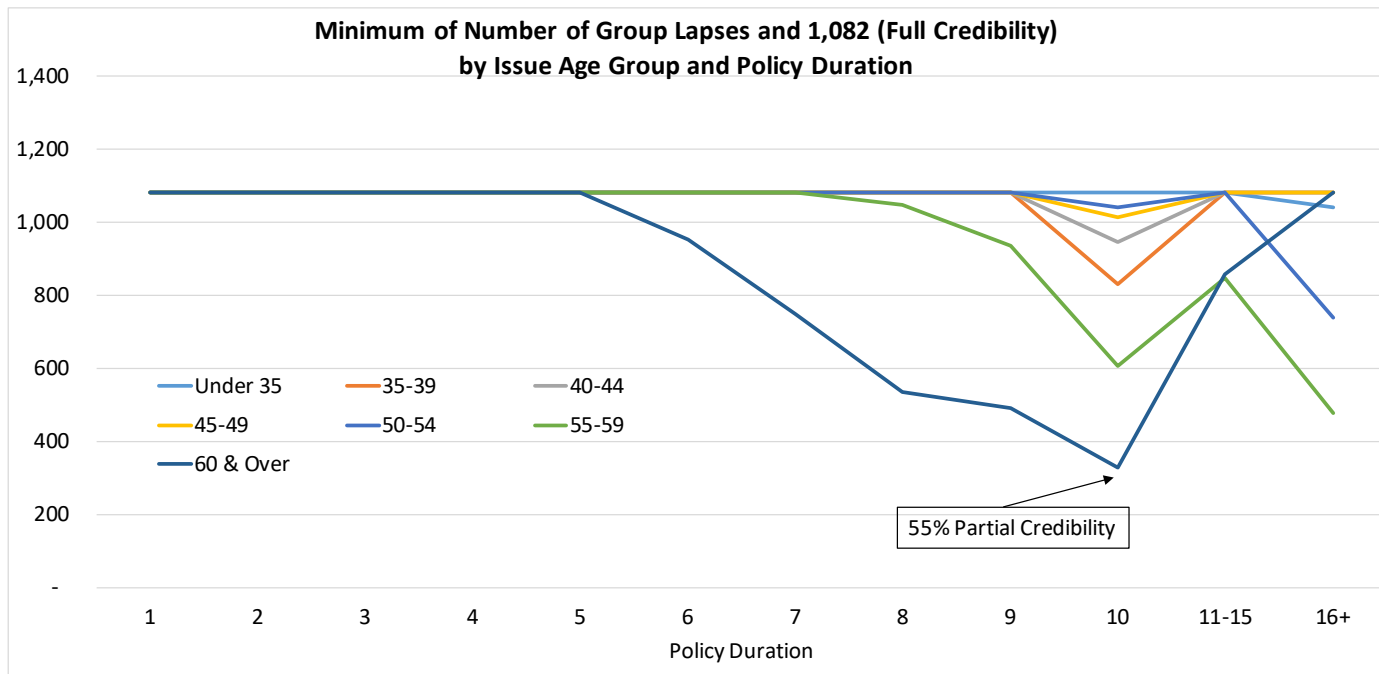
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Data Credibility for Individual Lapses



Data Credibility for Group Lapses



Mortality Improvement to 2020



Recommended Mortality Improvement

- The study period is 2008 through 2011
- Recommend to apply improvement trend using the 2012 IAM G2 scale from 2010 to 2020 (11 years)
- Recommended tables represent industry experience as of 2020
- G2 scale applies to both total lives and active lives



Alternatives for Mortality Improvement

- The mortality tables can be made dynamic by continuing to apply the G2 scale to future valuation dates
- For first principle valuation approach, G2 scale can be applied to both active lives and disabled lives



Recommended Margins

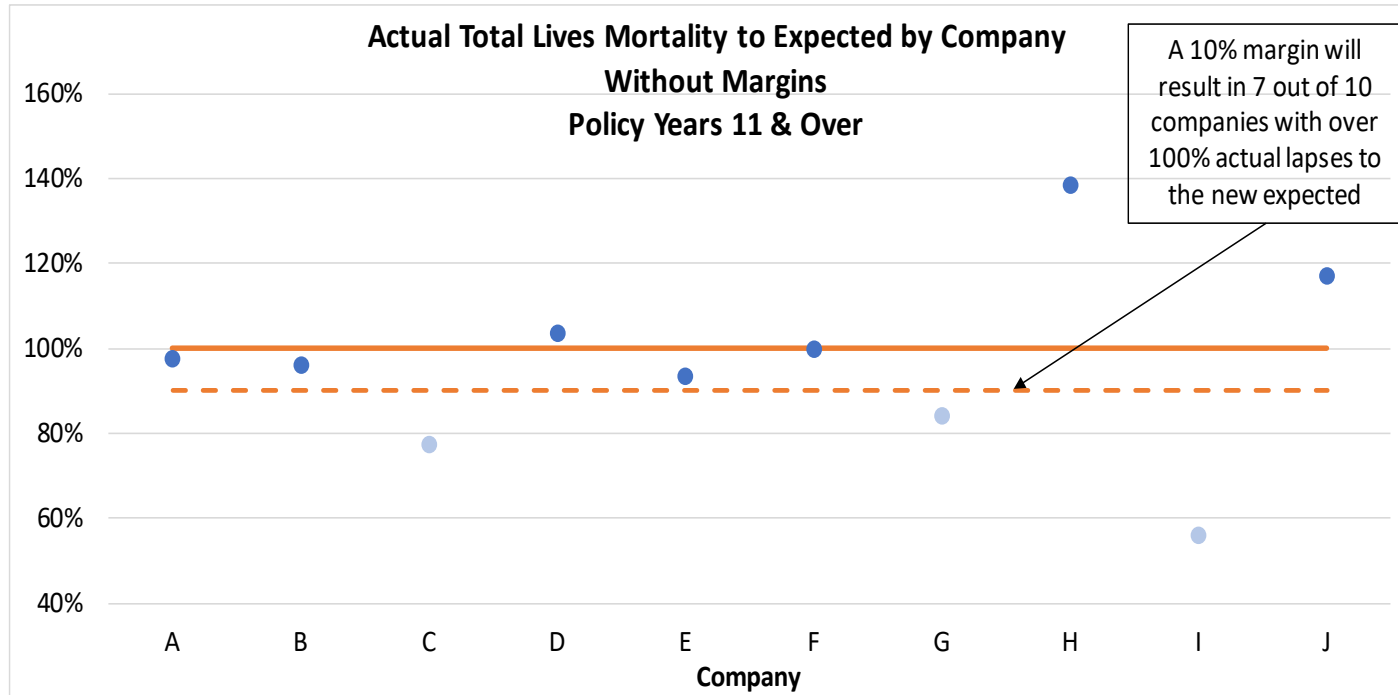


Recommended Margins

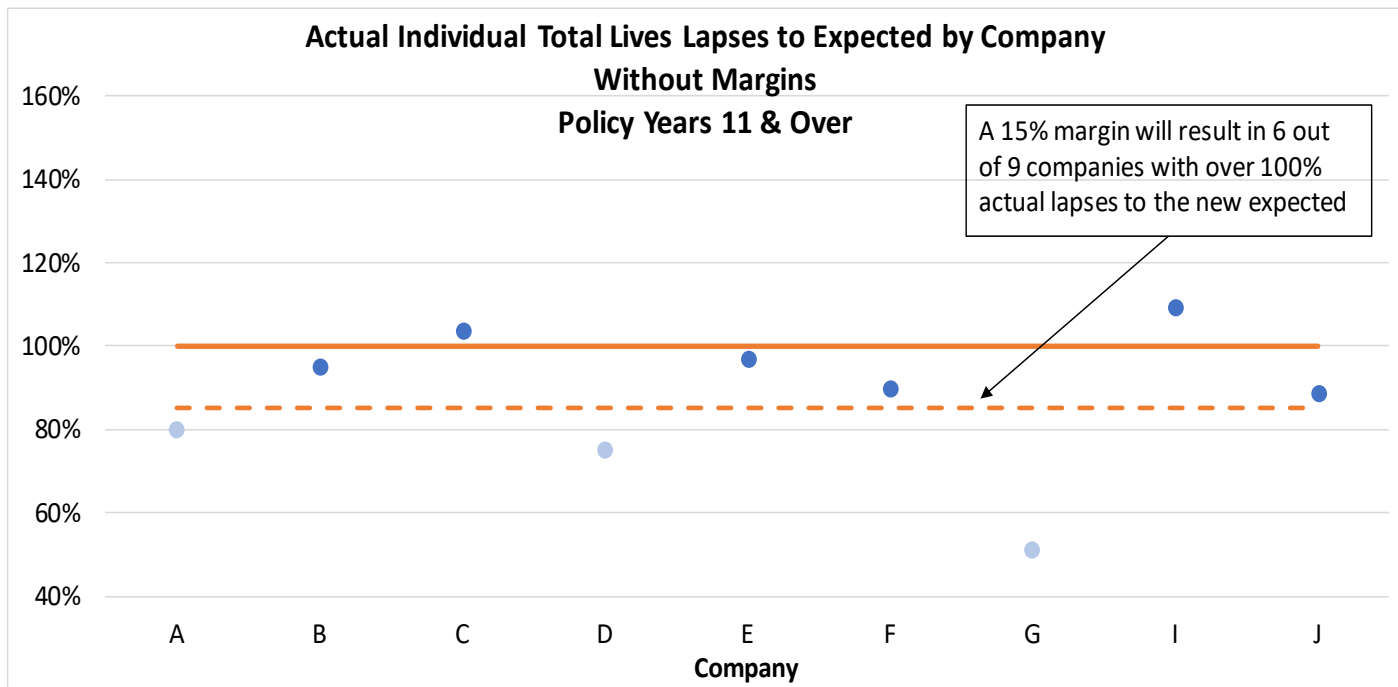
- 10% for mortality
- 15% for lapse
- Same for total lives and active lives



Actual Total Lives Mortality to Expected (Based on Recommended Tables) By Company



Actual Individual Total Lives Lapses to Expected (Based on Recommended Tables) By Company

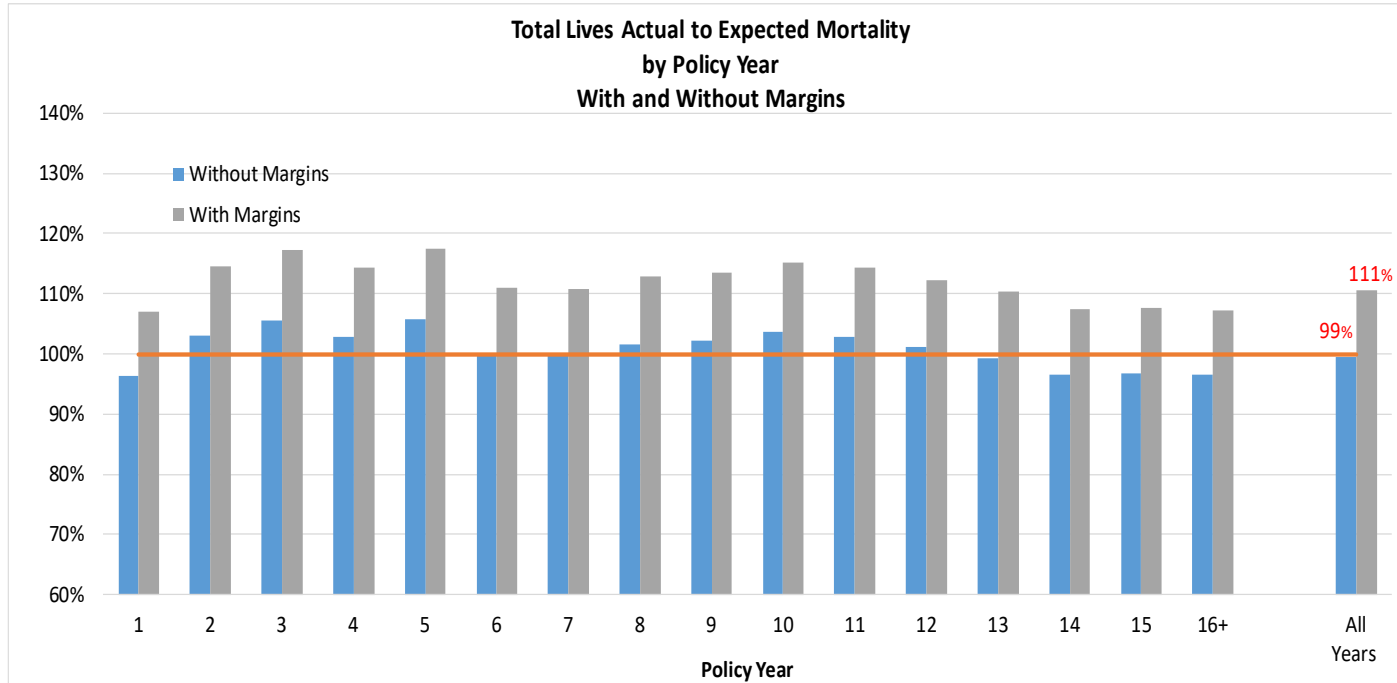


Actual to Expected Mortality Rates

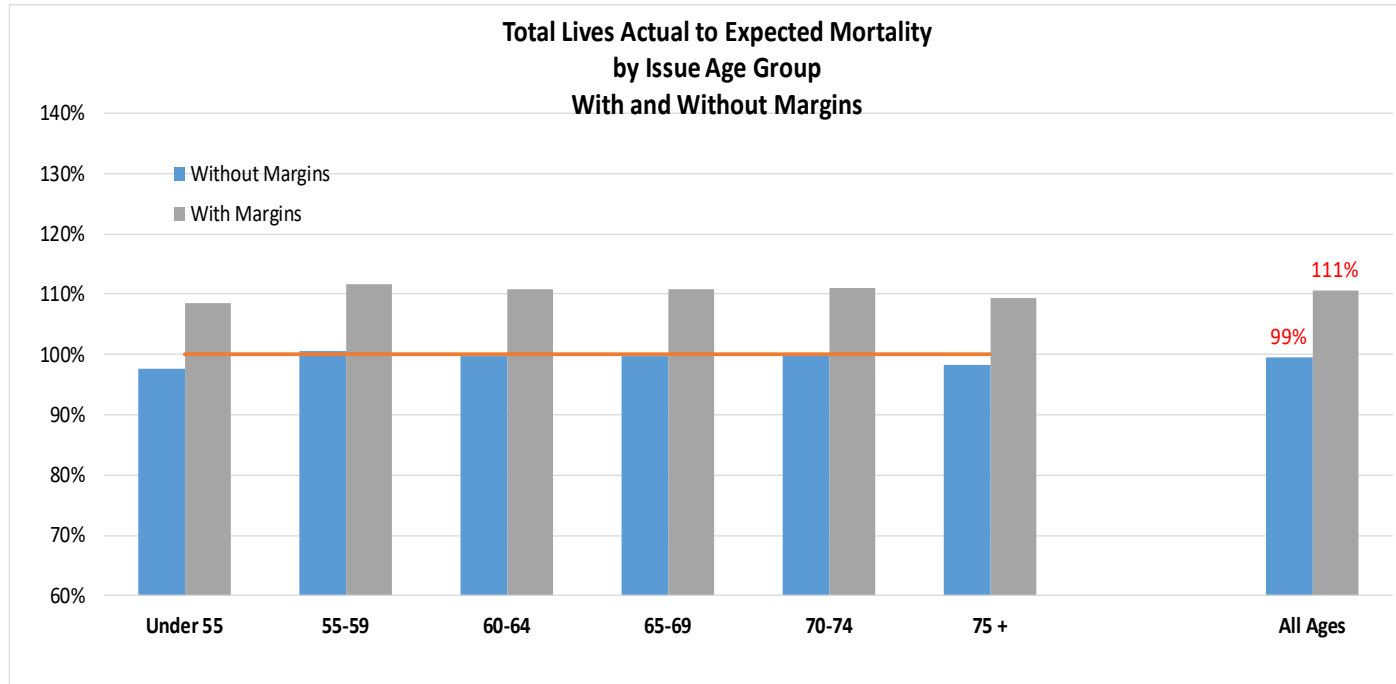
(Expected Based on Recommended Tables)



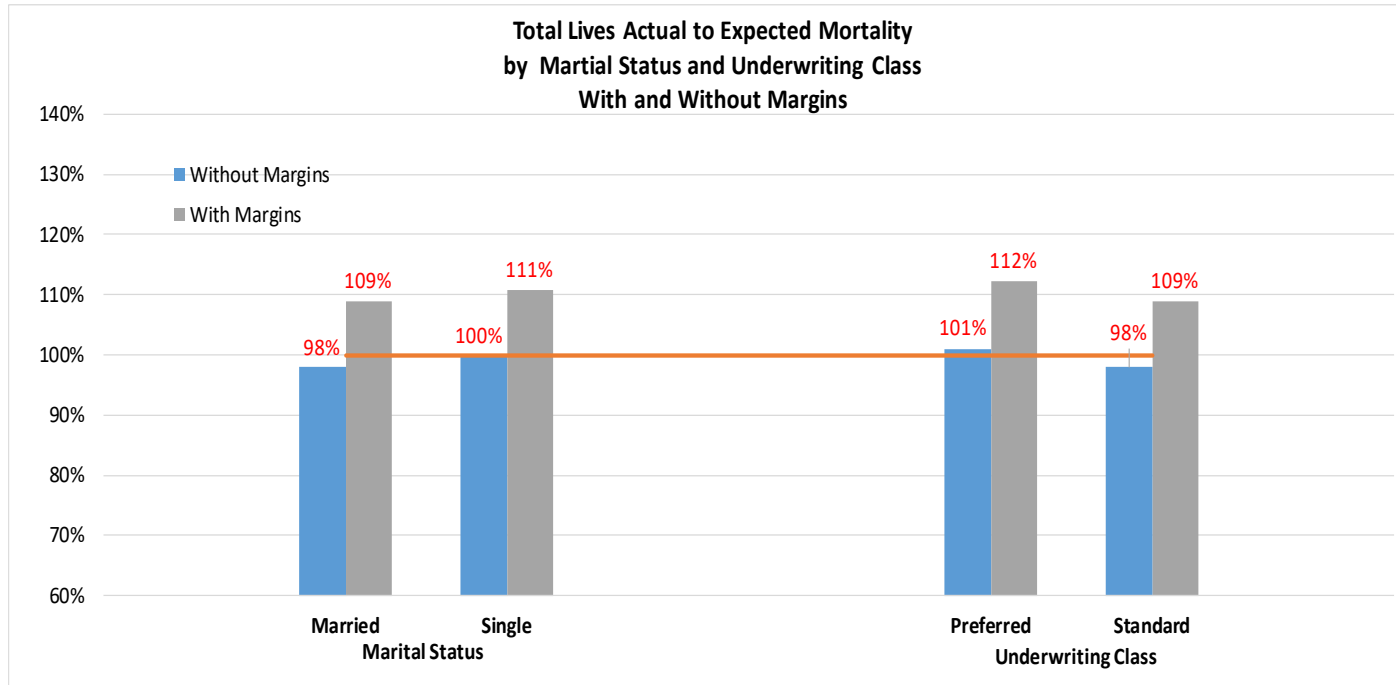
Actual Total Lives Mortality to Expected By Policy Year



Actual Total Lives Mortality to Expected By Issue Age Group



Actual Total Lives Mortality to Expected By Marital Status and Underwriting Class

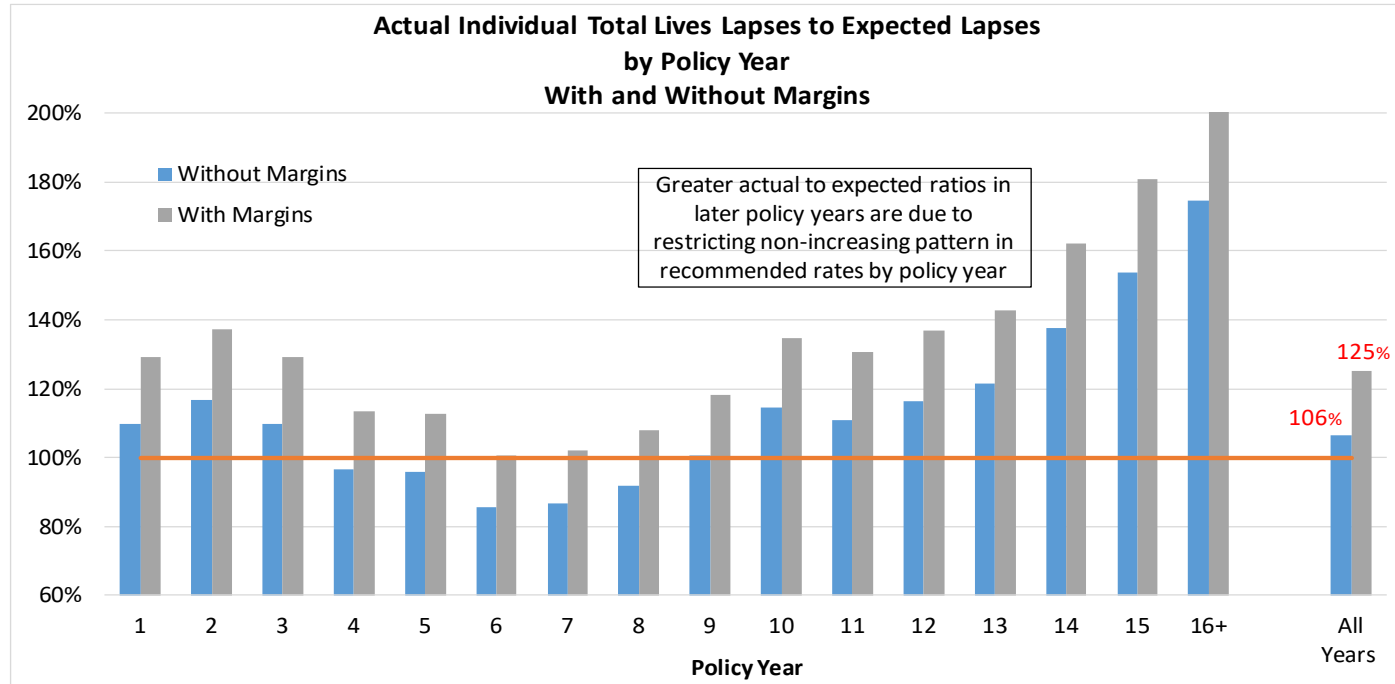


Actual to Expected Lapse Rates

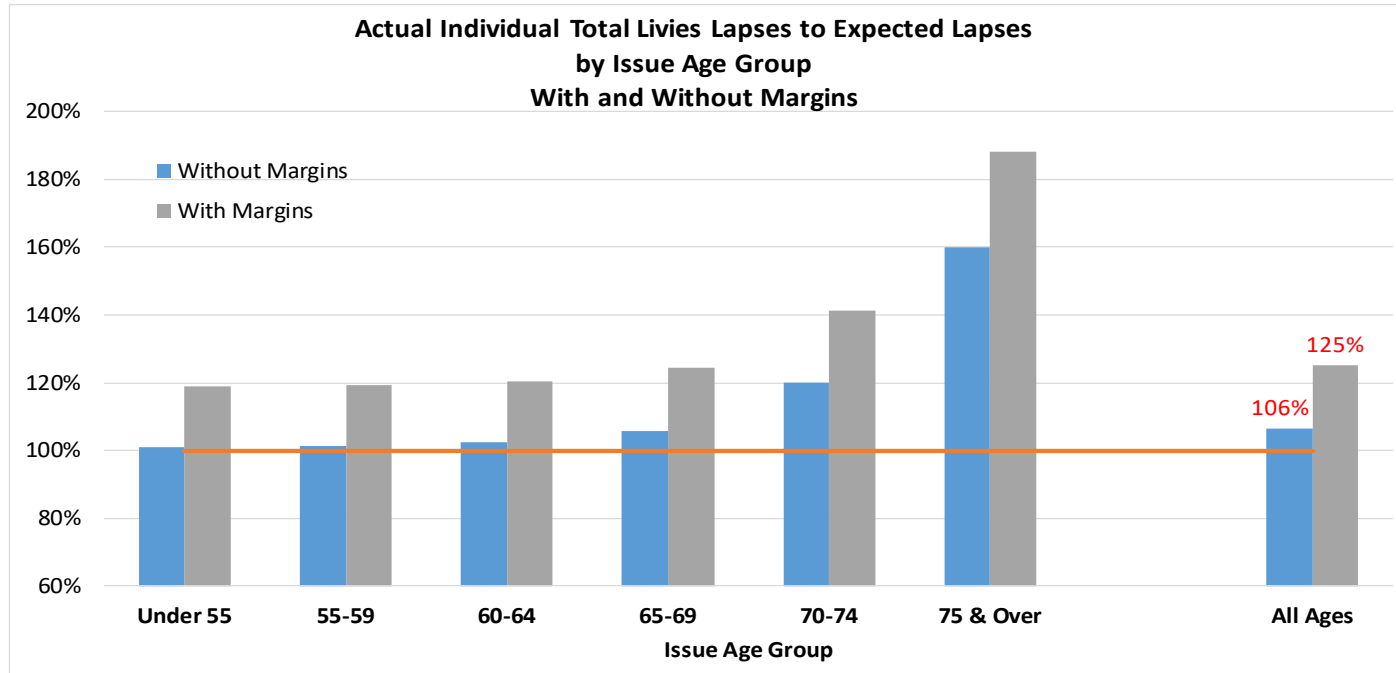
(Expected Based on Recommended)



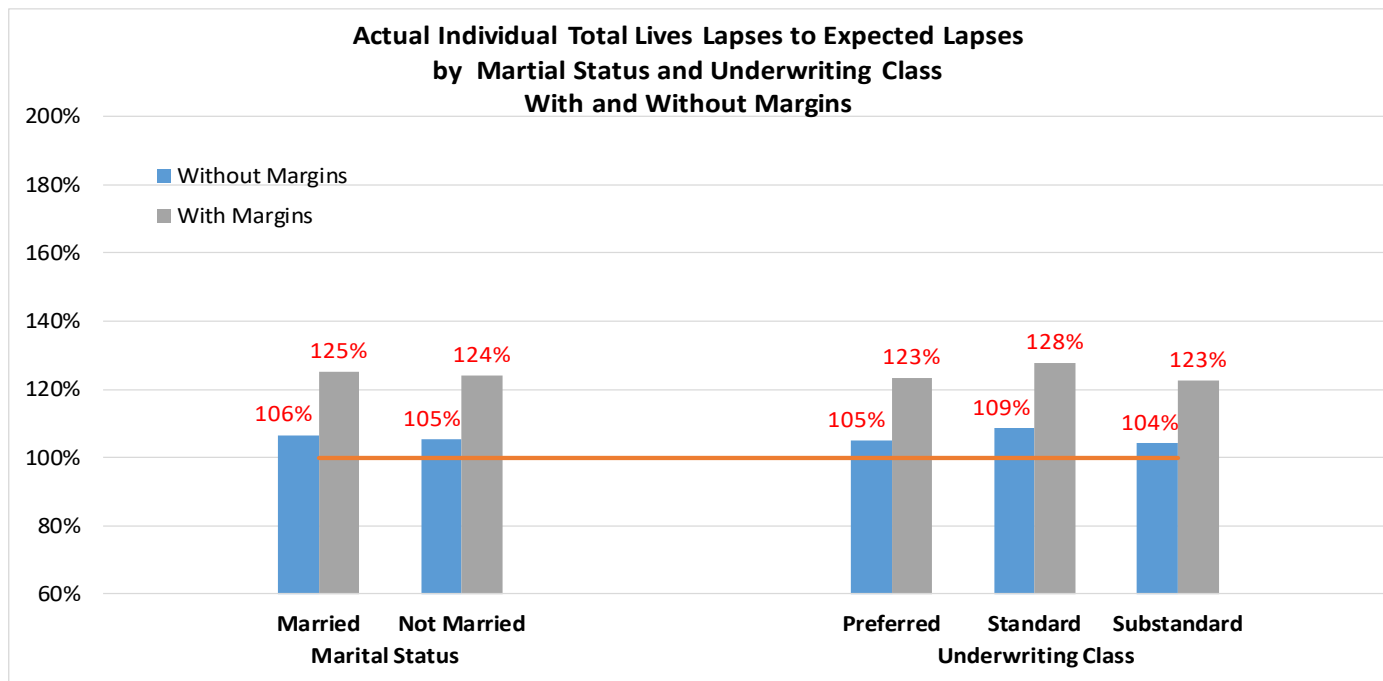
Actual Individual Total Lives Lapses to Expected By Policy Year



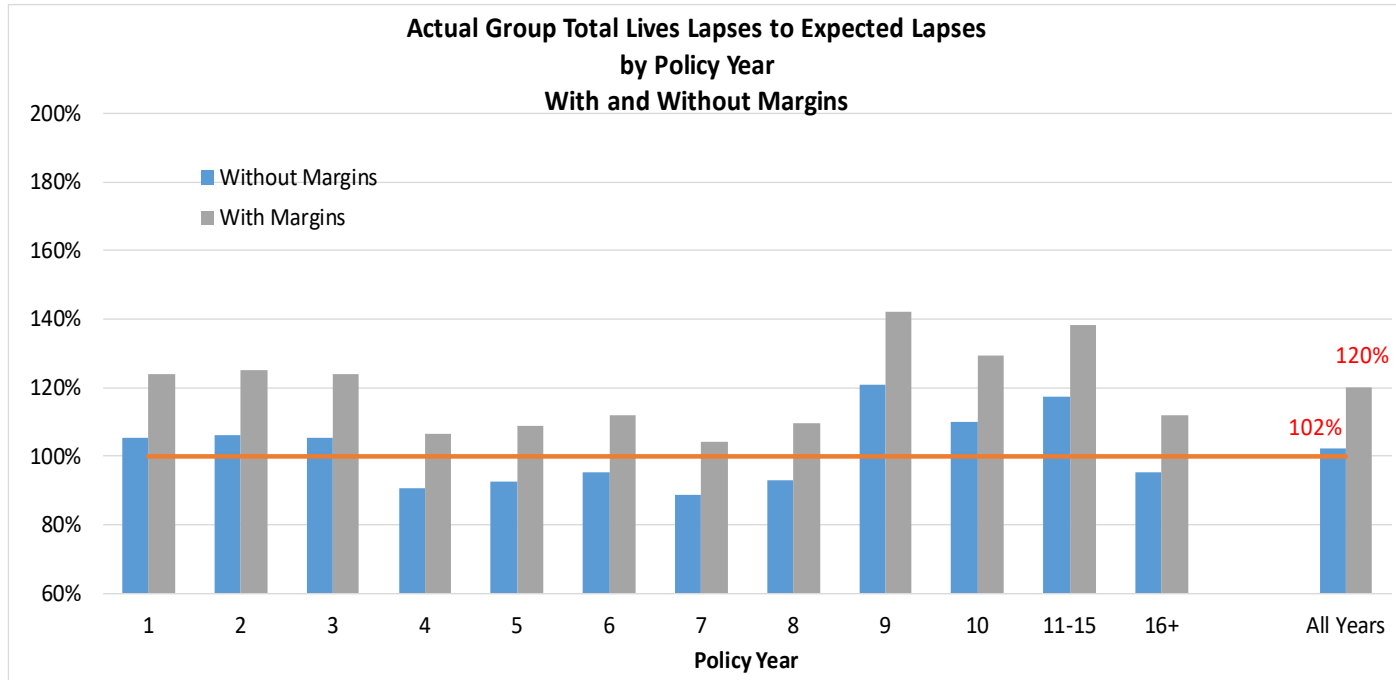
Actual Individual Total Lives Lapses to Expected By Issue Age Group



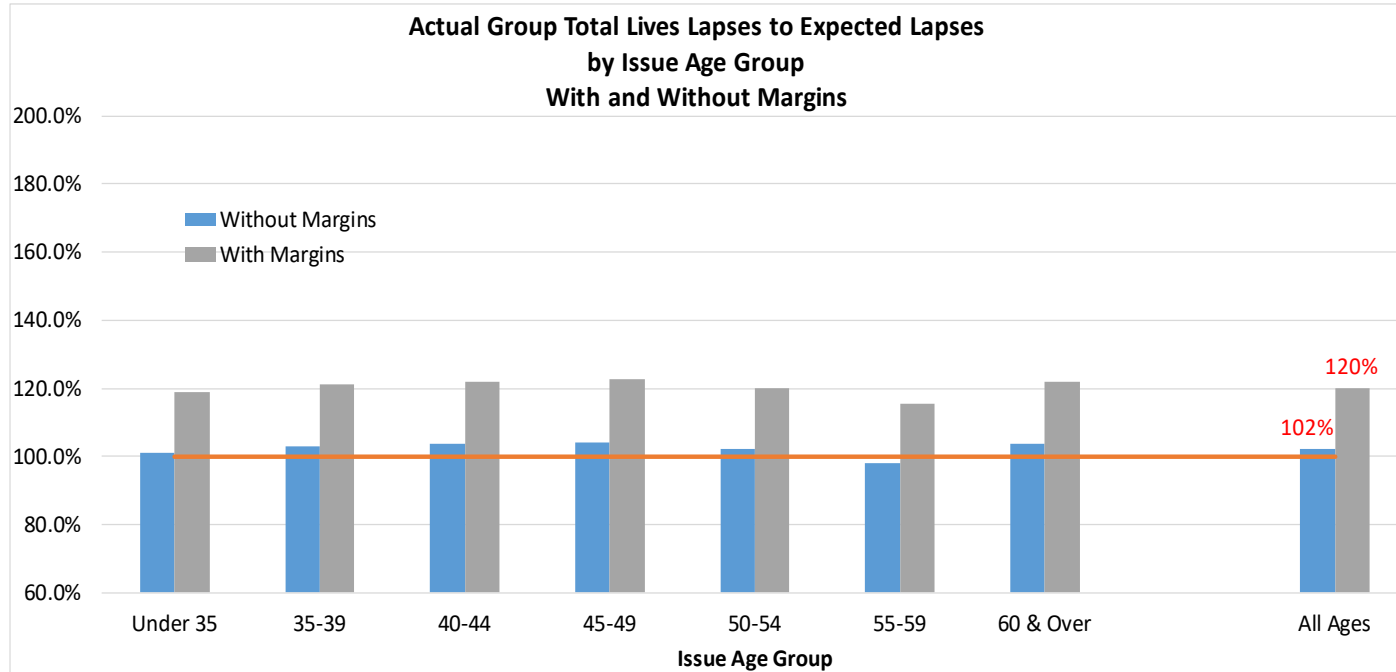
Actual Individual Total Lives Lapses to Expected By Marital Status and Underwriting Class



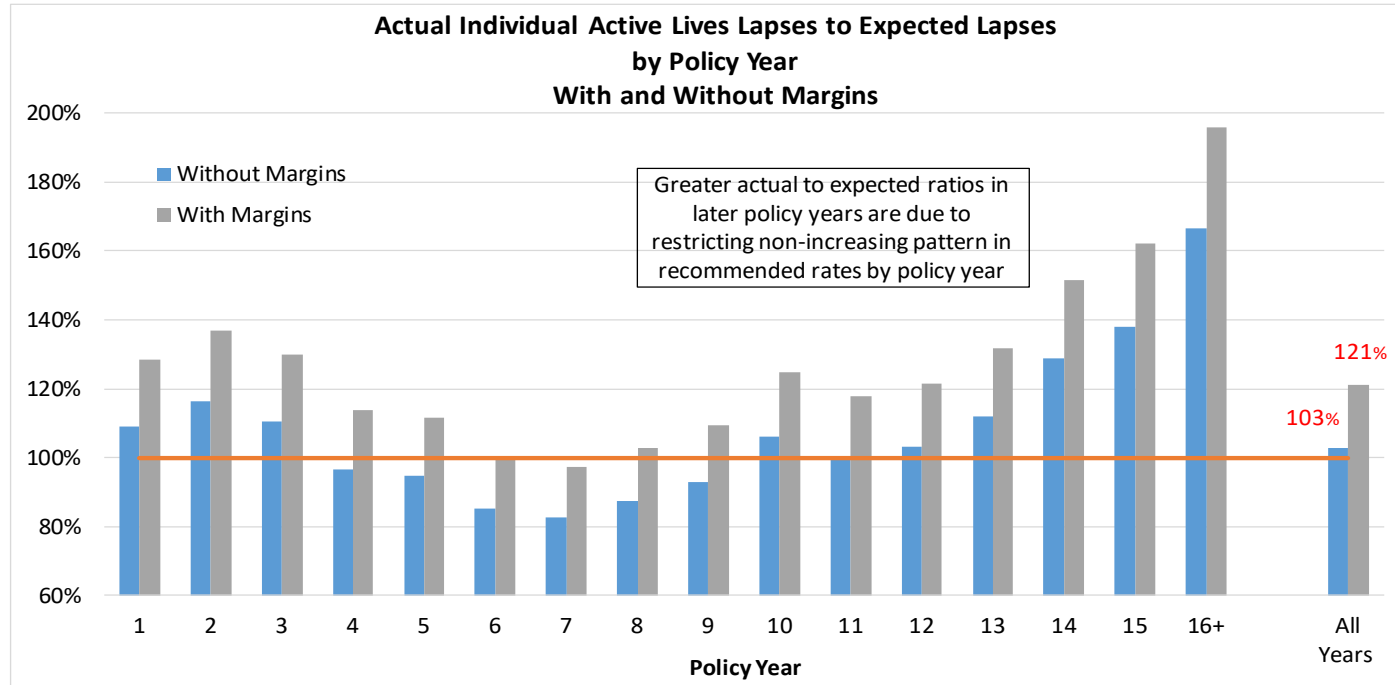
Actual Group Total Lives Lapses to Expected By Policy Year



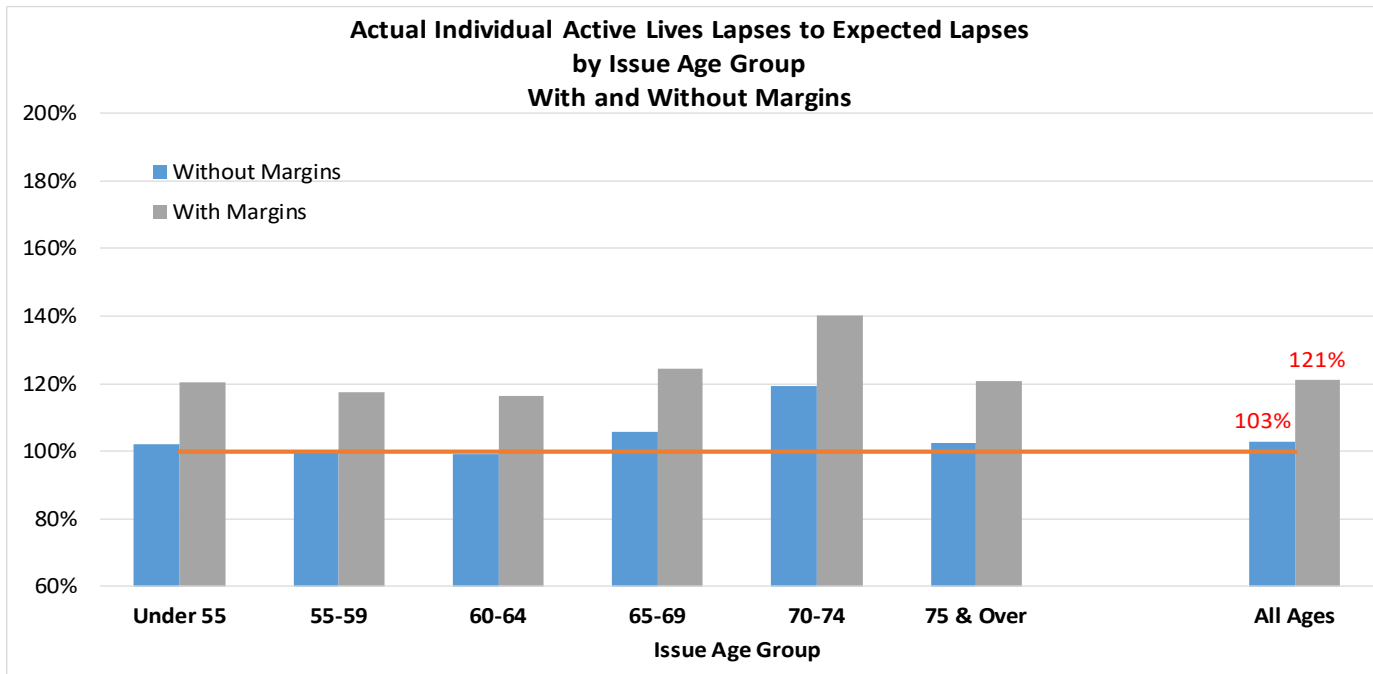
Actual Group Total Lives Lapses to Expected By Issue Age Group



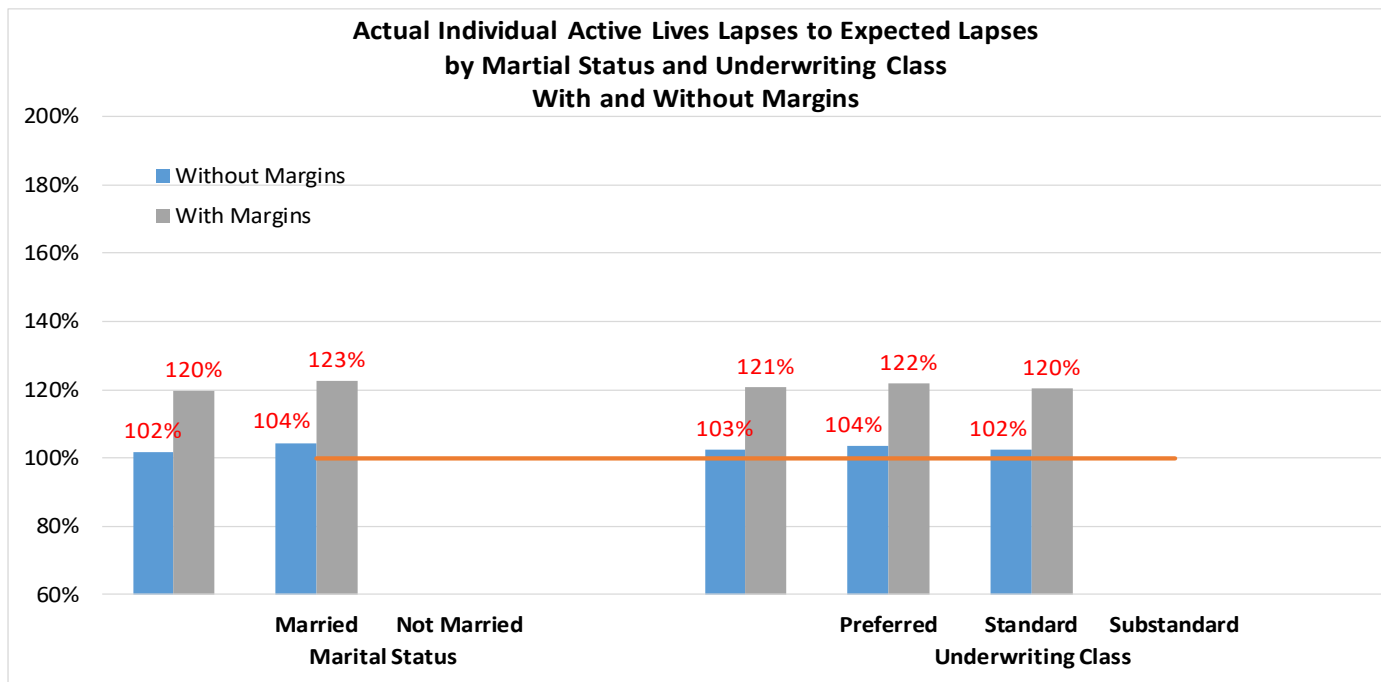
Actual Individual Active Lives Lapses to Lapses By Policy Year



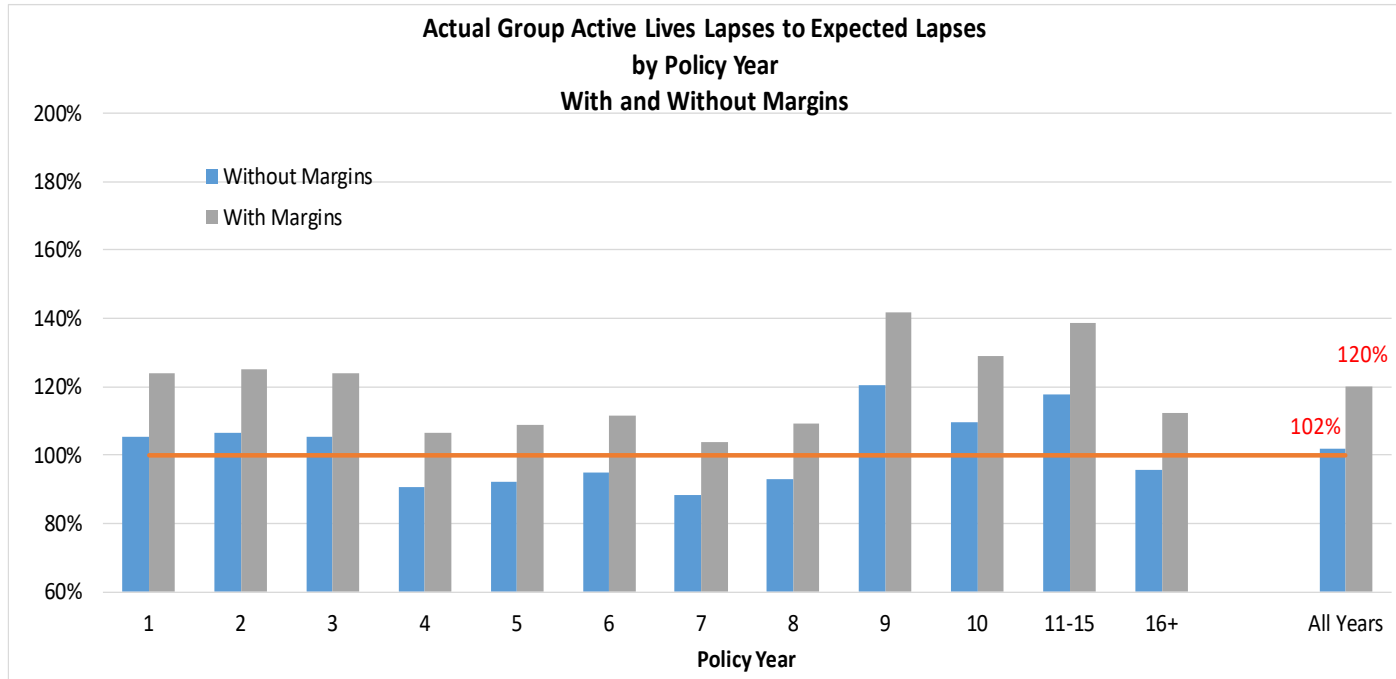
Actual Individual Active Lives Lapses to Expected By Issue Age Group



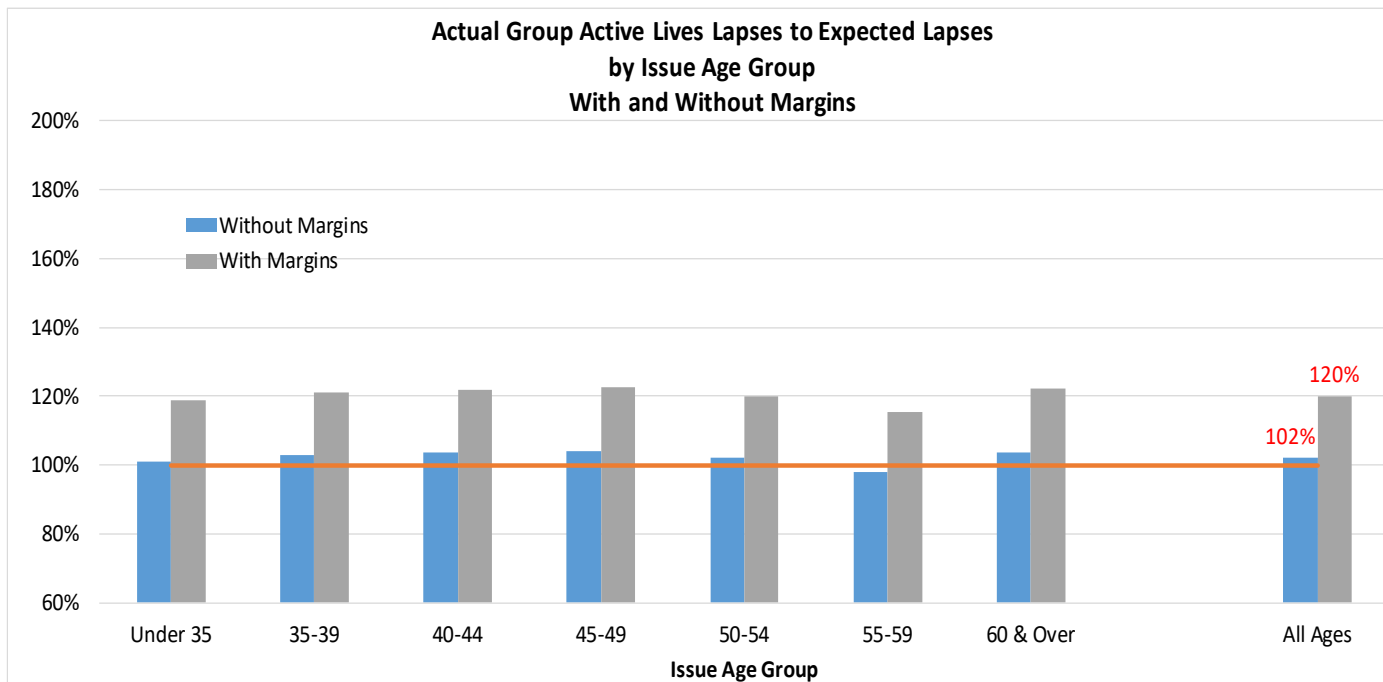
Actual Individual Active Lives Lapses to Expected By Marital Status and Underwriting Class



Actual Group Active Lives Lapses to Expected By Policy Year



Actual Group Active Lives Lapses to Expected By Issue Age Group

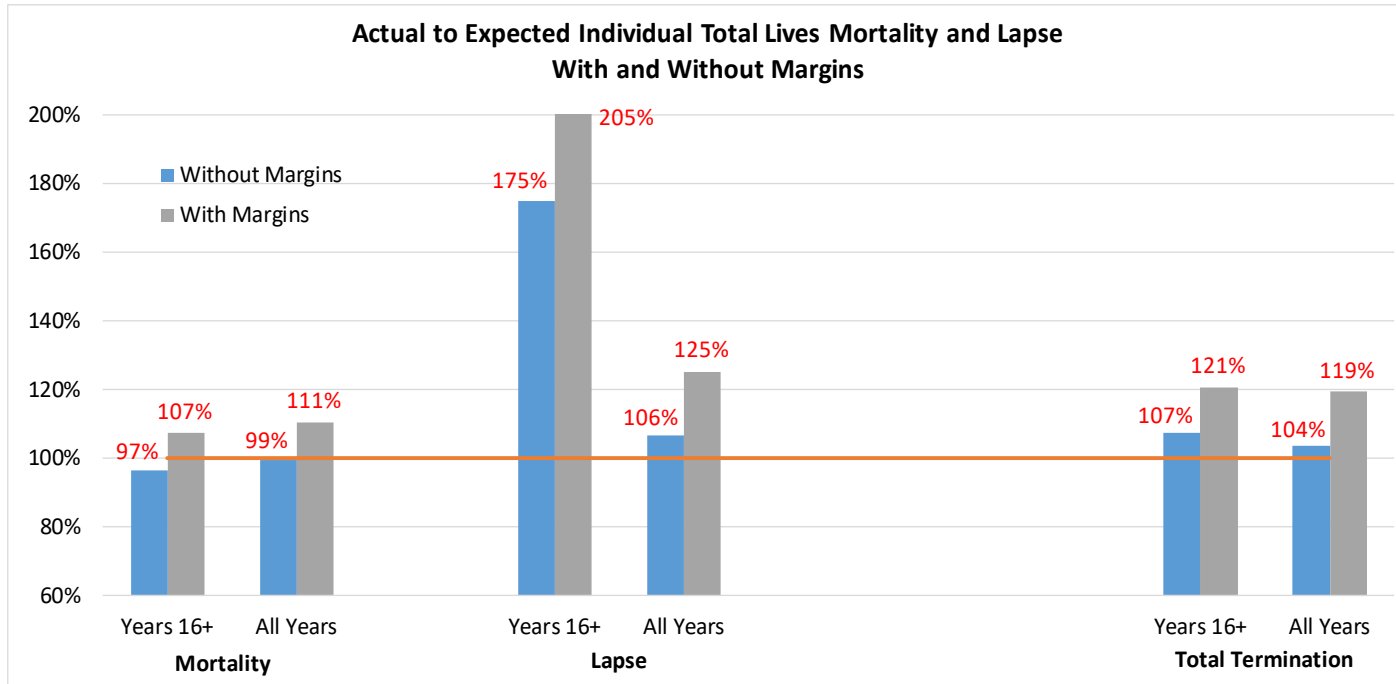


Actual to Expected Total Policy Termination Rates

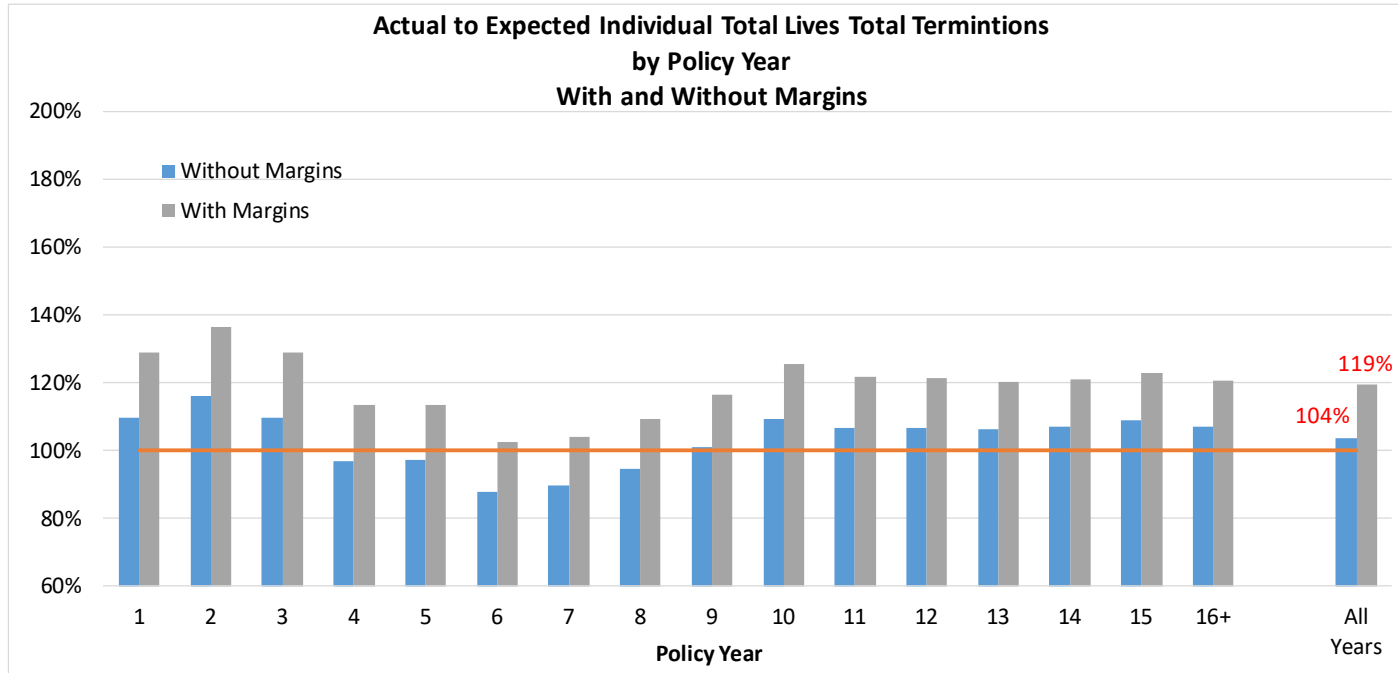
(Mortality and Lapse Combined – Total Lives Only)



Actual Individual Total Lives to Expected by Mortality and Lapse



Actual Individual Total Lives Total Terminations to Expected by Policy Year

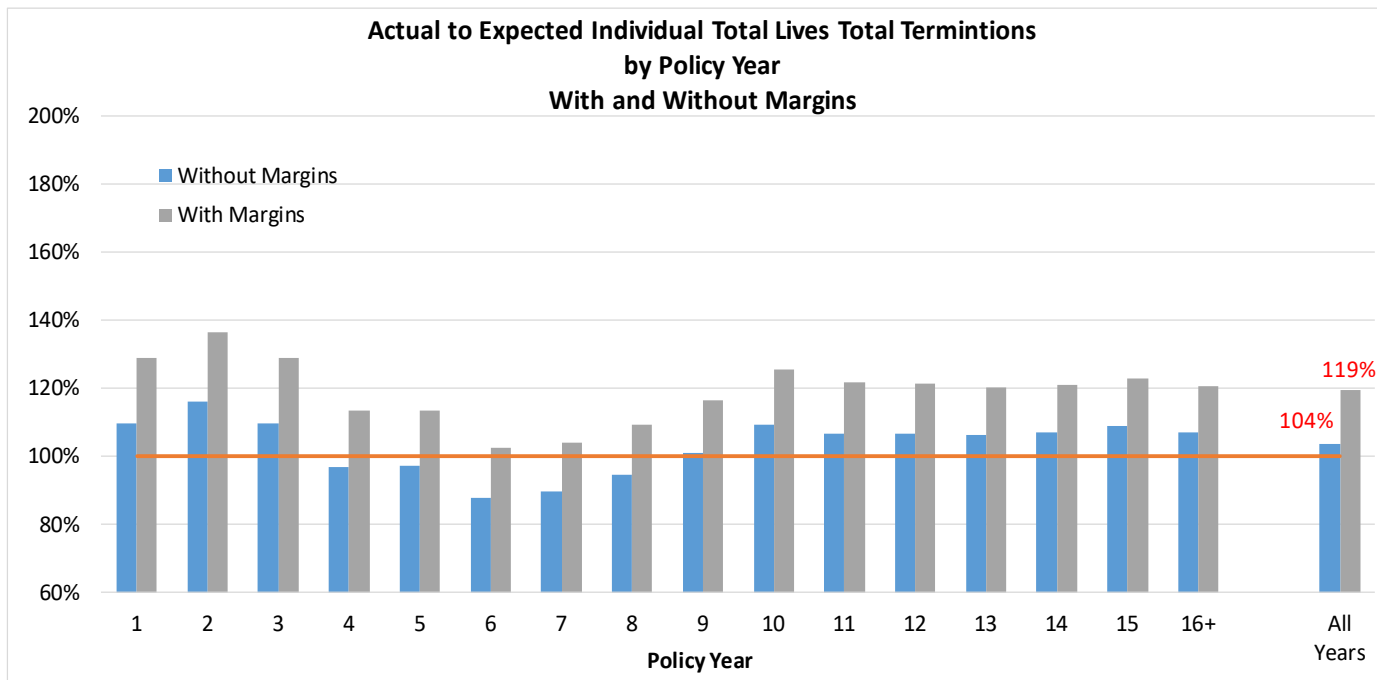


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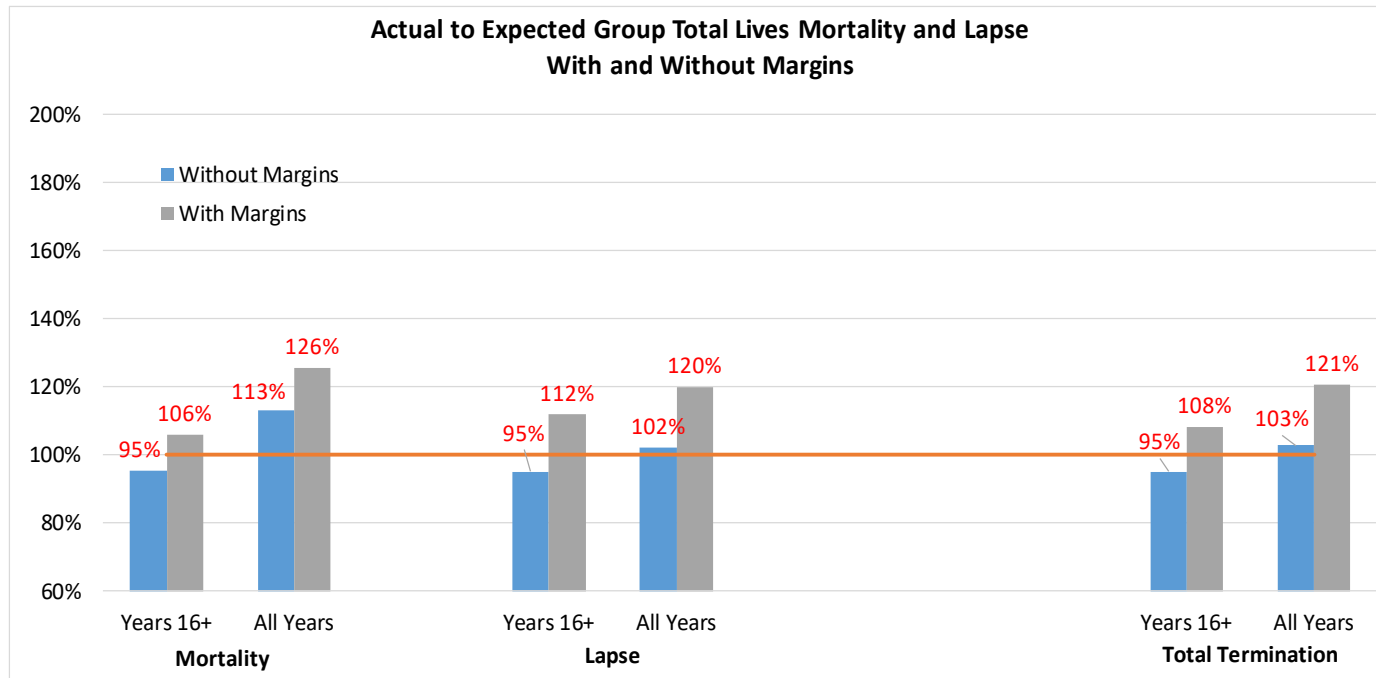
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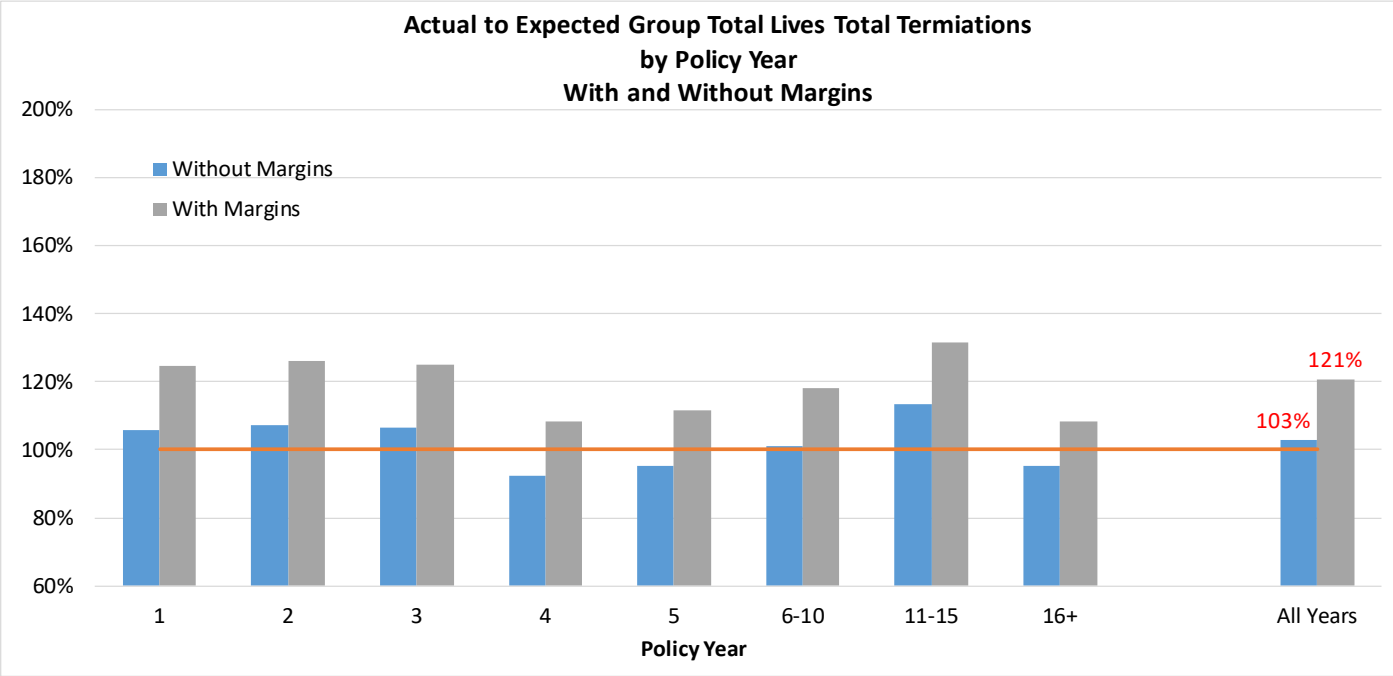
Actual Individual Total Lives Total Terminations to Expected by Issue Age Group



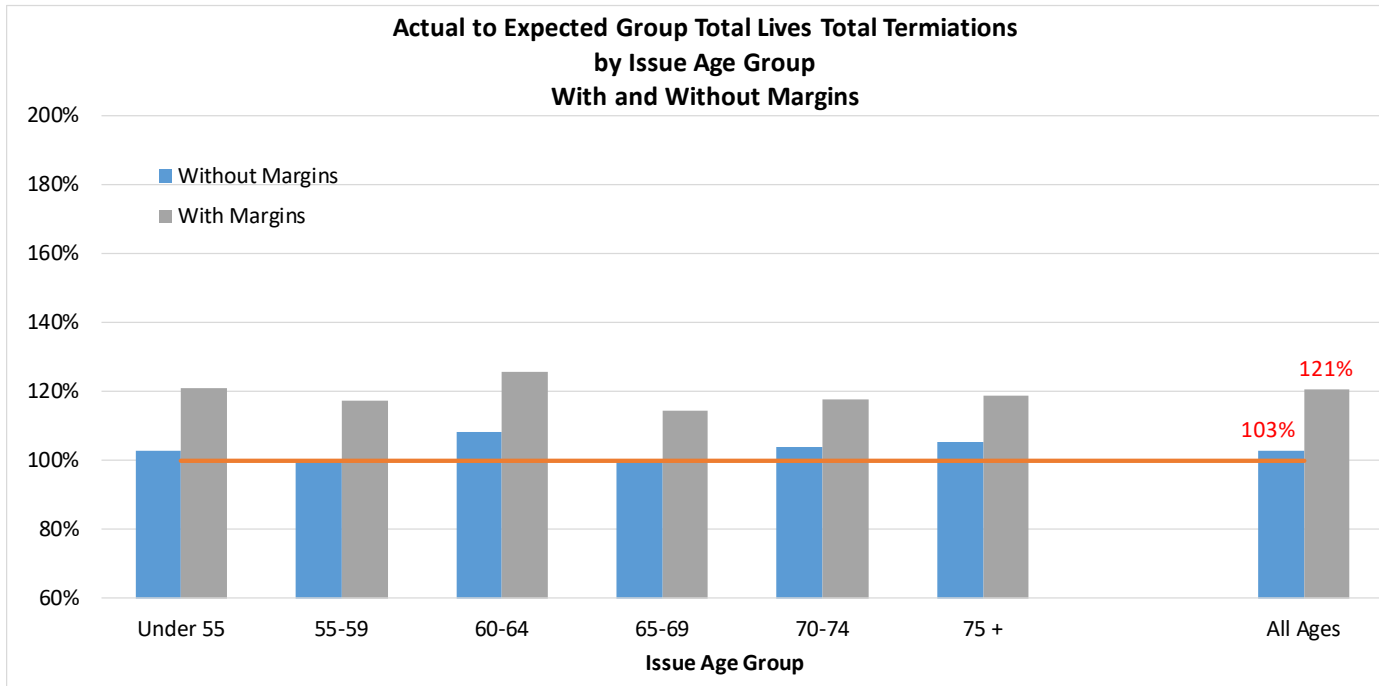
Actual Group Total Lives to Expected by Mortality and Lapse



Actual Group Total Lives Total Terminations to Expected by Policy Year



Actual Group Total Lives Total Terminations to Expected by Issue Age Group



Additional Information

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