Report of the Society of Actuaries Group Life Insurance Experience Committee

Mortality Change from the 2006 Study to the 2013 Study

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Group Life Insurance Mortality Change - Abstract

This report is provided as a supplement to the report on the 2013 Group Term Life Experience Study conducted by the Society of Actuaries' Group Life Experience Committee. The Committee's report was initially presented in May 2013 and revised in January 2014. A copy of the report can be found at: https://www.soa.org/Files/Research/Exp-Study/research-2013-group-term-life-report.pdf.

The 2013 Study includes measures of Death, Accidental Death and Dismemberment ("AD&D") and Disability Waiver of Premium ("Waiver" or "Disability") incidence for Group Term Life Insurance policies in force anytime during the study period of 2007 to 2009. The study results include Basic and Supplemental Group Life coverage for Individually Billed and Self-Administered Group Life. The focus of this report is on mortality changes by age and gender for Basic Individually Billed coverage.

Cautions and Caveats

As highlighted in the January 2014 SOA Group Life Mortality Committee report, a number of caveats must be considered when reviewing the analysis shown in this report, particularly for pricing or reserving purposes:

- The results shown represent raw data and have not been smoothed or adjusted in any way.
- Despite the Committee's best efforts to validate data and the cooperation of the contributing companies to investigate and correct their submissions, it is likely that some data errors were not discovered and are, therefore, included in the results.
- Experience will vary from company to company and from year to year for a number of factors that we were unable to study.
- When reviewing segmented results, the smaller the exposure, the less credible the results for that segment.

Mortality Change from the 2006 Study to the 2013 Study

To evaluate mortality improvement, 2006 rates were applied to the 2013 exposures, before aggregating along the various dimensions. All data for both studies can be found in workbooks on the Society website.

- Since the 2006 study included only Basic coverage (not Supplemental), comparisons are to 2013 Basic only, for Individually Billed only.
- 2006 data is not tagged with region, so geographical influences could not be normalized out of the overall changes.
- Similarly, no normalization for company has been attempted. In other words, all observations assume that the data submitted covered similar portions of the market in the two periods, despite being from a different mix of companies.
- Comments are restricted to ages below 80, as cells become sparser above this age, and exposures are less than at age 17. Also, results for females aged less than 35 and males aged 17 are not credible due to having less than 250 deaths each.

"Overall" change in mortality is a slippery concept due to the large effects of age and gender, so changes are analyzed by age/gender cells. Rates by age and gender could be skewed by changes in the underlying populations, so 2006 mortality rates are applied to 2013 exposures at as granular a level as possible, then aggregated to age/gender rates. See Chart 1. Cell parameters for the 2006 study were (i) age, (ii) gender, (iii) group size, and (iv) industry. Even with only those four dimensions, some cells from each study do not exist in the other, so normalization is also done without group size. Rates thus adjusted are generally the same as or higher than raw 2006 rates at ages below 60, and mixed at ages above 60. Not surprisingly, rates adjusted by industry-only are closer to the raw rates than rates adjusted using the smaller (more volatile) cells that include group size. With or without group size, adjusted mortality rates are no more than 10% from the raw rates for males over age 19 and for females from ages 20 to 60. Using the raw rates would tend to overstate the extent of mortality improvement, so comparisons are to the 2006 rates adjusted by industry only.

Chart 1: 2006 Individually Billed (Basic) Mortality Rates Weighted by 2013 Exposure

			adjusted by 2013 exposure			
	2006 raw		Industry and Group Size		Industry Only	
	Monthly q (Lives)		Monthly q (Lives)		Monthly q (Lives)	
Central Age	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*
17	.178	.050	.224	.067	.196	.058
22	.053	.019	.052	.018	.052	.019
27	.045	.017	.047	.017	.044	.017
32	.053	.023	.052	.024	.052	.023
37	.063	.036	.063	.039	.063	.039
42	.095	.052	.094	.055	.093	.052
47	.144	.081	.149	.085	.144	.086
52	.226	.132	.225	.128	.226	.131
57	.367	.211	.388	.209	.378	.218
62	.559	.339	.516	.388	.573	.373
67	.928	.521	.945	.473	.916	.490
72	1.733	1.038	1.599	.863	1.687	1.051
77	3.237	2.043	2.945	1.433	3.192	1.923

	Monthly q (Amounts)		Monthly q (Amounts)		Monthly q (Amounts)	
Central Age	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*
17	.189	.043	.215	.065	.202	.054
22	.048	.019	.048	.017	.047	.018
27	.035	.016	.037	.016	.035	.015
32	.042	.020	.044	.022	.042	.020
37	.050	.030	.051	.030	.049	.031
42	.078	.045	.077	.049	.076	.046
47	.116	.074	.128	.072	.116	.076
52	.181	.121	.171	.113	.183	.117
57	.301	.194	.343	.184	.315	.197
62	.463	.299	.429	.346	.467	.301
67	.763	.456	.818	.438	.762	.424
72	1.246	.788	1.269	.700	1.240	.852
77	2.377	1.377	2.590	1.005	2.334	1.430

Before presenting the results, it is worth observing that the 2006 population is significantly different from the 2013 population, which the above adjustments do not address. See Chart 2. The exposure

increases are moderate at young ages, then jump at age 45, and again at age 55. Meanwhile, the increases per life show surprisingly smooth and shallow arcs from 20 to 65, then drop rapidly, possibly suggesting a more different population in the retiree age ranges. That compounds concerns that low exposures in the upper age ranges should already have caused when interpreting the startlingly high improvements at older ages.

There is no real way to evaluate the differences in the populations. Five companies were in both studies, which was less than half of the number of companies in each.

Chart 2: Exposures by Age, for Individual Billed Basic Only

	2013 Lives		2006 Lives		Increase	
Central Age	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*
17	40,655	25,569	38,486	29,922	6%	-15%
22	504,201	439,246	443,750	393,946	14%	11%
27	1,020,059	890,616	903,948	763,310	13%	17%
32	1,135,779	877,034	1,116,786	834,167	2%	5%
37	1,268,178	926,715	1,211,580	872,652	5%	6%
42	1,312,010	971,558	1,199,884	895,984	9%	8%
47	1,375,231	1,073,135	1,023,259	814,823	34%	32%
52	1,243,435	1,008,033	820,722	680,542	52%	48%
57	1,016,094	838,243	564,053	443,690	80%	89%
62	719,791	540,242	334,485	237,204	115%	128%
67	236,226	158,889	129,011	80,331	83%	98%
72	99,174	57,093	56,735	30,995	75%	84%
77	53,622	28,180	26,745	13,708	100%	106%

	Amounts		Amounts				Increase per life	
Central Age	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*
17	$1,016,018,389	$668,749,443	$726,812,949	$576,664,158	40%	16%	32%	36%
22	17,344,623,732	15,942,158,720	11,317,549,165	10,311,014,306	53%	55%	35%	39%
27	46,153,719,974	40,229,112,955	30,265,159,259	24,377,643,490	52%	65%	35%	41%
32	61,617,268,369	44,775,529,739	43,293,399,178	29,543,109,867	42%	52%	40%	44%
37	76,625,599,151	49,116,031,031	51,105,440,576	31,432,193,110	50%	56%	43%	47%
42	82,577,694,739	51,464,585,261	52,424,494,706	31,910,003,036	58%	61%	44%	49%
47	87,534,918,014	56,371,187,098	45,722,084,558	28,681,556,112	91%	97%	42%	49%
52	80,968,541,401	51,883,409,542	37,670,588,376	23,511,715,802	115%	121%	42%	49%
57	63,620,863,342	41,105,455,048	25,424,852,937	14,565,394,714	150%	182%	39%	49%
62	40,117,487,026	23,844,565,741	13,748,875,393	7,165,330,280	192%	233%	36%	46%
67	10,412,882,544	5,328,480,340	4,466,814,046	1,933,902,597	133%	176%	27%	39%
72	2,667,305,079	1,163,663,103	1,349,600,063	514,036,865	98%	126%	13%	23%
77	1,082,817,418	415,873,919	465,932,797	168,708,413	132%	147%	16%	20%

Mortality improved markedly over the eight years from the first study period to the second, except for ages 20-29. (Recall credibility concerns for females through age 34.) See Chart 3. By lives, male gains were in the low teens from ages 30 to 54, then double that at older ages, while female gains were mid-teens and double that, but anomalously less at (age 32 and) age 67. Male mortality deteriorated at age 22 (and female at age 27), and improved only by single digits for male age 27 (and female age 22). By amounts, gains were near 20% after age 30, though female gains were inconsistent at older ages. Again, male mortality deteriorated at age 22 (and female at age 27), but less by amount than by lives, and male age 27 (and female age 22) similarly improved more by amount than by lives. Female improvements by amount were less than by lives after age 60.

The picture is the same when the changes are annualized into rates. By lives, as previously noted, males lost nearly 1% per year in their low 20s. But, they gained nearly 1% in their late 20s, under 2% for ages up to 54, near 3% for the next 10 years, then nearer 4% at older ages. Female gains by lives were more volatile, only settling at ages 40 to 54, near 2%. By amount, male gains were less consistent but within a narrower range after age 24, higher than by lives, at between 2% and 3.2%, except at age 57. Interestingly, female gains also peaked at age 57, while being more inconsistent than by lives.

Chart 3: Mortality rates by Age, for Individual Billed Basic Only

	2013		2006 weighted by 2013 industry-exposure		Implied Mortality Improvement		Implied Mortality Improvement Rate	
Table 2A	**Monthly q (Lives)**		**Monthly q (Lives)**					
Central Age	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*
17	.070	.023	.196	.058	64.4%	61.0%	12.1%	11.1%
22	.056	.018	.052	.019	-7.8%	6.4%	-0.9%	0.8%
27	.041	.020	.044	.017	6.6%	-17.5%	0.9%	-2.0%
32	.044	.022	.052	.023	14.1%	5.8%	1.9%	0.7%
37	.055	.032	.063	.039	13.8%	17.9%	1.8%	2.4%
42	.083	.045	.093	.052	10.6%	14.3%	1.4%	1.9%
47	.125	.074	.144	.086	13.3%	14.2%	1.8%	1.9%
52	.193	.111	.226	.131	14.5%	15.2%	1.9%	2.0%
57	.301	.161	.378	.218	20.3%	26.2%	2.8%	3.7%
62	.451	.256	.573	.373	21.2%	31.4%	2.9%	4.6%
67	.669	.415	.916	.490	26.9%	15.2%	3.8%	2.0%
72	1.164	.709	1.687	1.051	31.0%	32.5%	4.5%	4.8%
77	2.265	1.382	3.192	1.923	29.1%	28.1%	4.2%	4.0%
Table 2B	**Monthly q (Amounts)**		**Monthly q (Amounts)**					
Central Age	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*
17	.058	.028	.202	.054	71.1%	47.6%	14.4%	7.8%
22	.049	.014	.047	.018	-2.4%	23.1%	-0.3%	3.2%
27	.030	.016	.035	.015	15.1%	-6.2%	2.0%	-0.8%
32	.032	.016	.042	.020	23.1%	18.6%	3.2%	2.5%
37	.039	.024	.049	.031	20.4%	23.2%	2.8%	3.2%
42	.060	.036	.076	.046	21.5%	22.1%	3.0%	3.1%
47	.093	.060	.116	.076	19.8%	20.3%	2.7%	2.8%
52	.141	.090	.183	.117	23.2%	22.6%	3.2%	3.2%
57	.229	.129	.315	.197	27.2%	34.2%	3.9%	5.1%
62	.387	.223	.467	.301	17.1%	26.0%	2.3%	3.7%
67	.613	.384	.762	.424	19.6%	9.4%	2.7%	1.2%
72	1.009	.638	1.240	.852	18.7%	25.1%	2.5%	3.6%
77	1.959	1.256	2.334	1.430	16.1%	12.2%	2.2%	1.6%

Greyed results are not credible due to minimal exposure in each cell

APPENDIX A

Contributing Companies

The Committee wishes to thank the following companies that contributed data to the 2013 Study:

- Assurant, Inc. Group
- CIGNA Group
- Guardian Life Group
- Hartford Life Group
- Health Care Service Corporation Group (BC/BS of IL)
- ING
- Liberty Life Assurance Company of Boston
- Lincoln Financial Group
- Metropolitan Life and Affiliated Companies Group
- Mutual of Omaha Group
- OneAmerica Group
- Prudential of America Group
- Reliance Standard Life Group
- Standard Insurance Group
- Symetra Life Group
- UnitedHealth Group
- Unum

APPENDIX B

Group Life Insurance Experience Committee
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