SOCIETY OF ACTUARIES

Mortality and Longevity

2016 Individual Life Insurance Mortality Experience Report

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2016 Individual Life Insurance Mortality Experience Report

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CONTENTS

Section 1: Purpose of the Study

This study and report have the following primary purposes:

1. Compare recent mortality experience relative to standard industry mortality tables, at a broad level.

2. Provide the actuary with broad insights into the current experience, and industry changes which have impacts on this experience.

3. Provide the underlying data in spreadsheet pivot tables format for further investigation by qualified actuaries. Provide data also in a text delimited format for use with other software tools.

Any comparison of mortality trends should be considered carefully and evaluated with attention to all underlying factors. The experience is that of the contributing companies in aggregate and, thus, may or may not reflect the experience of any individual company. Also, distribution exposures have changed over time and results observed may reflect impacts of variables not included in the current analysis, and frequently a deeper dive is necessary for understanding. Multivariate predictive modeling techniques are well suited to help the actuary understand results.

An actuary using this report should make his/her own determination concerning the applicability of this information to his/her individual purpose and use.

Section 2: Description of the Data

This section of the report describes the data that was compiled for the SOA's Individual Life Experience Committee (ILEC) to use in the development of the latest mortality study, the 2016 Individual Life Experience Report. Data from the prior ILEC study have been appended to the new experience data to create a composite data set for all years 2009-2016.

The data used in this study is available in Excel pivot tables and also in a text delimited file. More detail on the use and format of these files can be found in Section 5 of this report. With these data files, the reader may pursue their own detailed analysis as desired. The CSV file provided with the 2009-2015 Individual Life Experience Report contains data from the prior study.

As with the prior studies of the ILEC, this report examines mortality under standard individually underwritten life insurance and excludes rated, converted, and guaranteed or simplified issued business. For the data underlying this report, the ILEC has relied upon the data integrity of the individual company submissions, and the data validation performed by the statistical agent on behalf of those companies and regulators. It should be noted that the definition of simplified issue has become increasingly blurred in recent years and may not be consistent across companies.

The data includes experience on direct written business in the U.S., and no assumed reinsurance business is included. The number of companies that contributed data is significant. The following table lists the number of companies in each calendar study year 2009-2016. The data for the study years 2009-2016 is organized on a calendar-year basis. These mandatory submissions utilized the VM-51 record format in the Valuation Manual, with submissions being either voluntary or required from the New York Department of Financial Services and the Kansas Insurance Department.

Table 1
NUMBER OF COMPANIES SUBMITTING DATA

Calendar Year	# Companies	Source
2009	48	NY required, KS voluntary
2010	64	NY required, KS voluntary
2011	82	NY required, KS required
2012	83	NY required, KS required
2013	85	NY required, KS required
2014	93	NY required, KS required
2015	91	NY required, KS required
2016	91	NY required, KS required

With the calendar-year method, exposure formulas were used which are consistent with the Balducci assumption. This approach is commonly used in the industry for life insurance mortality studies. The Balducci assumption is used for convenience in tabulation of exposures. It may, in some situations, produce nonsensical results, but these situations tend to occur where there are limited exposures.

Except where noted otherwise, the expected mortality basis used in the calculation of Actual-to-Expected (A/E) ratios in this report is the 2015 Valuation Basic Table (2015 VBT), RR 100. Life insurance writers in the U.S. issue policies on both an Age Last Birthday (ALB) basis and an Age Nearest Birthday (ANB) basis. The calculation of A/E ratios utilized the version of the expected table consistent with how the company indicated their data was organized. Similarly, the application of smoker-distinct versus composite (uni-smoke) tables relied on the indication made by the submitting company. However, composite tables were used as the expected basis for all business issued prior to 1980, regardless of smoking status indicated, as the ILEC believes smoking as a distinct rating factor to be rare prior to that period. When smoker distinct rates were first introduced, the smoking status field was added to databases. Many companies filled this field for their entire portfolio of previously issued composite smoking policies as smokers. Others defaulted all of that business to non-smokers.

A/E ratios in this report are reported on an amount basis, unless noted otherwise. The actuary should be aware of differences in results on amount basis versus count basis, and the volatility associated with each measure. Unless otherwise noted, references to claim counts are on a by policy basis.

Section 3: Discussion

The following sections of this report briefly discuss analysis and trends overall and for segment(s) within the data of potentially further interest. At a high level, 2016 experience is quite consistent with the trends observed in the prior recent years. As such, the report is briefer than the prior 2014-2015 report. Section 3.1 compares the information from the newly added study period (2016) to the recent period (2009-2015). Sections 3.2 examines older age mortality while section 3.3 examines the recent trend of worsening mortality of the millennial and younger generation-X cohorts. Beyond this report, the subgroup will be putting more attention towards accelerating the rollout of experience data and reporting of upcoming experience years.

As noted previously in this report, A/E results are shown with the 2015 VBT table as the expected table by amount, unless otherwise specified. Please note the 2015 VBT table was developed primarily with experience from 2002-2009, with adjustments and improvement applied as appropriate. Differences in company participation and observation period between the 2015 VBT experience and the current study may be contributing to the deviation of the actual mortality experience from the expected.

The term "improvement" has been used generically within this document when comparing changes or trends in mortality results between study periods, or by study year. The reader should understand that the use of this term does not imply any connection to a formal mortality improvement measure, as the mortality trends observed through the 2009-2015 study years are also greatly influenced by differences in mix of business, changes in underwriting, and changes in the companies that contributed data.

3.1 2016 CURRENT STUDY YEAR VS 2009-2015 PRIOR STUDY YEARS

The following table summarizes the amount of data that was used in the current study (2016) and the prior study (2015) by experience year. This table includes all issue ages, including juveniles.

Table 2
COMPARISON OF AVAILABLE DATA DURING THE STUDY PERIOD

Observation Year	# Companies	# Claims	$ Claims	# Exposure	$ Exposure
2009	48	249,865	$11.0B	31,322,347	$5,330B
2010	64	412,029	$16.1B	40,190,513	$6,567B
2011	82	563,694	$26.1B	57,118,520	$10,973B
2012	83	537,286	$27.8B	51,036,427	$10,799B
2013	85	554,199	$30.0B	57,373,029	$11,898B
2014	93	560,393	$32.8B	57,552,165	$12,450B
2015	91	565,853	$35.5B	57,907,852	$13,078B
2009-2015		3,443,319	$179.4B	352,500,854	$71,095B
2016	91	552,127	$37.2B	57,921,762	$13,589B
Total		**3,995,446**	**$216.6B**	**410,422,616**	**$84,684B**

Please note that discussions in sections 3.2-3.5 are based on observation years 2009-2016, as the ILEC believes the focus on a longer trend is more value-added.

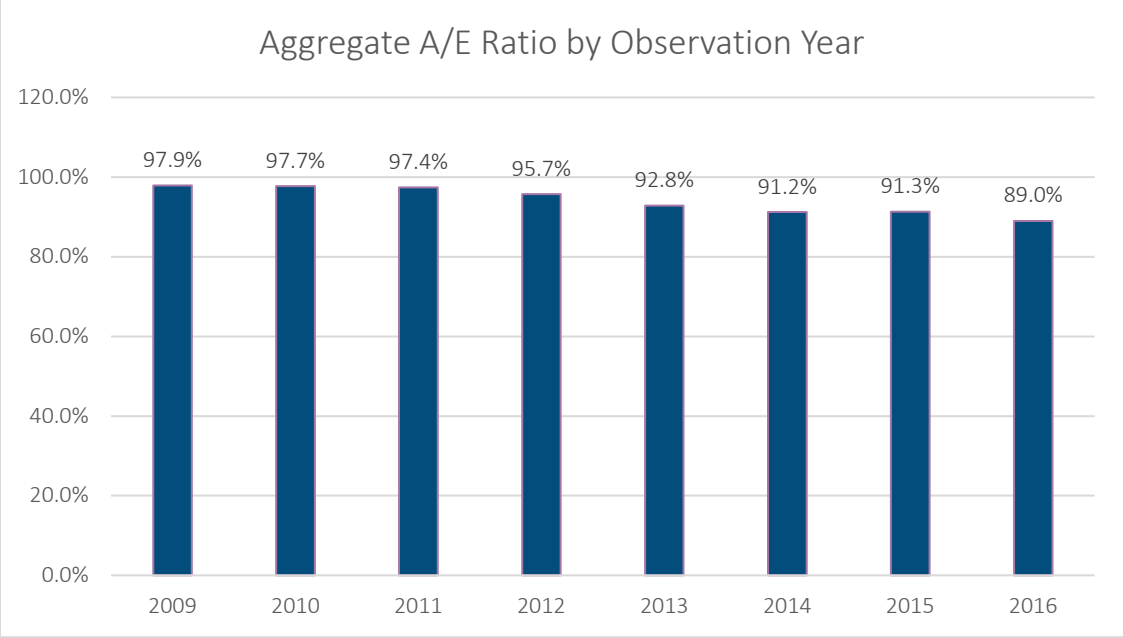
When comparing aggregate mortality experience from the prior mortality studies' observation periods (2009-2015) to the current observation period (2016), there are moderate but clear improvements. The following results are based upon looking at the data with the following filters:

- Issue ages 18+
- Exclude term policies in the post-level premium period

The graphs below compare actual-to-expected mortality ratios by amount, using the 2015 VBT as the basis for the expected.

The aggregate actual-to-expected (A/E) mortality ratio for the 2016 observation period was **89.0%**, which continues the generally declining trend of A/E ratios by observation period. The A/E ratio for the full 2009-2016 observation period was **93.1%**.

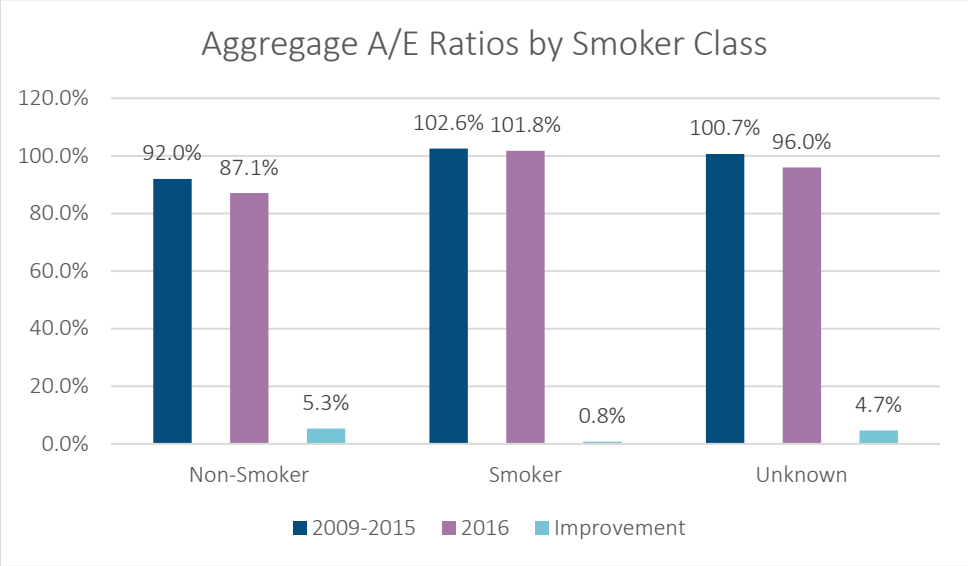
Figure 1
MORTALITY EXPERIENCE BY OBSERVATION YEAR



Similar improvement trends can generally be seen when looking at more detailed breakouts of the data, with notable exceptions being Juvenile experience (issue ages 17 and younger) and Millennial experience (attained ages 25-40, section 3.4).

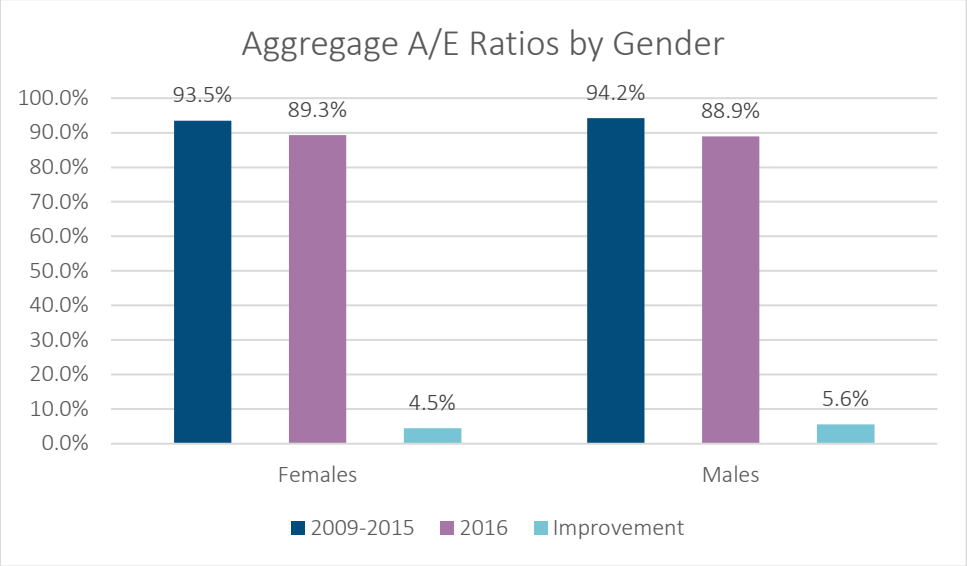
Smoker, non-smoker, and unknown mortality were all lower in the 2016 observation period compared to the previous study period (2009-2015). The mortality decrease was greatest for non-smokers, who continued to trend similarly to prior studies. The non-smoker actual-to-expected (A/E) ratio for the 2016 observation period is lower by 5.3% (1 - 87.1%/92.0%) compared to what was observed from 2009-2015.

Figure 2
MORTALITY EXPERIENCE BY SMOKER CLASS



Mortality results by gender also showed improvement in the 2016 experience year compared to the 2009-2015 study period. Female mortality A/E ratios decreased by 4.5%, while male mortality ratios decreased by 5.6%, both now running below 90% of expected for the 2016 observation period.

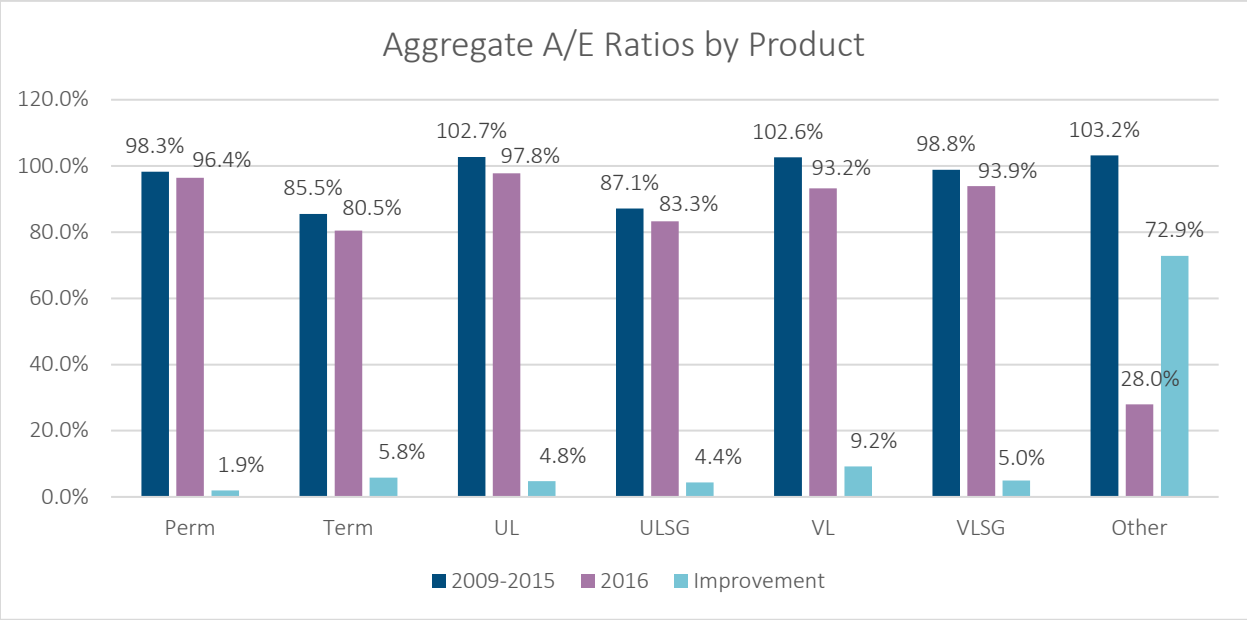
Figure 3
MORTALITY EXPERIENCE BY GENDER



A/E ratios based on 2016 experience were lower than the 2009-2015 study period for all product types, with A/Es for all products falling below 100%. With the current data, there is a clear difference in mortality A/E between the two categories of universal life (UL) – regular UL and ULSG. The lower mortality exhibited by the ULSG products may be attributable to lower lapse rates, larger policy size, target market, or other factors. The A/E for the 'Other'

product class has very low credibility (only 95 claims in the 2016 study period compared to 2,748 claims in 2009-2015), resulting in an unreasonable A/E of just 28.0%.

Figure 4
MORTALITY EXPERIENCE BY PRODUCT



* Note that "Perm" may be referenced as "Whole Life" in the appendices.

3.2 OLDER AGE ANALYSIS

Older age analysis is often done to provide special insights into experience for the older age population. For the industry as a whole, this segment was marketed to much more recently, with a significant increase beginning in the early 2000's. In addition, with the aging of the baby boomer population, many companies now have a great deal of exposure at older attained ages from policies issued many years ago. This indicates sufficient data availability for analysis by attained age as well. Accordingly, we present an analysis on each basis separately.

Issue Age 65 and over:

For this analysis, we have excluded:

- Issue Ages below 65
- Term Business past its level premium period (Post-Level Term)

Overall, for the study years 2009-2016, the older age A/E on the 2015 VBT expected basis was 90.9% by amount.

Results for this subgroup were further examined across all observation years by attained age. A common trend of generally decreasing mortality was observed, save for attained ages 65-69, which showed a sharp increase for the 2016 observation period. Multiple factors contribute to the changes of mortality over time, including change in the average duration, changes in policy size, changes in underwriting, mortality improvement/deterioration, changes in the average age within the age group, changes in issuing company, etc.

Table 3

OLDER AGE MORTALITY EXPERIENCE – ISSUE AGES 65+

A/E Ratios by Observation Year by Amount Issue Ages 65+, All Durations Expected Basis: 2015 VBT					
Observation Year	Attained Age Groups				
	65-69	70-79	80-89	90+	65+
2009	81.1%	88.1%	103.0%	105.8%	99.3%
2010	84.3%	118.4%	98.6%	91.5%	101.4%
2011	78.7%	100.8%	96.5%	92.0%	96.0%
2012	107.8%	96.0%	99.6%	92.8%	97.4%
2013	76.1%	88.3%	91.2%	88.7%	89.7%
2014	76.0%	81.3%	87.2%	84.3%	85.2%
2015	71.9%	87.9%	89.3%	92.3%	89.8%
2016	91.6%	86.5%	85.5%	84.8%	85.5%
2009-2016	83.6%	92.0%	91.8%	89.0%	90.9%

Attained Ages 65 and over:

For this analysis, we have excluded experience for:

- Attained Ages below 65
- Issue Ages below 18
- Term Business past its level premium period (Post-Level Term)

Overall, for this collection of policies, the 2015 VBT A/E ratio by amount is 95.4%, with some variation by attained age group. See Appendix OA (in the associated Excel sheet that contains the Appendices) for additional results on the 2015 VBT basis, and comparisons by the 2015 VBT, 2008 VBT, 2001 VBT, and 75-80E expected bases.

As with the experience for older issue ages, results for attained ages 65 and over were further examined across all observation years by attained age. A common trend of generally decreasing mortality was similarly observed for increasing observation years in Table 4, with only the attained age 65-69 group showing deterioration relative to expected. Multiple factors are included in the changes of mortality over time, including change in the average duration, changes in policy size, changes in underwriting, mortality improvement/deterioration, changes in the average age within the age group, changes in issuing company, etc.

Table 4

OLDER AGE MORTALITY EXPERIENCE – ATTAINED AGES 65+

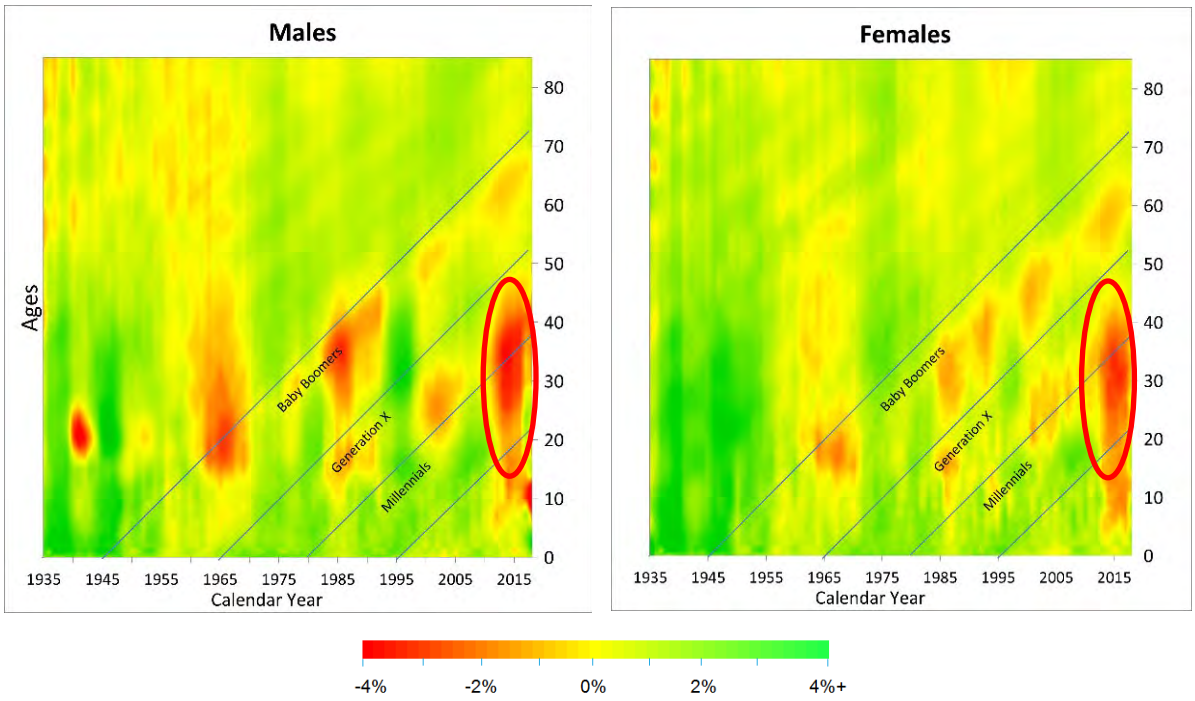
A/E Ratios by Observation Year by Amount Attained Ages 65+, All Durations Expected Basis: 2015 VBT					
Observation Year	**Attained Age Groups**				
	65-69	**70-79**	**80-89**	**90+**	**65+**
2009	92.1%	97.3%	101.0%	103.9%	98.5%
2010	99.7%	107.0%	99.3%	95.5%	101.3%
2011	99.5%	103.5%	99.4%	93.9%	99.9%
2012	98.0%	98.1%	100.2%	94.7%	98.4%
2013	97.0%	97.8%	96.0%	91.4%	95.9%
2014	90.1%	93.1%	94.1%	88.5%	92.2%
2015	85.9%	97.0%	96.6%	93.3%	94.5%
2016	86.1%	93.5%	92.9%	87.9%	91.0%
2009-2016	92.4%	97.6%	96.6%	91.6%	95.4%

3.3 YOUNGER GEN-X/OLDER MILLENNIAL POPULATION EXPERIENCE

3.3.1 Deaths of Despair of Younger Age Cohorts in the U.S. Population

A disconcerting trend in the U.S. population since around 2010 has been the deterioration of mortality for younger Gen-X and older Millennial cohorts. This can be seen in the following heatmap, based on U.S. Human Mortality Database (HMD)[1] experience smoothed by averaging over five years and five ages.

Figure 5
HEAT MAP SHOWING MORTALITY IMPROVEMENT BY BIRTH COHORT



In fact, as a quick indication of how dire the mortality improvement was for the group, taking just the arithmetic average of U.S. HMD male mortality improvement for ages 25-39 in year 2015 produces a mortality improvement rate of -10.8%.

As for what may be causing the aforementioned mortality deterioration, by examining the leading causes of death in the U.S. population, we see opioid deaths (which are the leading contributor to 'unintentional injury' deaths), as well as suicides, are the leading contributors to deaths for said cohorts. This provides an indication the deaths are more behavioral than physiological.

[1] Human Mortality Database. University of California, Berkeley (USA) and Max Planck Institute for Demographic Research (Germany) showing mortality improvement from 1935 to 2018. Available at www.mortality.org or www.humanmortality.de (data downloaded on 9/25/2017).

Figure 6

LEADING CAUSES OF DEATH

10 Leading Causes of Death by Age Group, United States – 2015

Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1	Congenital Anomalies 4,825	Unintentional Injury 1,235	Unintentional Injury 755	Unintentional Injury 763	Unintentional Injury 12,514	Unintentional Injury 19,795	Unintentional Injury 17,818	Malignant Neoplasms 43,054	Malignant Neoplasms 116,122	Heart Disease 507,138	Heart Disease 633,842
2	Short Gestation 4,084	Congenital Anomalies 435	Malignant Neoplasms 437	Malignant Neoplasms 428	Suicide 5,491	Suicide 6,947	Malignant Neoplasms 10,909	Heart Disease 34,248	Heart Disease 76,872	Malignant Neoplasms 419,389	Malignant Neoplasms 595,930
3	SIDS 1,568	Homicide 369	Congenital Anomalies 181	Suicide 409	Homicide 4,733	Homicide 4,863	Heart Disease 10,387	Unintentional Injury 21,498	Unintentional Injury 19,488	Chronic Low. Respiratory Disease 131,804	Chronic Low. Respiratory Disease 155,041
4	Maternal Pregnancy Comp. 1,522	Malignant Neoplasms 354	Homicide 140	Homicide 158	Malignant Neoplasms 1,469	Malignant Neoplasms 3,704	Suicide 6,936	Liver Disease 8,874	Chronic Low. Respiratory Disease 17,457	Cerebro-vascular 120,156	Unintentional Injury 146,571
5	Unintentional Injury 1,291	Heart Disease 147	Heart Disease 85	Congenital Anomalies 156	Heart Disease 997	Heart Disease 3,522	Homicide 2,895	Suicide 8,751	Diabetes Mellitus 14,166	Alzheimer's Disease 109,495	Cerebro-vascular 140,323
6	Placenta Cord. Membranes 910	Influenza & Pneumonia 88	Chronic Low. Respiratory Disease 80	Heart Disease 125	Congenital Anomalies 386	Liver Disease 844	Liver Disease 2,861	Diabetes Mellitus 6,212	Liver Disease 13,278	Diabetes Mellitus 56,142	Alzheimer's Disease 110,561
7	Bacterial Sepsis 599	Septicemia 54	Influenza & Pneumonia 44	Chronic Low Respiratory Disease 93	Chronic Low Respiratory Disease 202	Diabetes Mellitus 798	Diabetes Mellitus 1,986	Cerebro-vascular 5,307	Cerebro-vascular 12,116	Unintentional Injury 51,395	Diabetes Mellitus 79,535
8	Respiratory Distress 462	Perinatal Period 50	Cerebro-vascular 42	Cerebro-vascular 42	Diabetes Mellitus 196	Cerebro-vascular 567	Cerebro-vascular 1,788	Chronic Low. Respiratory Disease 4,345	Suicide 7,739	Influenza & Pneumonia 48,774	Influenza & Pneumonia 57,062
9	Circulatory System Disease 428	Cerebro-vascular 42	Benign Neoplasms 39	Influenza & Pneumonia 39	Influenza & Pneumonia 184	HIV 529	HIV 1,055	Septicemia 2,542	Septicemia 5,774	Nephritis 41,258	Nephritis 49,959
10	Neonatal Hemorrhage 406	Chronic Low Respiratory Disease 40	Septicemia 31	Two Tied: Benign Neo./Septicemia 33	Cerebro-vascular 166	Congenital Anomalies 443	Septicemia 829	Nephritis 2,124	Nephritis 5,452	Septicemia 30,817	Suicide 44,193

Data Source: National Vital Statistics System, National Center for Health Statistics, CDC.
Produced by: National Center for Injury Prevention and Control, CDC using WISQARS™

Looking beyond 2015 to U.S. population data up to 2019, it appears as though mortality disimprovement for older Millennials and younger Gen-X peaked around 2015. Since then, the improvement rate for said cohort has improved relative to around 2015. However, the current age group 35-44 in 2019 still experienced mortality disimprovement.

Figure 7

COMPARISON OF CHANGES IN MORTALITY RATES BY AGE GROUP AND CALENDAR YEAR[2]

Cause of Death*
All

County Quintile Group
All

All Ages	Annual Improvement 1999-2019	2014-2019	2018-2019
All	1.0%	0.3%	1.2%
Male	1.1%	0.2%	1.1%
Female	1.0%	0.4%	1.4%
Age Group+			
< 1 year	1.4%	1.2%	0.9%
1-4 years	1.9%	0.6%	3.0%
5-14 years	1.6%	-1.0%	-1.1%
15-24 years	0.6%	-1.3%	0.6%
25-34 years	-1.2%	-3.5%	0.0%
35-44 years	0.0%	-2.6%	-2.3%
45-54 years	0.3%	0.6%	0.9%
55-64 years	0.6%	-0.3%	0.4%
65-74 years	1.6%	0.2%	1.0%
75-84 years	1.4%	1.1%	1.8%
85+ years	0.8%	0.3%	1.7%

Naturally relevant questions are whether the recent negative trend in the U.S. population is also being experienced in the insured population, whether there is any different level of experience for that cohort, and how it may evolve in the future. In section 3.4.2 below, we examine younger Gen-X/older Millennial experience in U.S. industry experience between 2009 and 2016.

However, examining U.S. industry experience captured by the ILEC for said cohorts can be fraught with added challenges. It is certainly beyond the scope of this brief analysis to unpack whether the increases in mortality are not impacted by confounding factors. Nonetheless, we did observe some mortality experience distinctions for that cohort.

We invite the reader to look further into the data and we believe more research of this birth-year group is warranted. It will soon be the dominant demographic contributor in the U.S. economy and, as many insurers wish to provide products in these markets, it will be imperative to better understand that generation's mortality risk.

[2] https://www.soa.org/resources/research-reports/2021/us-population-mortality/

3.3.2 Younger Gen-X/Older Millennial Experience

For this analysis, we observed the actual claims to 2015 VBT expected claims by each birth year and found some similarities in birth-year cohorts. Furthermore, we filtered the data studies to include policies that were written with a risk structure containing preferred classes. We included all risk classes in those structures, but we excluded plans that were written with only aggregate or simple smoker-distinct structures. All A/E comparisons are against the 2015 VBT RR100 table.

That initial analysis showed the following Birth-Year cohorts:

Table 5

A/E COMPARISONS BY YEAR OF BIRTH

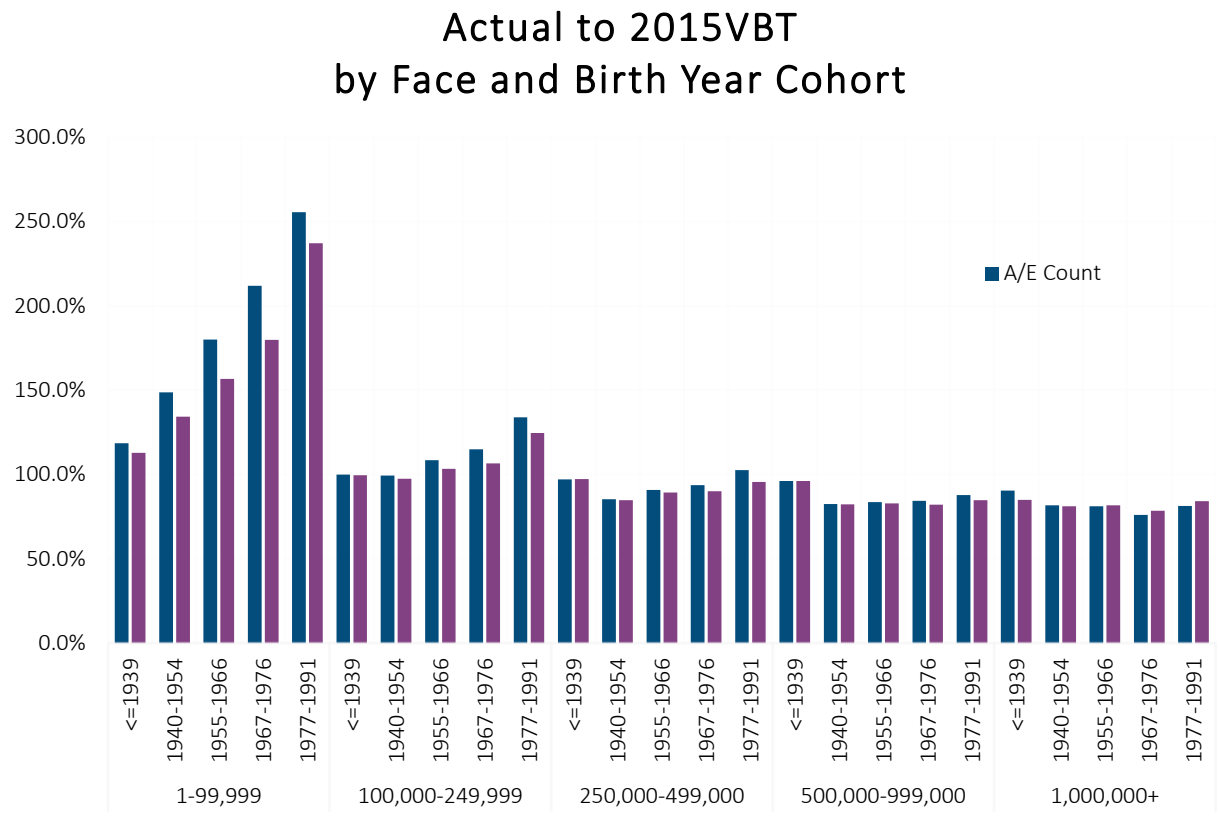
Birth Year	A/E Count	A/E Amount	# of Deaths
<=1939	106.5%	89.4%	127,071
1940-1954	105.2%	87.3%	145,494
1955-1966	103.8%	87.3%	83,788
1967-1976	102.0%	84.7%	26,895
1977-1991	123.0%	93.4%	9,465
1992+	97.7%	66.3%	354
Grand Total	**105.4%**	**88.0%**	**393,067**

The 1992+ birth-year cohort experience is largely juvenile ages or very early twenties and was excluded from further study. The birth-year cohorts prior to 1977 had similar experience overall and were considered as one group in the next analysis. The 1977-1991 (young Gen-X/older Millennials) had a distinctly higher A/E. While there were – not surprisingly, given the age range – considerably fewer claims for that group, there were enough to be considered credible.

Further review shows the interaction of face amount group with the birth-year cohort. The higher A/E for 1977-1991 was very pronounced at lower face amounts but minimal for face amounts above $500,000.

Figure 8

A/E COMPARISON BY FACE AMOUNT AND BIRTH YEAR COHORT



To look further, we capped face amount at $2.5 million to reduce skewing from very large policies, removed the 1992+ cohort, and looked at the results for Face < $500,000 and Face >= $500,000.

Figure 9

A/E COMPARISON BY OLDER AND YOUNGER BIRTH YEAR COHORTS

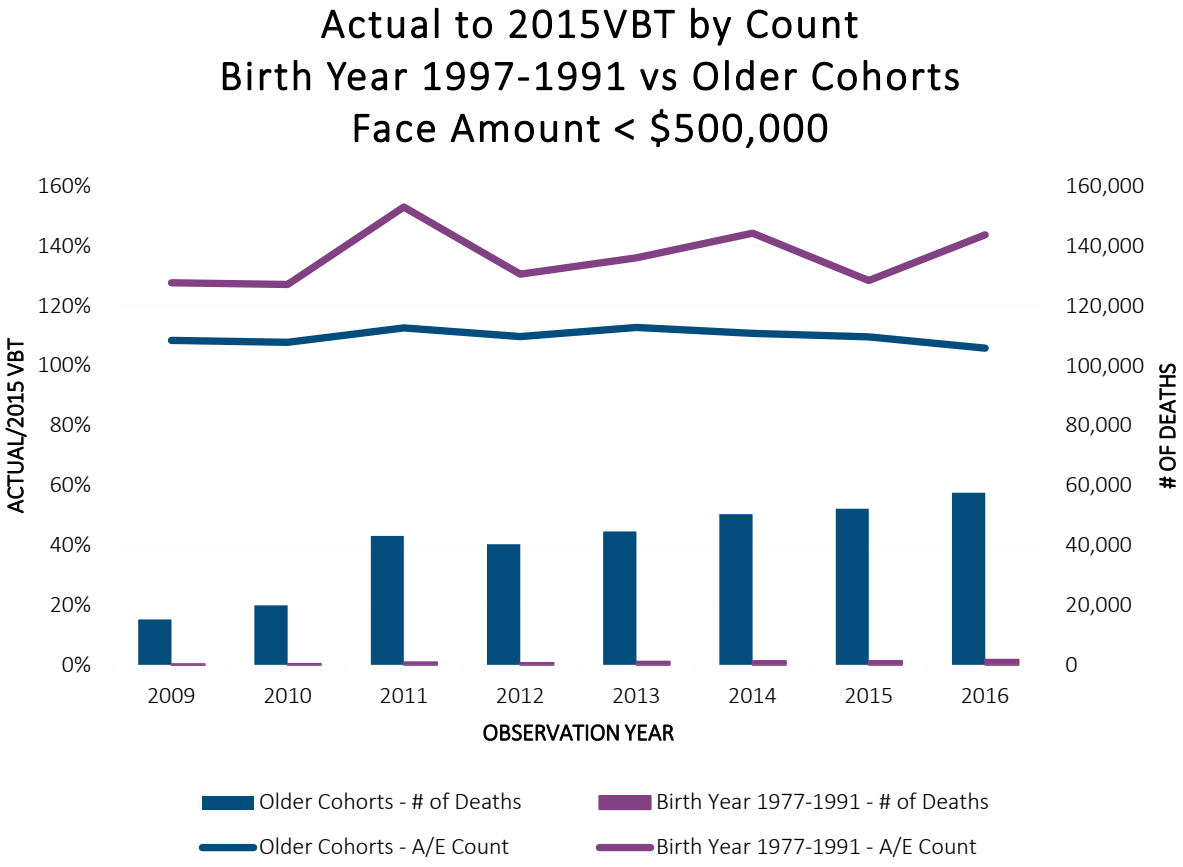
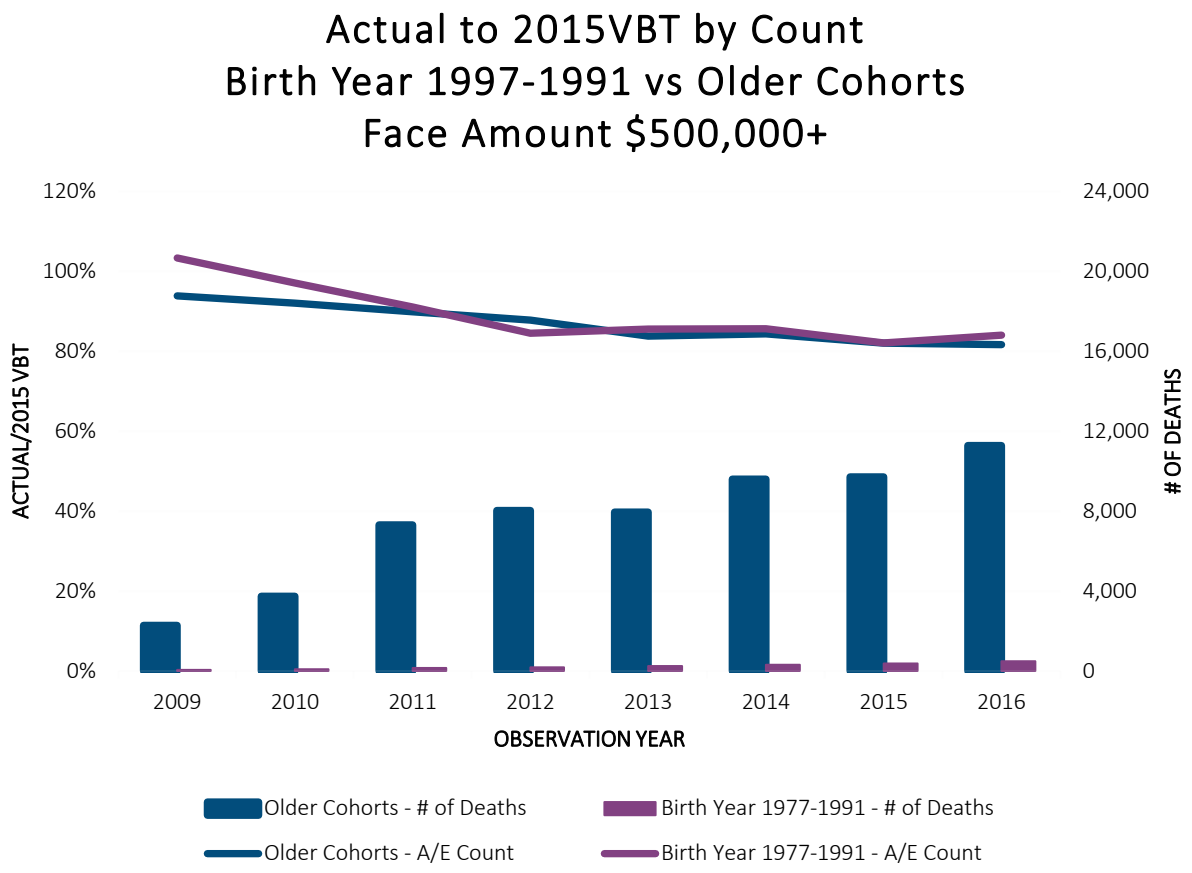


Figure 10

A/E COMPARISON FOR BIRTH YEAR 1991 – 1997 VS OLDER COHORTS



As stated earlier in 3.4.1, the indication is that the mortality performance for millennials in the U.S. population is likely more behavioral than physiological. It also may have a strong connection to socioeconomic status. Face amount can be somewhat of a proxy for socioeconomics and this break in experience at the $500,000 face amount is at least curious.

More research should be done before drawing conclusions. The reader is invited to consider other forces behind these observations. The reader also will have access to the data that underlie this report.

3.4 COMMENT ON COVID

All the results in this study precede any impacts from COVID-19 by a number of years. The COVID-19 impacts will only be noticeable once the 2020 data is included with the data release. The Society of Actuaries is actively working on additional COVID-19 research and the latest research in this area can be found on the Society's website at: https://www.soa.org/research/topics/indiv-mort-exp-study-list/. In particular, at the time of the writing of this report, the Society has issued a report, 2020 U.S. Individual Life COVID-19 Mortality Research, that provides some preliminary insights into the impact of COVID-19 on industry experience.

Section 4: Pivot Tables, Text Files and Use

Several Excel files are provided in conjunction with this report, giving the user the ability to examine the experience in multiple characteristic dimensions. Specifically, four Excel files accompany this report:

1. ILEC 2009-16 Aggregate 18+ 20200123.xlsx
2. ILEC 2009-16 Preferred 18+ 20200123.xlsx
3. ILEC 2009-16 Term 18+ 20200123.xlsx
4. ILEC 2009-16 Juvenile 20200123.xlsx – unknown smoker mortality rates were used for all durations

We have also provided a text delimited file that allows the actuary to analyze the data with more granularity than the pivot tables. Certain variables, such as attained age, are shown in more detail and not aggregated into quinquennial groups as is the case in the pivot tables. This delimited file can be read into R, Python, or other software for more detailed analysis.

These files are located on the SOA website under Research, Experience Studies, Individual Life: (www.soa.org/research/topics/indiv-mort-exp-study-list/).

Each Excel file has the following three tabs:

- Pivot Table – generic pivot table with all applicable filters that summarizes underlying experience at a high level
- Filters – description of the fields included in the underlying data
- Assumptions – key assumptions behind exposure calculations and a list of the expected bases

The pivot tables accompanying this report allow the user to analyze experience for the following expected bases:

- The SOA's 1975-80 15-year select and ultimate tables (maximum issue age of 70) with mortality rate extensions to issue age 95. The 1975-80 table was extended in two stages. The extension for issue ages 71 to 87 was published with the 2002-04 study, and the further extension for ages 88 to 99 (and attained ages through 120) was published with the 2005-07 study.
- 2001 VBT
- 2008 VBT, Primary table rates
- 2008 VBT, Limited Underwriting table rates
- 2015 VBT, Primary table rates

The mortality tables have different maximum issue ages. When an actual issue age was older than an expected table's maximum issue age, the expected mortality rates for that older age were determined by using the attained age rates for the maximum issue age actually included in that table.

The pivot tables mentioned above include new experience from 2016 and previously published ILEC data. The observation years refer to the calendar year.

The underlying data can be separated by insurance plan. However, this experience is very limited for some plans at face amounts greater than $100K during the 2009-2016 period.

In the appendices to this report, which provide statistics on years 2009-2016, the following standard filters and rules were applied:

- SOA Post-Level Term Indicator: PLT was excluded
- Underlying Expected Table: 2015 VBT
- Face Amount Bands: All

Additional filters were used for specific sections outlined above. For example, preferred experience analysis was limited to issue years 1990+ and face amounts greater than or equal to $100,000.

Section 5: Future Efforts

The primary goals of the ILEC are to provide both key industry experience data and high-level insights of it. As such, a centerpiece is this ILEC report and data. With the experience submission requirements of VM-50 on an annual basis, the goal of this subgroup is to provide an updated report and data on a frequent and expedited basis. The committee recognizes the early difficulties of the new mandatory data submissions for companies new to this process, and we look forward to working closely with the selected statistical agent in continually improving the quality of experience data.

The ILEC has been an active presenter at SOA meetings, and we will continue to present our findings in those settings that facilitate discussion and questions.

Specific future efforts are focused around including persistency to the ILEC data, as well as providing additional insights into cause of death analysis and predictive analytic findings when applied to the ILEC data. Other projects for consideration, subject to resource constraints and data availability, are term conversion mortality, mortality improvement, and waiver of premium experience.

The ILEC works closely with the SOA to determine where ILEC resources would be put to best use and partnering with other committees and SOA sections as makes sense.

We welcome feedback and any suggestions for improvement in future work products. Any such suggestions may be made by contacting Ed Hui (Chair), Philip Adams (Vice-chair), Tatiana Berezin (Vice-chair), or Mervyn Kopinsky (SOA).

Section 6: Reliance and Limitations

In preparing this report and the accompanying data files, the ILEC has relied on the integrity of the data as submitted by companies through the mandatory data submissions required by the New York Department of Financial Services (NYDFS) and the Kansas Insurance Department (KID). Those data submissions were facilitated and coordinated by the selected statistical agent, MIB.

The statistical agent, on behalf of NYDFS and KID, worked with each company independently to validate and verify the accuracy of their data submissions. Many companies submitting data in this process were new to the process of such data submissions. Ultimately, responsibility for data accuracy is placed on the individual company submitters, and the ILEC has relied on that process for the accuracy of its data.

In each situation that involves questionable results or flaws in the data, the ILEC must make the determination of whether the results be published with appropriate disclaimers or thrown out entirely. In the prior analysis of the underlying data, some apparent flaws in the data were identified. Except where such flaws produced meaningless results, we have generally chosen to keep the data in this report and identify the anomalies that were observed. In all cases, the individual user of this report and data should apply their own judgment as to the validity of the results.

Some situations encountered, which produced counter-intuitive results, but were kept in the prior and current report and data files, are:

1) Paid-Up Additions records are part of the mandatory data submissions. These records were submitted as unique records distinct from the associated base policy but are not easy to identify separately. It is expected that the experience at the lowest face amount bands is impacted by the presence of these records.

2) For some juvenile issue ages (1-4), experience at the very high attained ages (90+) showed unreasonable results and was inconsistent with other issue age groups.

3) Within face amount bands, the difference between A/E by count versus A/E by amount was larger than expected. Past studies had shown when isolating a particular face amount band, the difference is minimal, and this is what would have been expected.

4) Data records with face amounts at or above $100,000 and early policy durations contained an Unknown smoker status. The impact on overall results should be minimal, but the user should be aware of this in more refined analysis.

5) Preferred Risk Class structures were inconsistent in exposures by duration. This suggests lack of uniformity in how preferred class business is defined and classified.

6) Preferred Risk Class exposures are in the data for issue years prior to 1990. As noted in this report, we have chosen to exclude these exposures from any preferred class analysis.

The ILEC looks forward to partnering with the statistical agent in continuing to identify these data issues and improve the data validation process for these important industry studies.

Section 7: Acknowledgments

Report Subgroup, Individual Life Experience Committee

The SOA extends its gratitude to the report subgroup of the Individual Life Experience Committee (ILEC). The report subgroup designed the project, completed/oversaw the analyses, and authored and peer reviewed the report. The members are:

Philip Adams, FSA, MAAA

Tatiana Berezin, FSA, MAAA (Subgroup co-chair)

Dale Chudnow, FSA, MAAA

Ed Hui, FSA, MAAA, CFA (Subgroup co-chair)

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Kevin Larsen, ASA, MAAA

John McGarry, FSA, MAAA

Other Resources

The SOA contracted with MIB's Actuarial and Statistical Research Group, to collect, validate, and compile the data underlying this report.

At the Society of Actuaries:

Korrel Crawford, Senior Research Administrator

Mervyn Kopinsky, FSA, EA, MAAA, Senior Experience Studies Actuary

Cindy MacDonald, FSA, MAAA, CERA, Senior Director, Experience Studies

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