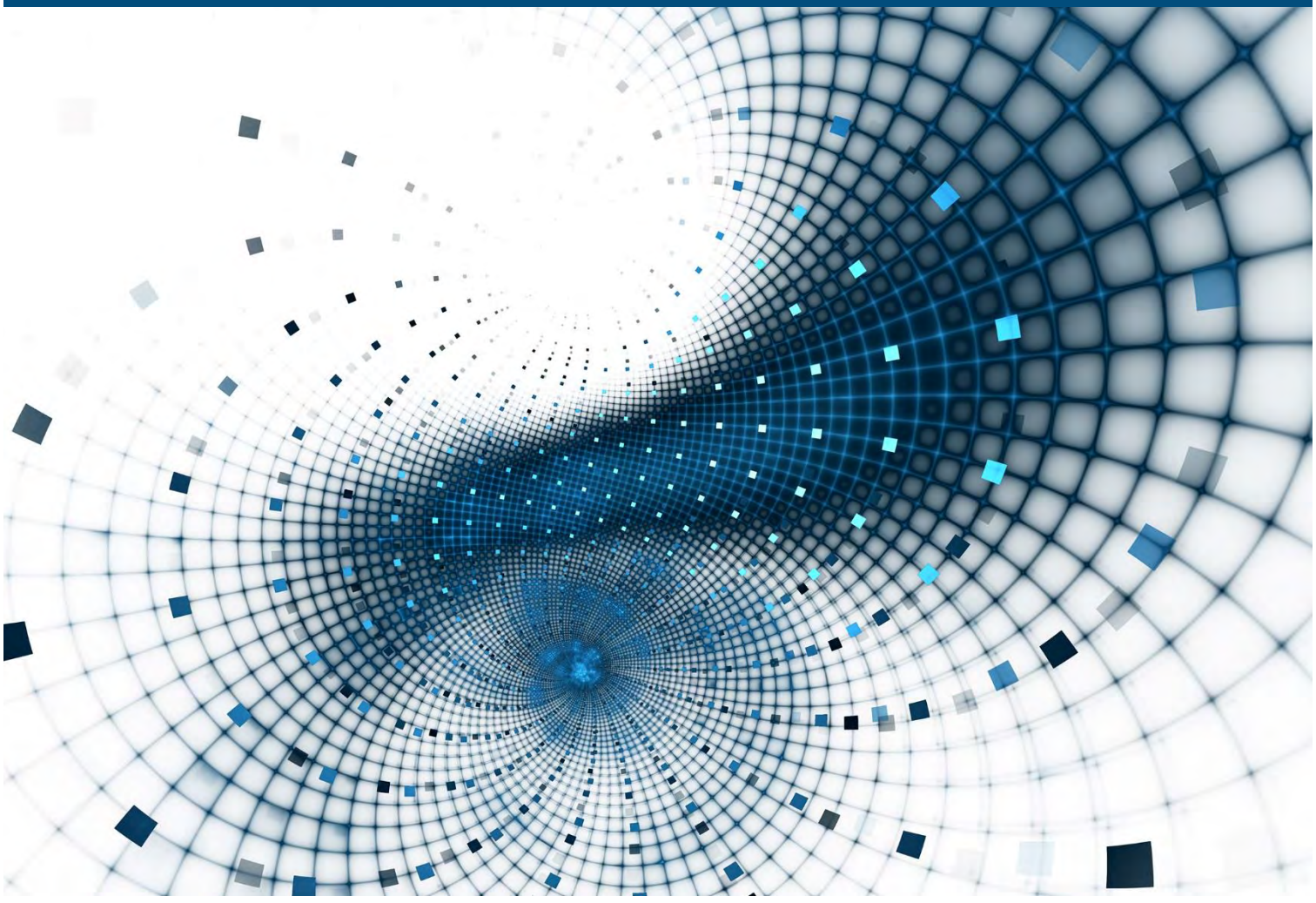
SOCIETY OF ACTUARIES

2015–2016 Group Annuity Mortality Experience Update



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2015–2016 Group Annuity Mortality Experience Update

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Caveat and Disclaimer

CONTENTS

Uses, Reliances and Limitations

The primary purposes of this study are to:

1. Compare emerging group annuity experience to various established mortality bases

2. Help to provide a credible basis for actuaries to assess mortality in group annuity business where mortality tables in existence and associated mortality improvement scales may not be representative of this distinct population

3. Allow actuaries to observe industrywide trends in group annuity mortality against which to compare their own company's experience

In developing this study, the SOA relied upon data and information supplied by the participating company contributors. For each contributor this information includes, but is not limited to, the data submission for mortality experience and the responses to follow-up questions.

Section 1: Mortality Experience Update

The Group Annuity Experience Committee (the Committee) of the Society of Actuaries (SOA) has performed biennial mortality studies of insurance company annuity experience under group pension contracts issued primarily in the United States. This experience is predominantly based on retired lives, which include benefit payments made under ongoing pension plans and/or terminated plans ("pension closeouts") and partially guaranteed arrangements, such as certain immediate participation guarantee contracts and nonguaranteed arrangements.

MIB's Actuarial and Statistical Research Group collects, validates, and summarizes the data for this research. Consistent with previous SOA Group Annuity studies, a database application was employed enabling access to more granular groupings. Nine insurance companies and a committee of volunteers, who are listed at the end of this document, supported this effort.

Table 1 summarizes mortality trends over 2015–2016 and compares them to the values seen in the 2011–2014 report. Actual-to-Expected (A/E) ratios are as follows:

Table 1
MORTALITY TRENDS 2015–2016 COMPARED TO 2011–2014

Expected Basis		Actual-to-Expected Ratios (2015–2016)		Actual-to-Expected Ratios (2011–2014)	
Table	Improvement	By Lives	By Income	By Lives	By Income
1983 GAM	None	87.4%	81.3%	91.7%	80.9%
1994 GAM Basic	Scale AA	100.9%	96.0%	104.8%	95.3%
1994 GAR	Scale AA	108.5%	103.3%	112.7%	102.4%
RP-2014	MP-2017, to Experience Year	101.5%	97.5%	109.6%	100.8%
RP-2014	MP-2017, to study midpoint	98.9%	94.8%	109.7%	100.8%

Compared to the previous 2011–2014 period, all of the A/E ratios by lives were lower in the 2015–2016 period. By income, the 2015–2016 period had higher A/E ratios for the three expected bases using either no improvement or Scale AA. The A/E ratios by income for the two bases using Scale MP-2017 saw a decrease.

Mortality improvement across the 2007–2016 period was determined by calculating the age-adjusted death rates (ADRs) for each age group within each year. This methodology is described in the cited paper published by the Centers for Disease Control and Prevention and written by Lester R. Curtin, Ph.D., and Richard J. Klein, MPH: https://www.cdc.gov/nchs/data/statnt/statnt06rv.pdf.

The Committee applied the direct standardization method (described on pages 2-3 of the paper) using the average population counts across calendar years 2007–2016 as the reference population. The unrounded mortality rates for each age band were weighted by these average population counts. For each age band 'x' and calendar year 'y', the mortality improvement rate f(x,y) was calculated from the weighted mortality rates q(x,y):

$$f_{(x,y)} = 1 - \frac{q_{(x,y)}}{q_{(x,y-1)}}$$

Comparisons to Scale AA and Scale MP-2017 were also performed. The improvement rates for Scale AA and Scale MP-2017 were determined as an arithmetic average of those scales' mortality improvement rates for the five ages within an age band. For the 0–54 age range, the age-50 improvement rate was used. For the 95+ age range, the age-98 improvement rate was used. These individual years were chosen for the extreme age bands as an approximation meant to reflect the concentration of data within those bands at the ages closest to the larger age 55–94 range.

Average annual mortality improvement rates for the period were determined using a geometric average. Tables 2 and 3 show a comparison of these average annual mortality improvement rates.

Table 2
AVERAGE ANNUAL MORTALITY IMPROVEMENT RATES BY LIVES

Basis	Annual Mortality Improvement by Lives (2007–2016)		Annual Mortality Improvement by Lives (2007–2014)	
	Males	Females	Males	Females
Group Annuity Experience Study Data	1.8%	1.6%	1.9%	1.9%
Scale AA	0.8%	0.4%	0.8%	0.4%
Scale MP-2017	1.1%	0.8%	1.2%	0.9%

Table 3
AVERAGE ANNUAL MORTALITY IMPROVEMENT RATES BY INCOME

Basis	Annual Mortality Improvement by Income (2007–2016)		Annual Mortality Improvement by Income (2007–2014)	
	Males	Females	Males	Females
Group Annuity Experience Study Data	1.5%	1.0%	1.2%	1.4%
Scale AA[1]	0.8%	0.5%	0.8%	0.5%
Scale MP-2017	1.1%	0.8%	1.2%	0.9%

On a lives basis, mortality improvement for 2007–2016 was about 1.0% faster (arithmetically) than Scale AA for males and about 1.2% faster for females. By income, mortality improvement was about 0.7% faster for males and 0.5% faster for females when compared to Scale AA. Scale MP-2017 generally included faster mortality improvement than Scale AA during the period, though the mortality improvement in the group annuity experience data was still greater. In comparison to the 2007–2014 period, average annual mortality improvement for the group annuity data was lower on a

[1] The average annual mortality improvement under Scale AA for females differs from the corresponding value in the "Lives" chart because changing the exposure basis from lives to income results in a reweighting of the mortality improvement rates by age group.

lives basis for the full 2007–2016 period, indicating a relative slowdown in mortality improvement for 2015–2016. On an income basis, the results were mixed, with higher improvement for males in the 2015–2016 period and lower improvement for females in the 2015–2016 period.

Section 2: Format of the Data

All experience is available by lives and by income. The data are available with the following breakdowns:

Experience Years (10):	2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016
Experience Periods (5):	2007–2008, 2009–2010, 2011–2012, 2013–2014, 2015–2016
Gender:	Male, Female
Attained Age Groups:	0–54, 55–59, 60–64, . . . , 90–94, 95+
Annual Income Groups:	$0–4,999, $5,000–9,999, $10,000–24,999, $25,000–49,999, $50,000–99,999, $100,000–249,999, $250,000–499,999, $500,000+
Retirement Class:	Before Normal Retirement Date, on or after NRD, Other (Unknown Retirement Date)
Certain Option:	Life-Only, Life and Certain Period, Cash Refund, Unknown (includes Temporary Life Annuities)
Survivor Option:	0% (Single Life), 1–50% (Joint and Survivor), 51–75% (Joint and Survivor), 76–100% (Joint and Survivor), Unknown Joint Status
Guarantee Status:	Guaranteed, Nonguaranteed
Duration:	0–1 years, 2–5 years, 6–10 years, Ultimate (11+)

To ensure the deaths are reliable, the data reflects annuitants who are receiving life contingent payments or, in some cases, are past normal retirement date but not currently receiving payments. For joint-and-survivor annuities, only the person in payment status is counted in the exposure and death statistics. Some companies did not include exposures and deaths for spouses, but those that did only included them to the extent that the spouses outlive the participants. Data from trusteed/reimbursement contracts (for which a third party administrator maintains the benefit records) are included for some contributing companies but may not be for others.

The Committee believes that any lags in reporting of deaths are minimal at this point and that results are generally credible in the formats provided. Results at the very low and very high ages may not be credible. Users who create their own pivot tables from the data should be careful to ensure there is adequate exposure in the resulting cells.

Actual-to-Expected ratios are available using the 1983 Group Annuitant Mortality Table (83 GAM and 1983 GAM Basic), the 1994 Group Annuitant Mortality Table (94 GAM Basic with Projection or 94 GAM Static), the 1994 Group Annuity Reserving Table (94 GAR), and the RP-2014 Mortality Tables projected with Mortality Improvement Scale MP-2015. All of these tables are applied on a sex-distinct basis. The 94 GAR tables are a combination of the 94 GAM Static Table and Projection Scale AA. Whenever reference is made to the use of the 94 GAR, it implies application of generational mortality techniques. These sets of tables represent the most recent group annuity valuation tables.

The 83 GAM and 94 GAM, with variants, along with Projection Scale AA may be downloaded from http://mort.soa.org (Table Identities 825-826, 832-835, and 923-924, respectively). Note that IRS Revenue Ruling 2001-62 refers to a 94 GAR variant that is projected to 2002. This version of 94 GAR, “IRS 1994 GAR,” is not present in the data.

Table 4 shows the seven mortality bases that are available in the data.

Table 4
AVAILABLE MORTALITY BASES

Mortality Table	Valuation Margin	Projection Scale	Projection Year
83 GAM	**Included**	**None**	**n/a**
83 GAM Basic	None	None	n/a
94 GAM Static	Included	None	n/a
94 GAM Basic with Projection	**None**	**Scale AA**	**Year of Experience**
94 GAR	**Included**	**Scale AA**	**Year of Experience**
RP-2014	**N/A**	**MP-2017**	**Year of Experience**
RP-2014	**N/A**	**MP-2017**	**Midpoint of Study Period**

The mortality tables shown in bold font above are already present in each of the pivot tables. The 83 GAM and 94 GAR were selected as they are prescribed valuation bases. The 94 GAM Basic with Projection was selected as a best-estimate version because a valuation margin is not included but mortality improvement projection is included. Other bases may easily be added to any pivot table by any user who wishes to see results on those bases.

Section 3: Acknowledgments

Special thanks to the contributing companies, the Society of Actuaries, and the members of the Committee for their valuable work in bringing this study and database to fruition. We hope you find it and the accompanying pivot tables to be useful.

Contributing Companies for the 2015–2016 Study Period

Aetna	AXA-Equitable	John Hancock Group
MetLife	Mutual of Omaha	New York Life
Pacific Life	Principal Financial	Prudential

Society of Actuaries

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About the Society of Actuaries

The Society of Actuaries (SOA), formed in 1949, is one of the largest actuarial professional organizations in the world dedicated to serving 32,000 actuarial members and the public in the United States, Canada and worldwide. In line with the SOA Vision Statement, actuaries act as business leaders who develop and use mathematical models to measure and manage risk in support of financial security for individuals, organizations and the public.

The SOA supports actuaries and advances knowledge through research and education. As part of its work, the SOA seeks to inform public policy development and public understanding through research. The SOA aspires to be a trusted source of objective, data-driven research and analysis with an actuarial perspective for its members, industry, policymakers and the public. This distinct perspective comes from the SOA as an association of actuaries, who have a rigorous formal education and direct experience as practitioners as they perform applied research. The SOA also welcomes the opportunity to partner with other organizations in our work where appropriate.

The SOA has a history of working with public policymakers and regulators in developing historical experience studies and projection techniques as well as individual reports on health care, retirement, and other topics. The SOA's research is intended to aid the work of policymakers and regulators and follow certain core principles:

Objectivity: The SOA's research informs and provides analysis that can be relied upon by other individuals or organizations involved in public policy discussions. The SOA does not take advocacy positions or lobby specific policy proposals.

Quality: The SOA aspires to the highest ethical and quality standards in all of its research and analysis. Our research process is overseen by experienced actuaries and non-actuaries from a range of industry sectors and organizations. A rigorous peer-review process ensures the quality and integrity of our work.

Relevance: The SOA provides timely research on public policy issues. Our research advances actuarial knowledge while providing critical insights on key policy issues, and thereby provides value to stakeholders and decision makers.

Quantification: The SOA leverages the diverse skill sets of actuaries to provide research and findings that are driven by the best available data and methods. Actuaries use detailed modeling to analyze financial risk and provide distinct insight and quantification. Further, actuarial standards require transparency and the disclosure of the assumptions and analytic approach underlying the work.

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