Individual Life Insurance Mortality Improvement Scale Recommendation – for Use with AG38/VM20

October 2021 (revised Dec. 2021)

This document outlines the 2021 individual life insurance mortality improvement recommendation.

Background

As part of the work done by the Joint Academy of Actuaries' Life Experience Committee and the Society of Actuaries' Preferred Mortality Oversight Group Valuation Basic Table Team that developed the 2015 Valuation Basic Table, a subgroup was tasked with reviewing recent mortality improvement levels based on available data for the individual life insurance policyholder population.

As a result of this work, the subgroup presented a recommendation for the development of a set of improvement factors that differ by gender and attained age to be used in conjunction with the 2015 Valuation Basic table. This recommended methodology was accepted and has been used for yearend 2013-2020 in conjunction with AG 38 and VM20. See Appendix A of this document for additional background on the development of the current methodology.

Since yearend 2014, a Mortality Improvements Life Working Group (MILWG) has been tasked with studying and annually recommending updates to the mortality improvement scales for use with AG38 and VM20 work (this is specific to the individual life insurance product lines).

The SOA Mortality and Longevity Steering Committee is simultaneously working on a general framework for developing product-neutral mortality improvement scales, which will subsequently be used as a guide by the MILWG to revisit the current approach for creating these scales each year.

The recommended scales are intended to be applied to update ("improve") valuation basic table mortality rates to the end of the current valuation year. As an example, for year-end 2021, the 2015 VBT table mortality would be improved from July 1, 2015 through December 31, 2021 (6.5 years) using the current recommended scale outlined in this document.

Example application:

Year-end 2021 valuation

Male, Age 40

Mortality rate for a male, age 40

$= q_{40}*(1-MI_{40})^{(6.5)}$

$= q_{40}*(1-0.0019)^{(6.5)}$

q_{40} is mortality rate from 2015 VBT

MI_{40} is mortality improvement rate from 2020 recommendation

Improvement applied to q_{40} from the middle of 2015 to the end of 2021 or 6.5 years.

Attained Age	2021 Recommendation Males - 2021	Females - 2021
30	0.0019	0.0027
31	0.0019	0.0027
32	0.0019	0.0027
33	0.0019	0.0027
34	0.0019	0.0027
35	0.0019	0.0027
36	0.0019	0.0027
37	0.0019	0.0027
38	0.0019	0.0027
39	0.0019	0.0027
40	0.0019	0.0027
41	0.0019	0.0027
42	0.0019	0.0027
43	0.0019	0.0027

2021 Mortality Improvement Scale Methodology

The raw, unsmoothed mortality improvement factors are equal to the average of a historical component and a future-looking component as described below:

- Historical component
  The historical component is represented by the 10-year average annual historical mortality improvement levels implied from general population historical mortality data published by the Social Security Administration (SSA). The SSA results are published with a 3-year lag (so for 2021 the historical data is available through 2018). Each year, the SOA applies the SSA methodology to produce a preliminary set of SSA-consistent mortality rates for use in this calculation for attained ages 20 to 100. For the 2021 recommendation, the 2019 historical rates were estimated by the SOA for ages 20 to 100. For ages under 20 and over 100, the SSA Alternative (Alt) 2 projected rates for 2019 were used as a proxy for actual historical rates.

- Future-looking component
  The future component is represented by the 20-year average annual mortality improvement levels (for 2021, this covers the period from 2019 to 2039), based on the most recent Social Security Administration Trustee's report intermediate assumption (Alt 2).

  For AG38/VM20 purposes, the "future/unknown" period component is relatively short (for 2021, historical data exists through 2019, so the "unknown" future component is 2 years). However, applying the 20-year period for averaging generally results in smoother patterns by age and calendar year and also allows for greater weight being given to the long-term average. The projection period length is also expected to be included as part of the full methodology review to apply the recommended consistent framework from the SOA Mortality and Longevity Steering Committee work.

The average annual rates calculated as above are then smoothed using simple linear interpolation to produce a final scale by gender and age.

Recommendation

Based on a review of the improvement factors resulting from application of the methodology to include the 2021 data updates, it is recommended that the downward trend in mortality improvement implied by the application of the standard methodology should be reflected in the recommended scale.

This will result in a reduction in mortality improvement levels from the 2020 scale of approximately 0.30 percent for males and 0.10 percent for females.

Application of the standard methodology for developing historical mortality improvement estimates, does not include data for 2020 where the impact of COVID-19 on both mortality and mortality improvement will be seen. This is because the complete data for 2020 will not be available until early 2022.

It is recommended that the improvement rates provided in the accompanying spreadsheet be used for 2021. In addition, individual companies should reflect their expectations around COVID-19 impacts for short-term mortality levels as part of a temporary mortality adjustment.

Applicability of Improvement Scale

The above recommendation represents a view of reasonable mortality improvement factors for short- and medium-term projections and is intended to be applied solely for the purposes of updating the mortality assumption from the time of the valuation table publication to the beginning of the current valuation period.

APPENDIX A:

Considerations in developing mortality improvement factors for application with VM38 and VM20.

- Recency of Experience Used – The desire for a methodology that weights the impact of recent historical rates of improvement with a longer-term assumption (i.e., SSA intermediate mortality projections) in determining projected improvement rates. This approach is (at a very high level) consistent with the current U.K. Continuous Mortality Investigation ("CMI") projection models, as well as methods commonly used to develop other insured mortality projection scales. These methods basically project rates based on past experience, but trend toward a long-term assumed average annual improvement level.
- Insured Data – Aggregate insurance company data for the period 2002-2009 from the Society of Actuaries regular studies of individual life insurance mortality was initially examined. It was eventually decided that, given (1) the relatively short period over which historical insured experience is available and (2) the year-over-year volatility of results (likely in part the result of both industry-specific factors and changes in underlying mortality rates), general population data is a preferable source for determining both an improvement scale for use in VBT table development efforts and as annual AG38/VM20 scale recommendations, at least for the near term.
- General Population Data Source – The subgroup examined several sources of general population data, including data from the U.S. Vital Statistics, the Human Mortality Database (HMD), and the SSA. The SSA data was selected as the source for general population analysis for several reasons, including the fact that it is strongly vetted, that it may have better data regarding age at death for the oldest ages than HMD, and that it includes projections of future estimated mortality.
- Additional Factors Considered (Gender, Attained Age, Smoker Status, Socioeconomic Status, Differences in Cause of Death for Insured vs. General Population) – In addition to data sources discussed above, the subgroup also researched and considered additional factors that could impact mortality improvement experience. The decision was made to regularly review the use of alternative or further adjustments to population mortality to eliminate potential basis risk at the same time any changes for consistent framework recommendations are incorporated.