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

American Academy of Actuaries' Life Work Group and the Society of Actuaries Research Institute's Mortality and Longevity Oversight Advisory Council

September 2025

Purpose

This document describes the 2025 individual life insurance historical mortality improvement (HMI) and future mortality improvement (FMI) recommendations approved by the National Association of Insurance Commissioners (NAIC) Life Actuarial Task Force (LATF) at the 2025 Summer National Meeting.

For US statutory reserves under VM20 or AG38 using the 2008 Valuation Basic Table (2008 VBT) or the 2015 Valuation Basic Table (2015 VBT) other than limited underwriting business, the HMI and FMI scales discussed herein are applicable.

For all limited underwriting business, the HMI and FMI mortality improvement assumptions are zero for all years.

Background

As part of the work conducted by the American Academy of Actuaries' Life Work Group and the Society of Actuaries Research Institute's Mortality and Longevity Oversight Advisory Council (MLOAC) to develop the 2015 Valuation Basic Table, the Mortality Improvements Life Working Group (MILWG) (a subgroup of MLOAC) was tasked with reviewing recent mortality improvement levels based on available data for the individual life insurance policyholder population.

Since year-end 2014, the MILWG has been tasked with studying and annually recommending updates to mortality improvement scales for use with AG38 and VM20 (specific to the individual life insurance product lines). Each year, the MILWG presents a recommendation for a set of HMI factors, and starting in 2022, a set of FMI factors to be

used in conjunction with the 2015 Valuation Basic table. Both the HMI and FMI scales vary by attained age and sex. The FMI scale also varies by calendar year of projection.

The HMI & FMI scales presented in this document were accepted for use for the 2025 valuation year in conjunction with AG38 and VM20. See Appendix A of this document for background on the development of the current methodology for producing these scales. See Appendix B for a discussion of the considerations of the impact of COVID-19.

Recommendation

It is recommended that the HMI and FMI rates provided in the accompanying spreadsheet be used for 2025.

2025 Historical Mortality Improvement (HMI) Scale Methodology

The raw, unsmoothed HMI rates are equal to the average of a historical component and a future-looking component as discussed below.

Historical component

For 2025, the HMI rates have been developed using the same methodology as in past years; however, the basis for the historical component of the calculation was insured data for calendar years 2011-2019. This contrasts with previous scale years where the historical component relied on US general population data. In prior years, the historical component represented the average of the most recent 10 years of data available from US population mortality using Social Security Administration (SSA) data. This change has resulted in higher HMI levels at some attained ages for both males and females (Charts 1&2 below).

The historical component is represented by the geometric average of the most recent 10 years of annual mortality improvement data implied from individual life insured population mortality data published by the SOA Research Institute. The source of the data is NAIC and Kansas mandatory data calls. The methodology for deriving the mortality improvement rates and the associated analysis tool is examined in detail in the following SOA Report: https://www.soa.org/resources/research-reports/2024/ind-life-mort-tools/.

Chart 1: Male HMI Rates 2024 and 2025

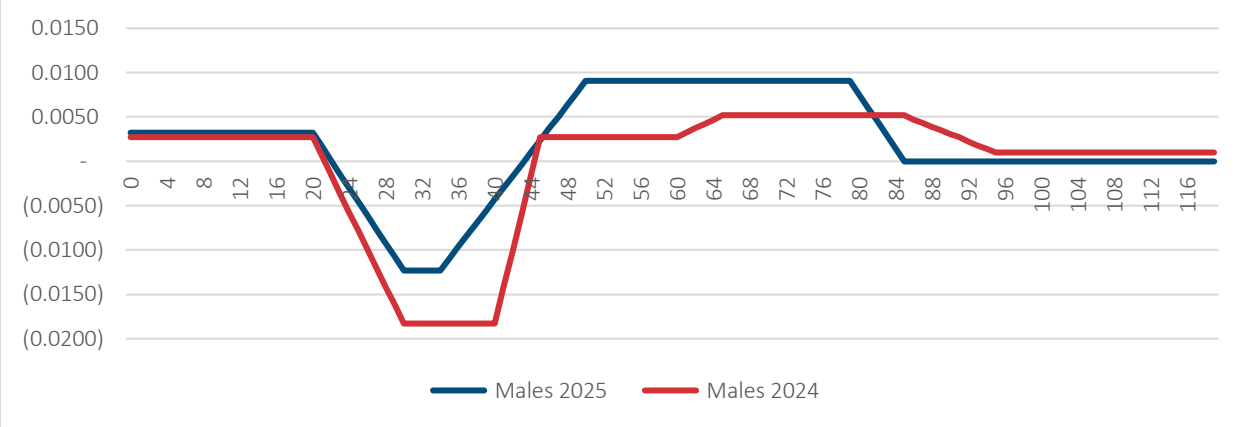
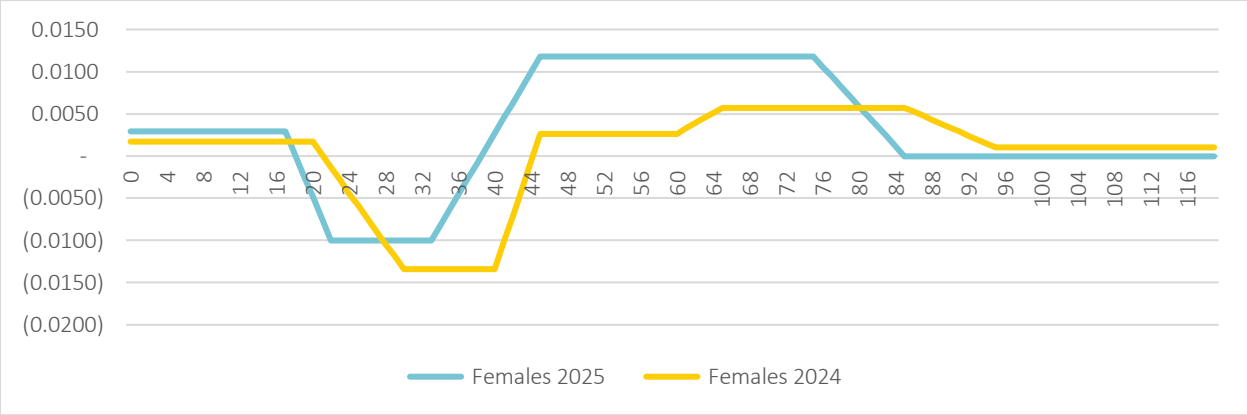


Chart 2: Female HMI Rates 2024 and 2025



MILWG examined different approaches for determining a basis for mortality improvement experience derived from individual life insured data. As discussed in the report linked above, this involved developing a means of estimating the true biometric improvement by removing the impacts on insured mortality trend of various changes in industry over time. Examples of this include changes in underwriting risk classes and definitions, changes in underwriting tools and guidelines, and changes in target markets and distribution channels. To accomplish this, a set of predictive models was developed which identified factors that were strong drivers of mortality improvement. A tool was then developed to "normalize" the insured data for each of these factors, by holding the distribution of the key factor constant over the period of measurement.

It should be reiterated here that the predictive model described above was not used to project or estimate any HMI scale recommended here. The model was used only as a means of identifying key factors that tend to impact the insured mortality and therefore distort the MI results taken directly from the data.

The normalized insured data was then compared to data from an SOA report deriving mortality improvement by socioeconomic decile from US general population data for the period 2011-2019 (https://www.soa.org/resources/research-reports/2020/us-mort-rate-socioeconomic/). The purpose of this comparison was to determine if there was a decile or a weighted average of deciles that consistently demonstrated similar experience to the insured population; if so, emerging experience for that decile could be used as a proxy for insured experience in deriving insured HMI rates. Socioeconomic Decile 6 was identified as a potential proxy for the insured population as the experience seemed to be similar across most ages. Ultimately, it was decided that the normalized insured data itself could be relied on directly at most ages as the volume of data now available through the mandatory data collections (combined with the normalization techniques) allows for a stable and reasonable pattern of historical mortality improvement to be derived.

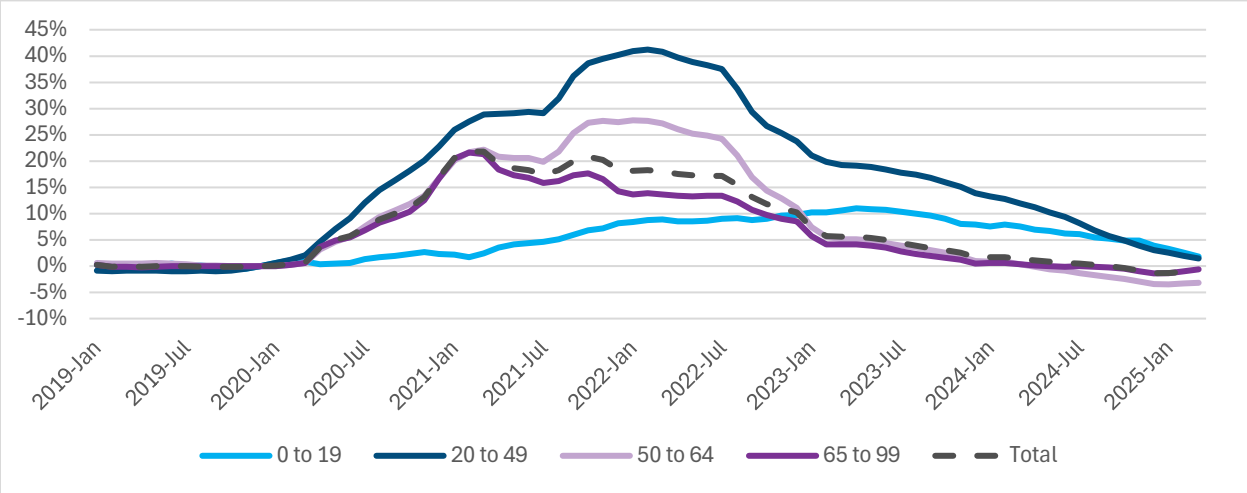
The recommendation for the historical component of HMI for 2025 reflects the use of the insured data directly for most adult ages, the exceptions being ages under 20 ages and ages over 80. At ages under 20, the mean of the US general population data from the SSA continues to be used as the basis for the historical component. For ages over 80, HMI rates have been calculated by grading from age 80 insured mortality improvement levels to zero MI at age 85, then remaining at zero for all ages above 85. **These rates represent the final HMI recommendation for ages 80+.**

At the youngest ages, there is insufficient credible insured data to rely on the insured data alone. At the oldest ages, the historical data shows some deterioration – which may be the result of industry factors. A possible example is the impact of the life settlements, which may have reduced lapse rates resulting in more policies terminating as

death claims. That being said, based on medical advances seen in the past 10-15 years, the expectation is that there will be some small levels of improvement in the historical MI rates for insureds at these ages. For the general population, there are healthy improvements at older ages over the same period as the insured data. The expectation of the subgroup is that for the next 5-10 years, the results for insureds will vary between small positives and small negatives.

As a reasonability test of the HMI results, general population MI trends were derived from CDC and SSA data available through May of 2025 (see SOA report https://www.soa.org/resources/research-reports/2025/qmmr-us-population/).
General population mortality has recently achieved a return to pre-pandemic 2019 levels at most ages for both males and females (Chart 3).

Chart 3: US General Population Mortality Trends: Excess Mortality over 2019 Levels by Age, Sex and Calendar Quarter



Under the assumption that the trends in excess mortality should be similar for insureds, the individual life insurance valuation mortality rates were calculated by applying the recommended HMI scale for 2025 to the 2015 VBT table. The resulting valuation starting mortality was then compared to 2019 insured mortality rates as reported in the most recent SOA study of individual insured mortality (https://www.soa.org/resources/research-reports/2024/ilec-mort-2012-19/). The resulting valuation mortality is higher than 2019 insured mortality for some ages and lower for other ages, a similar result to the general population. Assuming the insured data is following the pattern of the general population and returning to 2019 levels at 2025, this would indicate the 2025 HMI recommendation holds up to high level reasonability check.

Future-looking component

The future component continues to be represented by the 20-year geometric average annual mortality improvement level (for 2025, this covers the period from 2019 to 2039 – beginning at the end of the historical period of data for insured MI and based on the most recent SSA Trustees report (2025) intermediate assumption. At this time, there is insufficient data to form the basis of a future projection of MI results directly from insured data.

The "future/unknown" period is longer than in the prior scale years with the move to using insured data (for 2025, final historical data only exists through 2019, so that years being estimated are from 2019-2025). The 20-year period was chosen for future component averaging because it results in smoother patterns by age and calendar year, as well as allowing for greater weight being given to the long-term average.

The average annual rates calculated as above are then manually smoothed to produce final scales by sex and age.

2025 Future Mortality Improvement (FMI) Scale Methodology

The FMI rates are calculated as follows. The calculation of FMI has not changed with the 2025 scale. The only change is that the HMI starting point has been determined using insured data rather than US general population data as in the past.

- The starting point for FMI is the 2025 HMI scale.
- The FMI rates grade from the 2025 HMI level to a long-term MI assumption that is based on the average of years 10-15 of the SSA 2025 Trustee's Report intermediate projected mortality assumption.
- The FMI rates grade to the long-term MI assumption level over the first 10 years of the projection.
- The FMI rates then remain level at the long-term rate from 2035-2040 (5 years).
- The FMI rates then grade to zero at year 20 (2045).

For ages between 22 and 44, where there has been significant mortality deterioration, current general population trends show a continued improving trend over the past few years. Therefore, at these ages, the FMI recommendation assumes a return to zero MI levels in 2027, continuation of zero MI until 2030, then grading to the long-term MI rate assumption in 2035. FMI rates then remain level at the long-term assumption until 2040 and then grade to zero in 2045 and later.

APPENDIX A: Development of HMI and FMI Factors – Scale Years 2013-2025

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

- Recent Historical Experience Impact – 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 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 including the SOA Mortality Improvement Model (https://www.soa.org/resources/research-reports/2023/mortality-improvement-model/). These methods project rates based on past experience but trend toward a long-term assumed average annual improvement level.
- Insured Data –Prior to this year, the aggregate insurance company data from the Society of Actuaries' regular studies of individual life insurance mortality was not used in the development of HMI and FMI scales because of (1) the relatively short period over which historical insured experience is available, and (2) the year-over-year volatility of industry specific results. The volatility is ascribed both to non-biometric factors — such as changes in target market, distribution channel, and underwriting mix — and true biometric changes in underlying mortality rates. Instead, general population data had been considered a preferable source for determining an improvement scale for use in VBT table development efforts and annual AG38/VM20 scale recommendations. This has changed with the 2025 HMI and FMI scale work, and insured data is now being used in the determination of HMI rates.
- General Population Data Source – The MILWG 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 be based on better data regarding age at death for the oldest ages than HMD, and that it includes projections of future estimated mortality.
- Additional Factors Considered (Sex, 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.

APPENDIX B: Considerations for Impact of COVID-19 – Scale Years 2022-2025

In 2022, the MILWG, as well as other industry groups working on valuation mortality and mortality improvement rates, considered appropriate methods to reflect the impact of a shock mortality event like COVID-19. To ensure consistency in thinking about how to reflect the impact of a shock mortality event, an industry group was formed in January 2022 to discuss and develop a set of principles to reflect the impacts of COVID-19 on life insurance and annuity valuation mortality. This group included representatives from the life insurance industry, the American Academy of Actuaries, the Society of Actuaries, and the NAIC. A key principle agreed upon by the group was that the initial shock impact of the COVID-19 event should be reflected in valuation mortality only to the extent it is expected to continue in the future.

In practice, this principle was reflected in the recommendations by implementing a revised methodology for HMI and FMI for years 2022 through 2025. The revised methodology is outlined below.

Revised Methodology

HMI

For HMI, for 2022 and 2023 scale years, under the principle of not including the initial shock impact of COVID-19 to develop the HMI or FMI scales, the historical average component was calculated as the 10-year average from 2010-2020 and from 2011-2021, respectively. However, for purposes of this calculation, it was assumed that 2020 and 2021 mortality remained at the same level as 2019. For 2024 and 2025, the 10-year average calculation returned to the standard methodology, using a geometric average over the periods 2012-2022 and 2013-2023, respectively.

FMI

For FMI, for the first three reserve projection years, for all ages where HMI rates were negative, the FMI rates were adjusted to show continued deterioration in mortality, followed by a zero MI level. This was done to reflect a reasonable estimate of potential ongoing impacts of COVID-19 as well as the opioid epidemic on the life insured population. This resulted in an increase in mortality over pre-pandemic levels at these ages.

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