Mortality Improvements Life Working Group (MILWG):
2023 HMI and FMI Scale Recommendation for Approval

Academy Mortality Improvements Life Work Group (MILWG)
SOA Mortality and Longevity Oversight Advisory Council (MLOAC)

Life Actuarial Task Force (LATF)—9/14/23

Agenda

- Overview of the changes to Life Historical Mortality Improvement (HMI) and Future Mortality Improvement (FMI) scale methodologies for 2023

- Recommendation for 2023 HMI and FMI scales

HMI and FMI Methodology Changes

1. **Smoothing method (HMI and FMI) - greater detail by attained age group**

2. **Adjustment for potential disconnect between HMI and FMI scales applied**
   - ☐ 2024 100% deterioration implied by full impact of COVID in the HMI methodology applied
   - ☐ 2025 50% of the deterioration applied
   - ☐ 2026 FMI= 0
   - ☐ 2027-2033 grades to the long term MI assumption at 2033
   - ☐ 2033-2043 grades to 0 MI at end of 20 years

Review Smoothing Approach

|	Current Method	Recommendation
1. Ages 0-15 (juvenile)	Use adult average (18-84) x 1.5	Use 0-20 average
2. Ages 16-20	Linear interpolation from juvenile rate to adult rate at age 21	Use 0-20 average
3. Ages 21-84	**Use Adult Average 18-84**	**Break into more detailed age groups:** **0-20** **25-40** **45-60** **65-85** **Linear interpolation between groups.**
4. Ages 85-94	Linear interpolation from adult rate to .0025 per year ultimate level at age 95	Linear interpolation from 65-85 average to .001 per year ultimate level at age 95 (use .001 due to COVID considerations)
5. Ages 95 and later	Use constant .0025 (used .001 for 2022 due to COVID impact considerations)	Use constant .001 due to COVID considerations

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Comparison of Smoothing Approaches
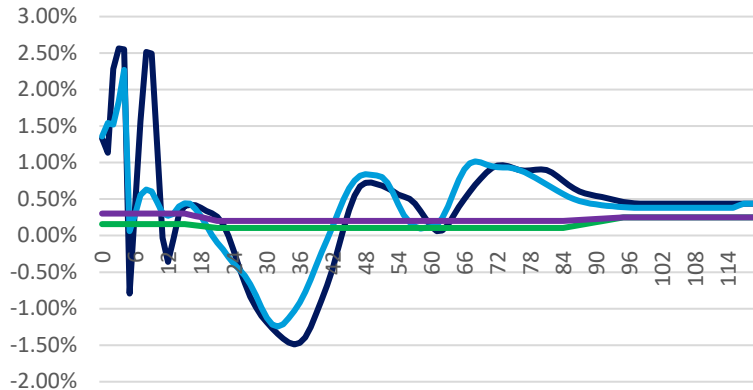
2023 Recommended HMI scale

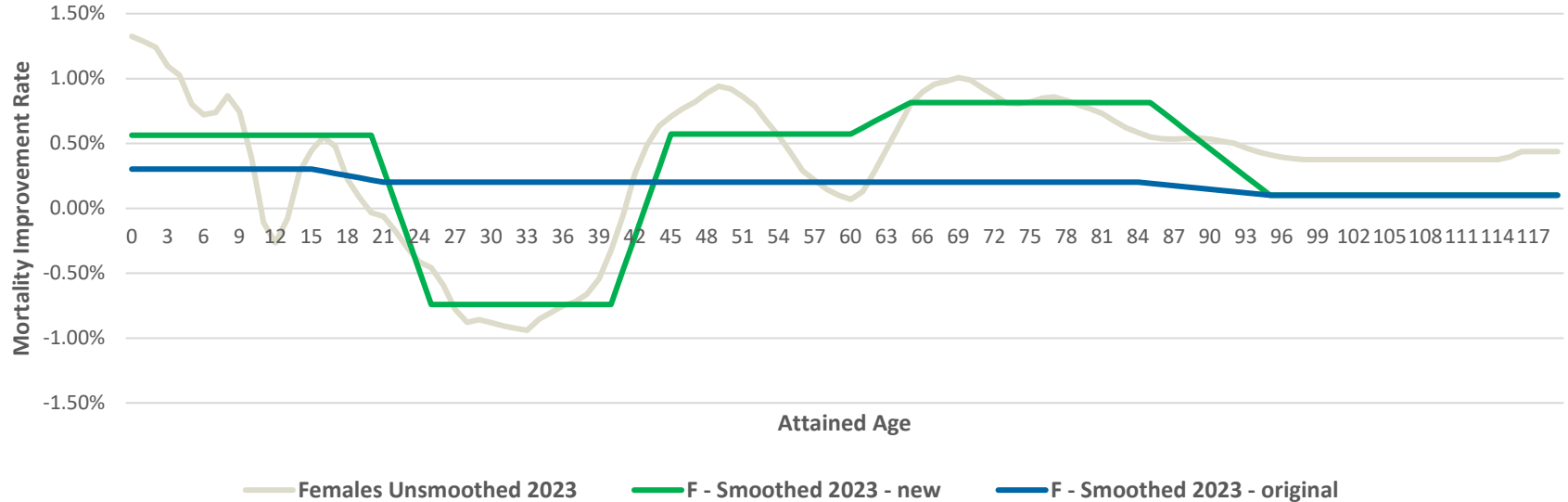### Smoothing—OLD
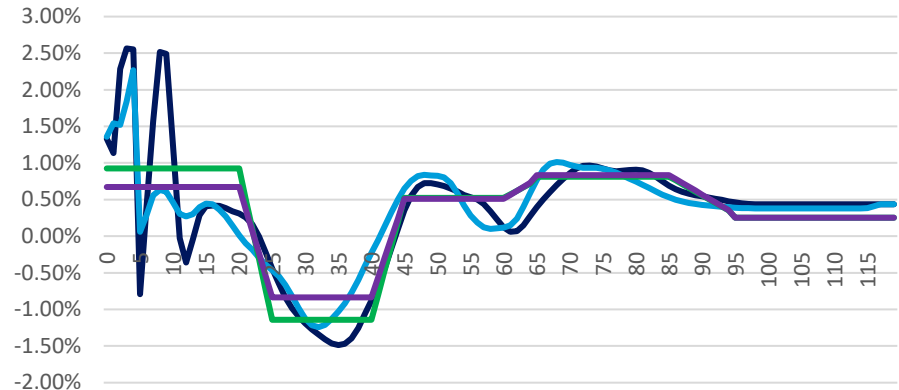
Smoothing—NEW

HMI 2023 Recommendation
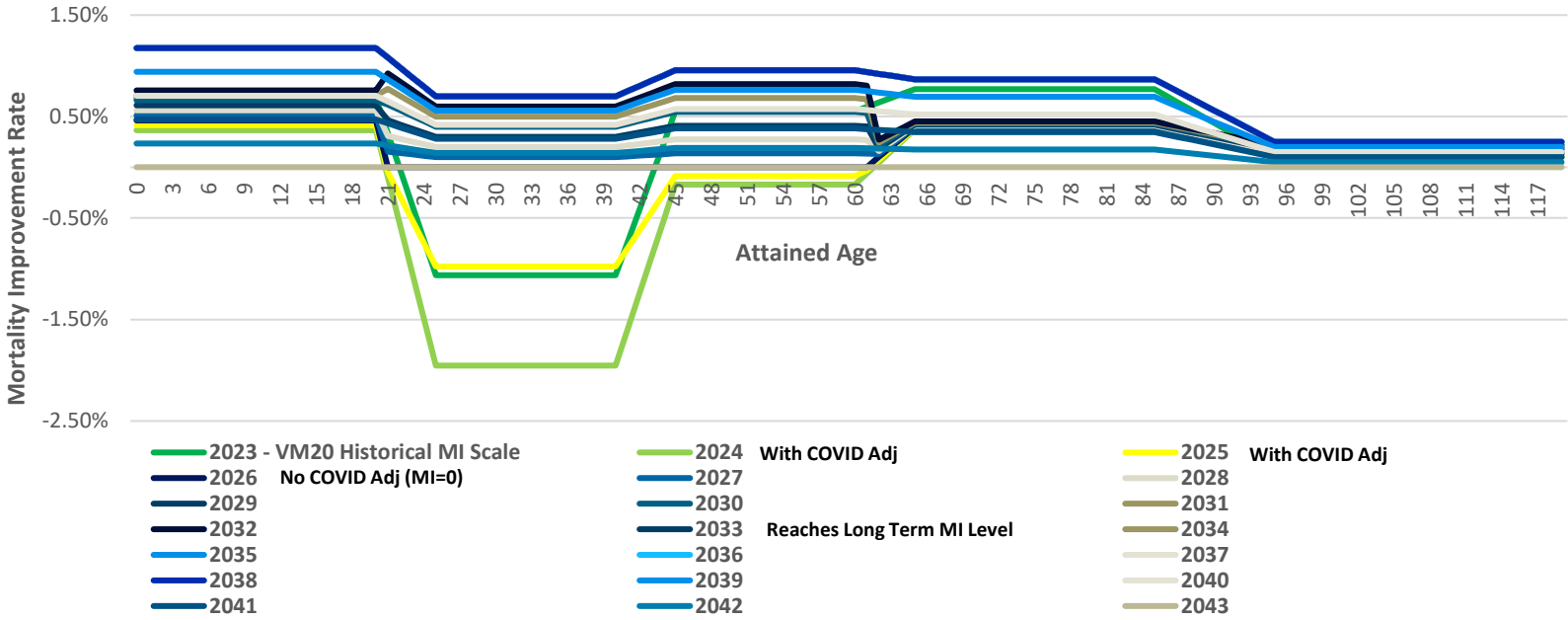# Male, Mortality Improvement Rates

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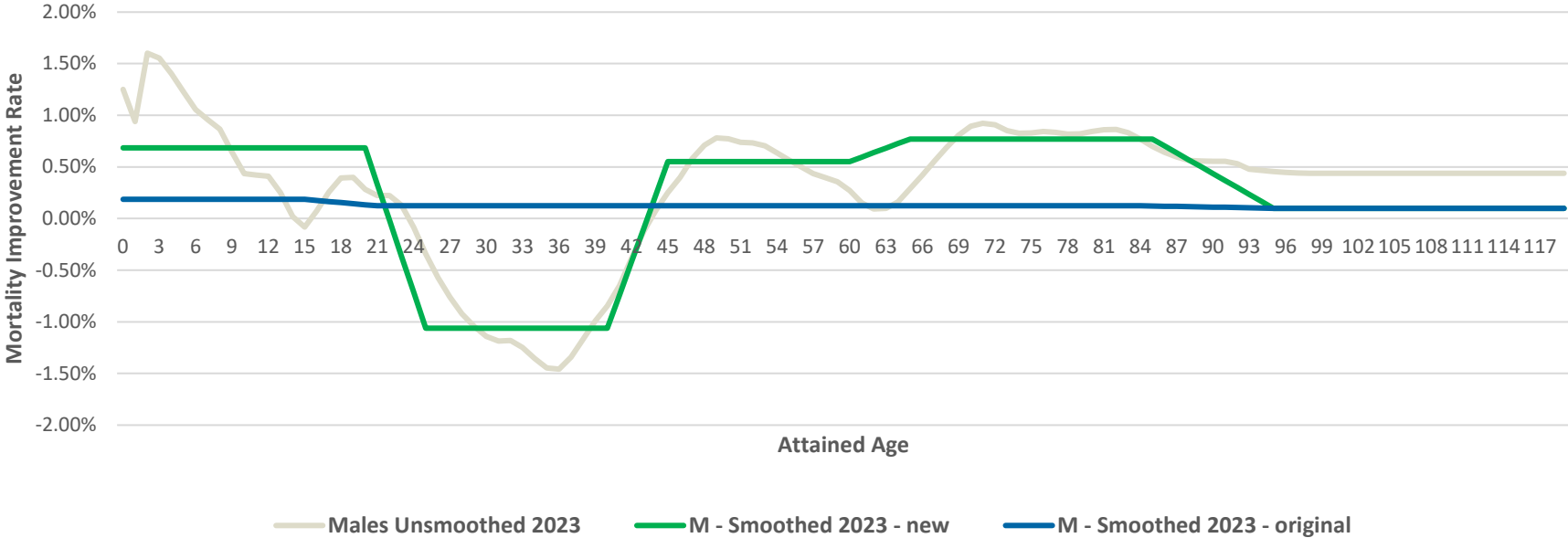
HMI 2023 Recommendation
Female, Mortality Improvement Rates

FMI 2023 Recommendation—Basic Scale Male, Future Mortality Improvement Rates

MI LTR (Males)

Age:
0-20   1.2%
21-60   .7% - 1%
60-85   .9%-1%
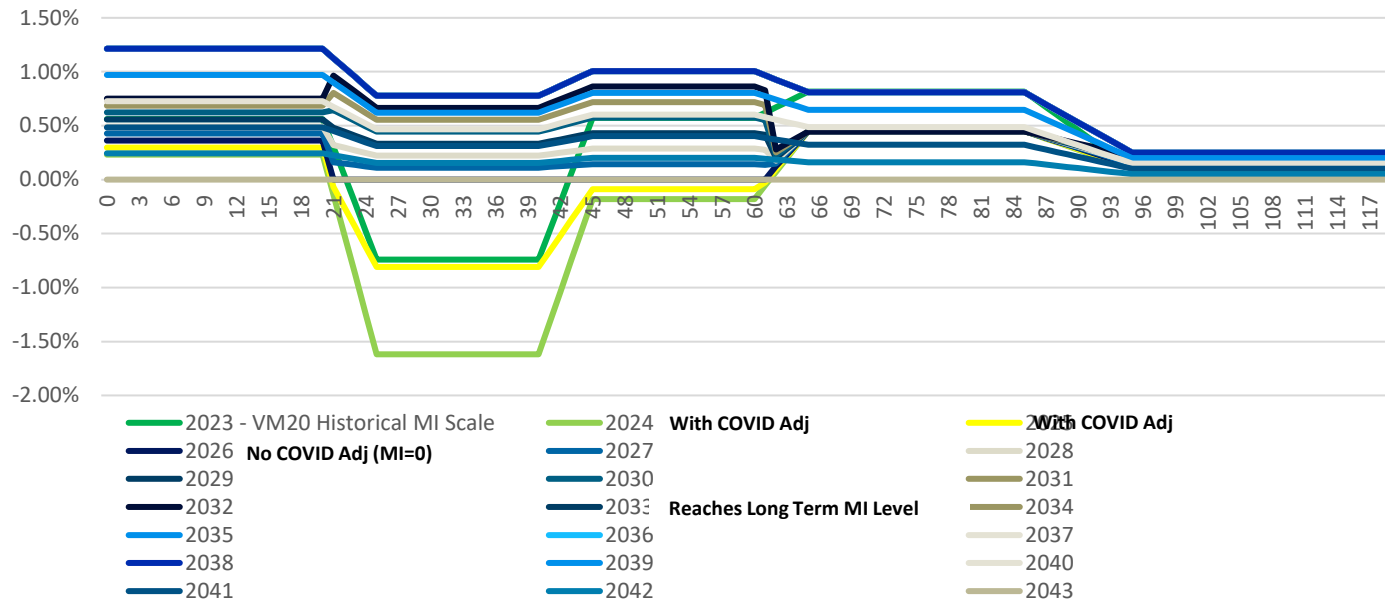85+   grades to
         .25% at 95

FMI 2023 Recommendation—Basic Scale Female, Future Mortality Improvement Rates

MI LTR (Females)

Age:
0-20   1.2%
21-60   .8% - 1%
60-85   .8%-1%
85+   grades to .25% at 95

Questions?

Contact Information

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Members available to provide supplementary information and explanation as needed.

Appendix

2023 Work Plan

Presented at 2023 NAIC Spring Meeting

- ☐ Revisit historical HMI methodology in light of recent and expected experience - completed

- ☐ Revisit smoothing approach for HMI and FMI—completed

- ☐ Approach to COVID-19 impact for 2023—FMI (future mortality improvement) and HMI (historical mortality improvement)—completed

- ☐ Insured vs. general population HMI and FMI recommendations (begin work in 2023)

- ☐ Revisit FMI margin structure

- ☐ Review recommendation for MI with 2008 VBT Limited Underwriting (LU) table
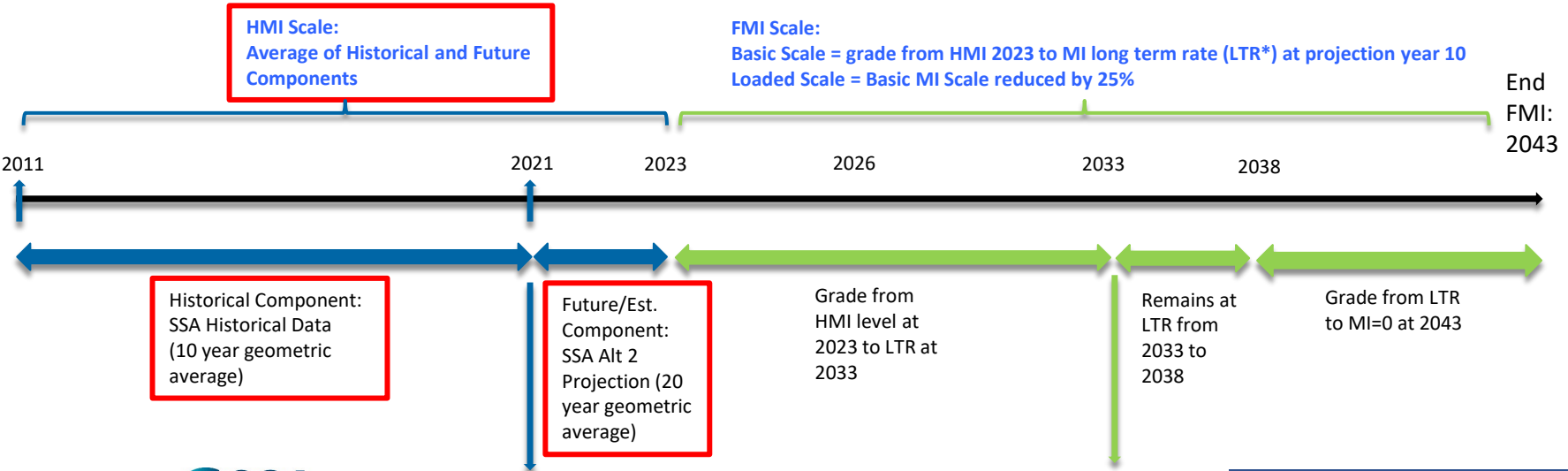
HMI/FMI General Methodology

HMI Scale Year	Historical Component: *Historical Data (10 yrs)* *SSA Data = General Population Mean*		Estimated/Future Component: *SSA (Social Security Administration)* *Alt2 Projection (20 yr average)*
2023	Averaging Period: 2011-2021		Averaging Period: 2023-2043
FMI Scale Year	**Process**		**Long-Term Rate (LTR)**
2023	**Basic Scale:** • Grades to LTR at projection yr 10 (2033) • Remains at LTR for projection yrs 10-15 • Grades to no additional MI at projection yr 20 (2043) • Margin for uncertainty included to develop **"Loaded Scale" – 25% flat reduction in MI**		Average of SSA Alt 2 MI for projection years 10-15

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Revisit HMI Methodology

HMI/FMI General Methodology

Scale Year = 2023

*LTR = arithmetic average of MI implied by SSA Alt 2 projection for years 10-15 2033-2038

HMI Scale:
Average of Historical and Future Components

FMI Scale:
Basic Scale = grade from HMI 2023 to MI long term rate (LTR*) at projection year 10
Loaded Scale = Basic MI Scale reduced by 25%

End FMI: 2043

2011   2021   2023   2026   2033   2038

Historical Component: SSA Historical Data (10 year geometric average)

Future/Est. Component: SSA Alt 2 Projection (20 year geometric average)

Grade from HMI level at 2023 to LTR at 2033

Remains at LTR from 2033 to 2038

Grade from LTR to MI=0 at 2043

Last year SSA historical data available

FMI reaches LTR

Items under review

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HMI Methodology Recommendation:
Historical Averaging Period (currently 10 years)

Recommendation: remain at 10 years

- ☐ Recent experience (2011-2021)

- ☐ Reduces year-to-year potential volatility of shorter periods but experience is relevant

HMI Methodology Recommendation: Future Averaging Period (currently 20 years)

Recommendation: remain at 20 years

☐ Smooths out potential SSA Alt 2 early projection year bumps

HMI Methodology Recommendation: Averaging Method

Averaging method: currently use geometric average over historical and future periods

<u>Recommendation</u>: continue to use geometric approach for 2023

Consider moving to arithmetic average rather than geometric for both historical and future components (will re-examine for 2024 scale work)

- ☐ Relies less on only the beginning and ending year experience

- ☐ Not much difference between arithmetic and geometric average results for years since we implemented the annual life MI scale updates

- ☐ Consistent with the FMI LTR determination

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Calculation of Historical MI Averages
Comparison of Approaches

Male Historical Component—10 year average, Full COVID Impact
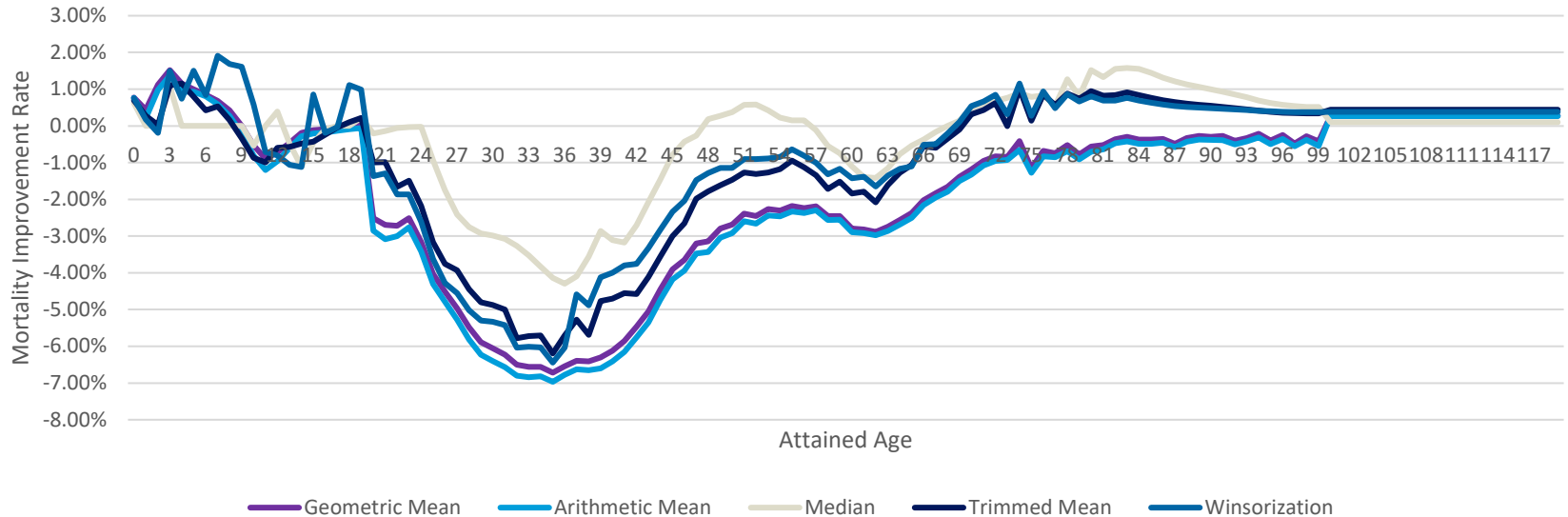
HMI Methodology Recommendation: Weighting of Historical and Future Components of HMI

Recommendation:

Keep 50/50 weighting on averaging

☐ No data-focused basis for changing at this point

COVID-19 Impact—2023 Approach

COVID-19 Impact

COVID-19 impact considerations

☐ Ensuring COVID-19 impact is considered

☐ Some companies with high credibility will use their best estimate mortality (including implied historical improvement) for long periods before grading to industry

   ◪ Creates potential disconnect between HMI and the recommended industry FMI scale

Recommendation: Follow 2022 method – remove COVID from historical average for HMI and put in an adjustment for COVID in first few years of FMI
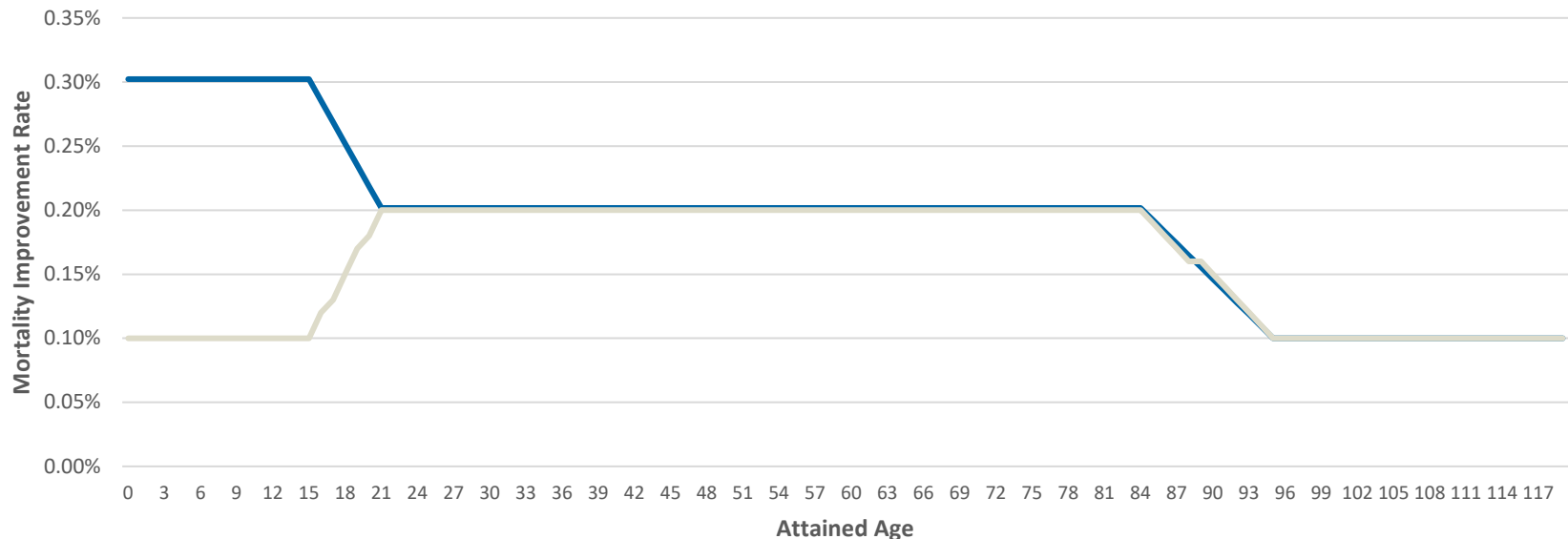
2023 vs 2022: Male—Old Smoothing Historical Mortality Improvement Rates
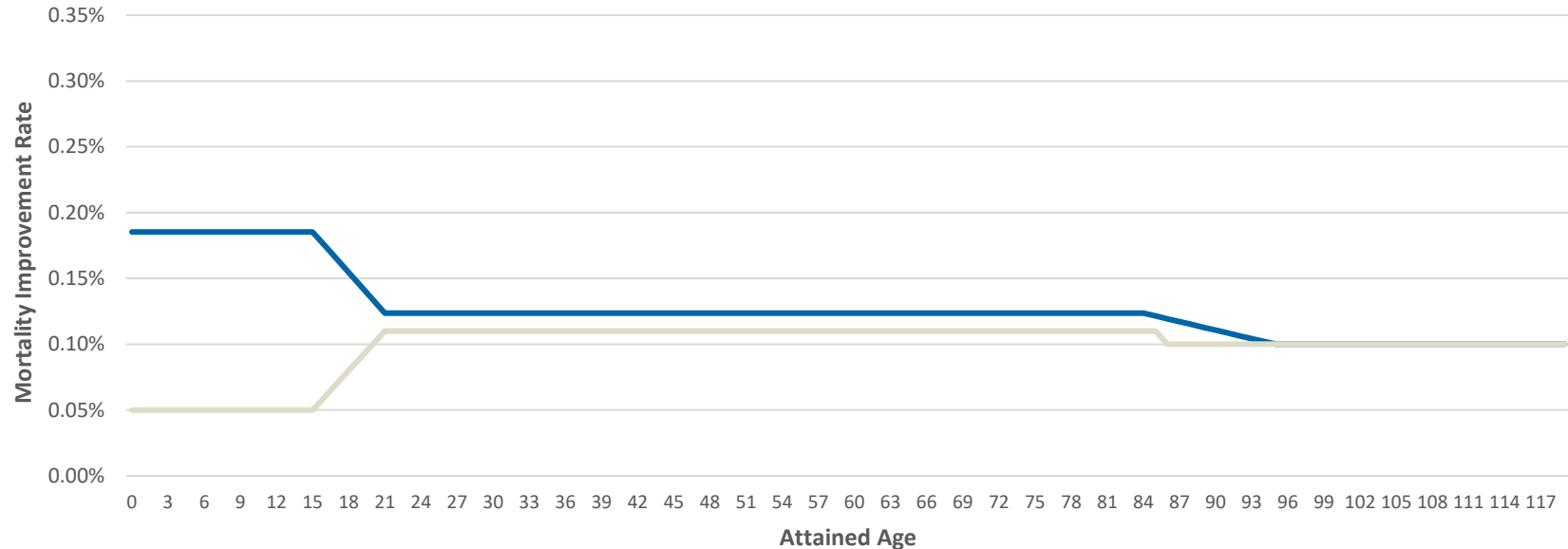
2023 vs 2022: Female—Old Smoothing Historical Mortality Improvement Rates

2023 vs 2022—Male
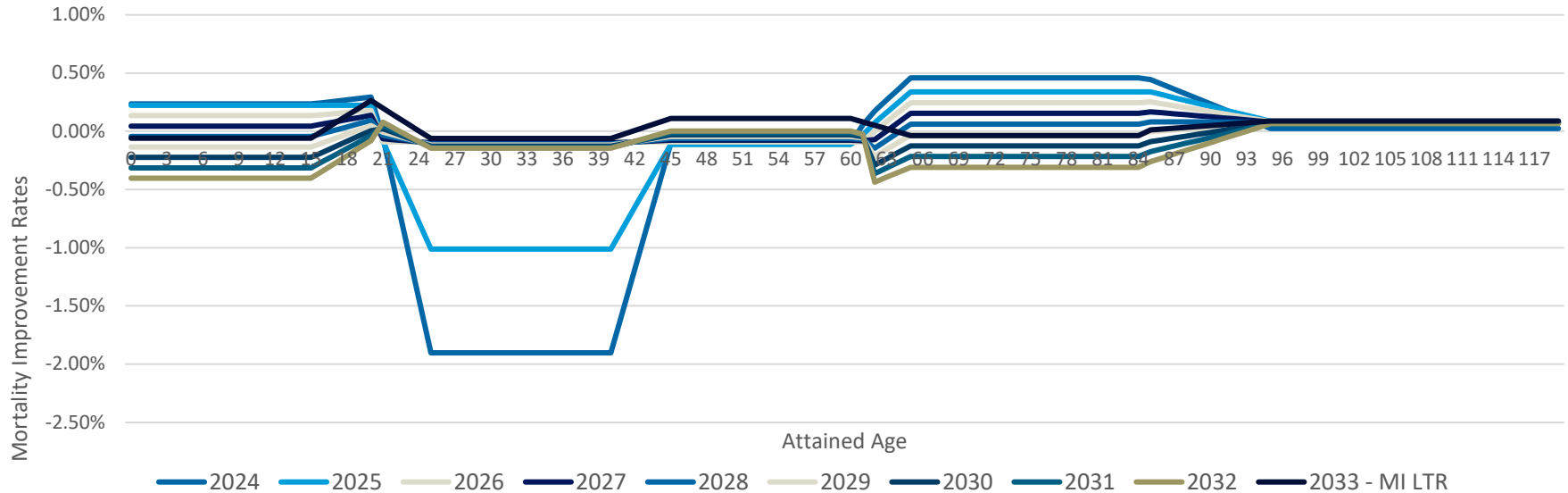# Future Mortality Improvement Rates

Male - Increase/Decrease in FMI Rates
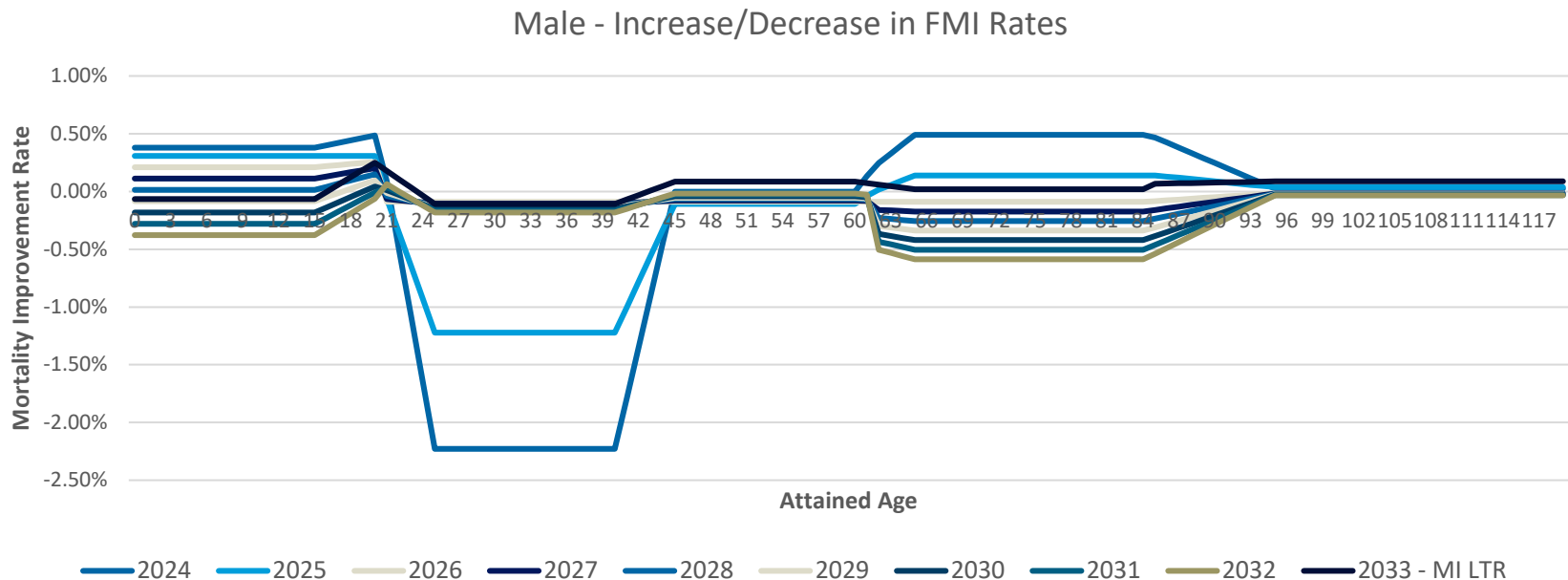
2023 vs 2022—Female
Future Mortality Improvement Rates

Female - Increase/Decrease in FMI Rate

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Update on Next Steps for 2023

- �“ Insured vs. general population HMI and FMI recommendations (work continues)

- ◙ Revisit FMI margin structure

- ◙ Review recommendation for MI with 2008 VBT Limited Underwriting (LU) table

  - ■ Keep the HMI and FMI scales at 0 MI for all ages

  - ■ Look at additional data sources to support this