Mortality Improvements Life Working Group (MILWG): 2023 HMI and FMI Scale Update

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American Academy of Actuaries

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

Life Actuarial Task Force (LATF)—7/20/23

2023 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

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Agenda

- Provide an update on work completed:
  - Revisit historical HMI methodology in light of recent and expected
  - Revisit smoothing approach for HMI and FMI
  - Approach to COVID-19 impact for 2023—FMI (future mortality improvement) and HMI (historical mortality improvement)
- Present recommendation for 2023 HMI and FMI scales
- Provide an update on next steps for remaining 2023 work plan

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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

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

Grade from LTR to MI=0 at 2043

Last year SSA historical data available

FMI reaches LTR

Items under review

HMI Methodology Review Items

1. **Historical averaging period (10 years)**
   - Mortality improvement between 2011-2021 (last year through which SSA historical data has been compiled and published)
2. **Future averaging period (20 years)**
   - From last year of historical data available
3. **Averaging method**
   - Calculation of historical and future averages
   - Weighting of historical and future

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

Recommendation: remain at 20 years

- Smooths out potential SSA Alt 2 early projection year bumps

HMI Methodology Review Items Recommendation: Averaging Method

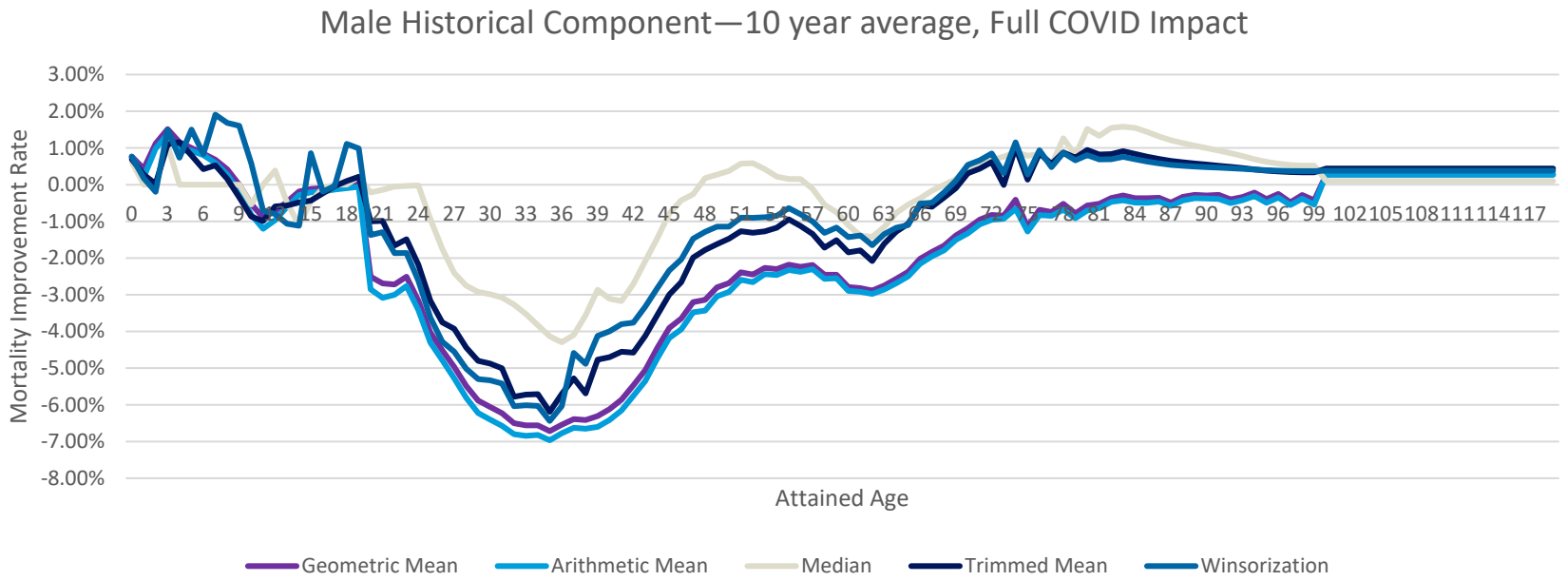
Averaging method: currently use geometric average over historical and future periods

Recommendation: 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

Calculation of Historical Averages



HMI Methodology Review Items Recommendation: Weighting of Historical and Future Components of HMI

Recommendation:

Keep 50/50 weighting on averaging

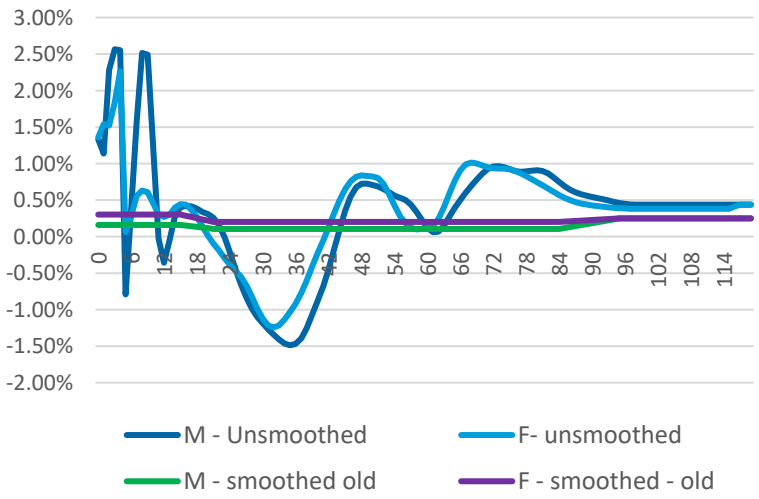
- No data-focused basis for changing at this point

Revisit Smoothing Process

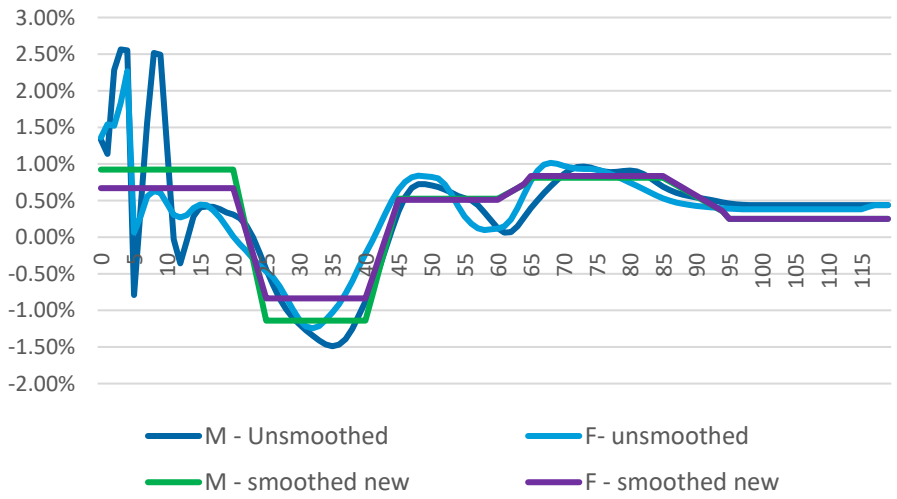
Review Smoothing Approach

	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

Comparison of Smoothing Approaches



2023 Recommended HMI scale



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COVID-19 Impact—2023 Approach

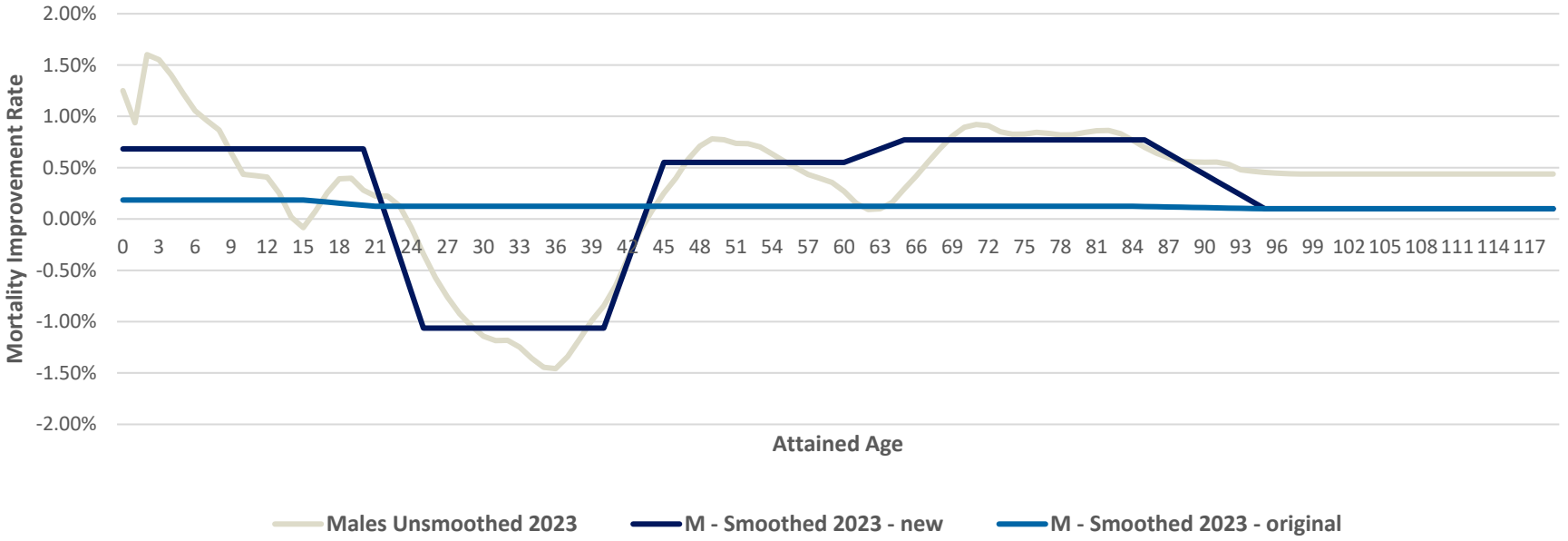
COVID-19 Impact

COVID-19 impact considerations

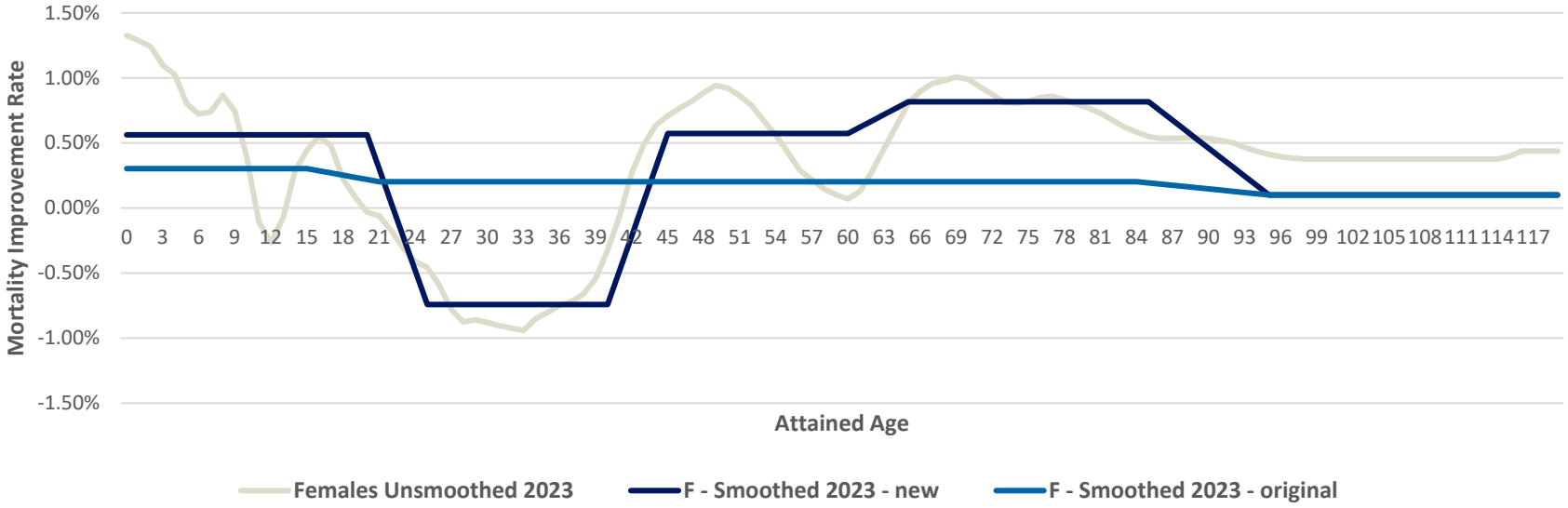
- Ensuring COVID-19 impact is considered
- Some companies with high credibility will use their best estimate mortality (including implied historical improvement) for long periods before grading to industry
  - Creates potential disconnect between HMI and the recommended industry FMI scale

Recommendation: COVID impact will be included in the first few years of the FMI scale for 2023 (similar to approach for 2022 scale work)

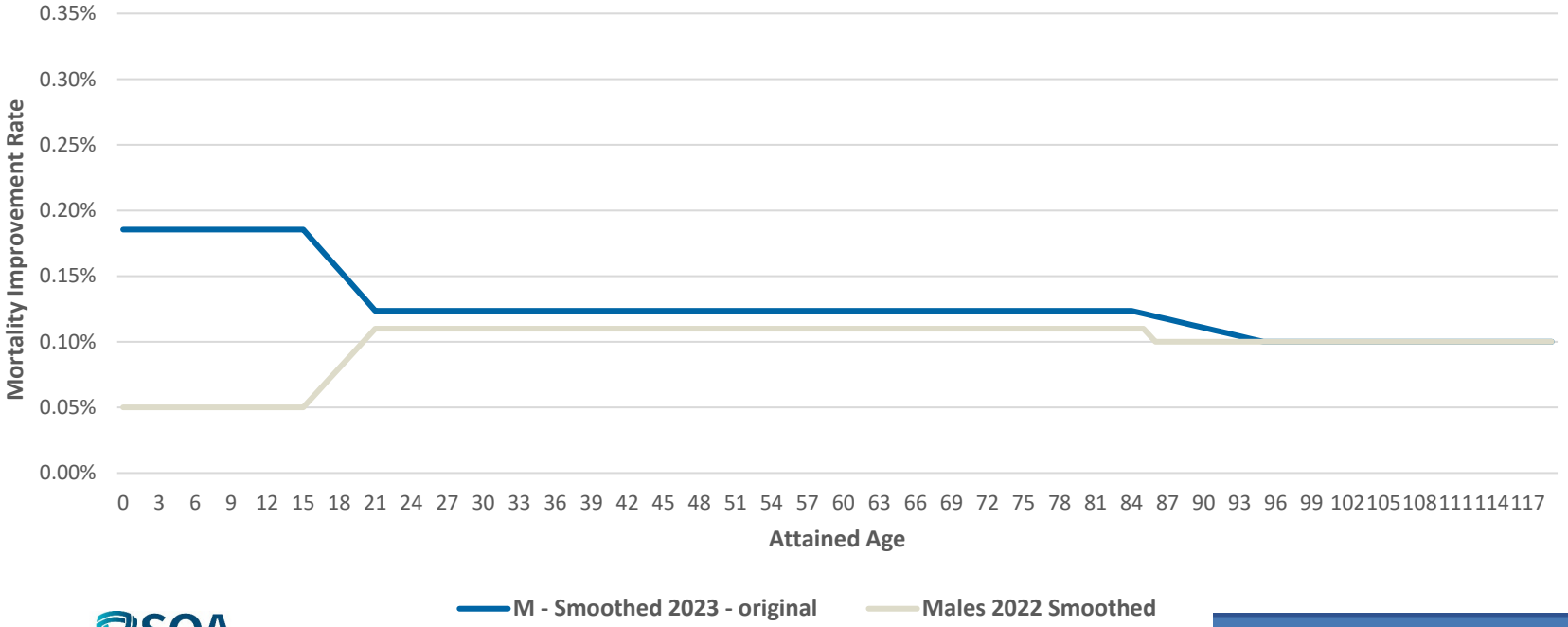
HMI 2023 Recommendation
Male, Mortality Improvement Rates



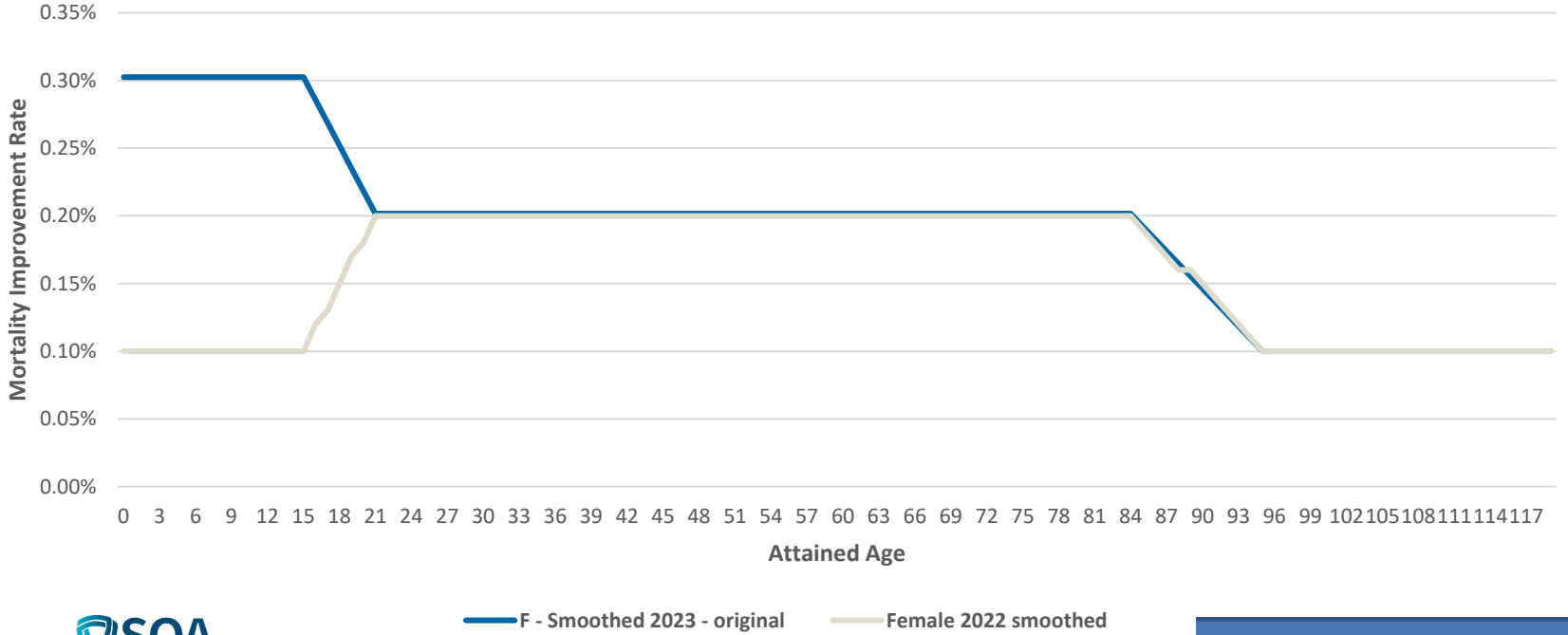
HMI 2023 Recommendation
Female, Mortality Improvement Rates



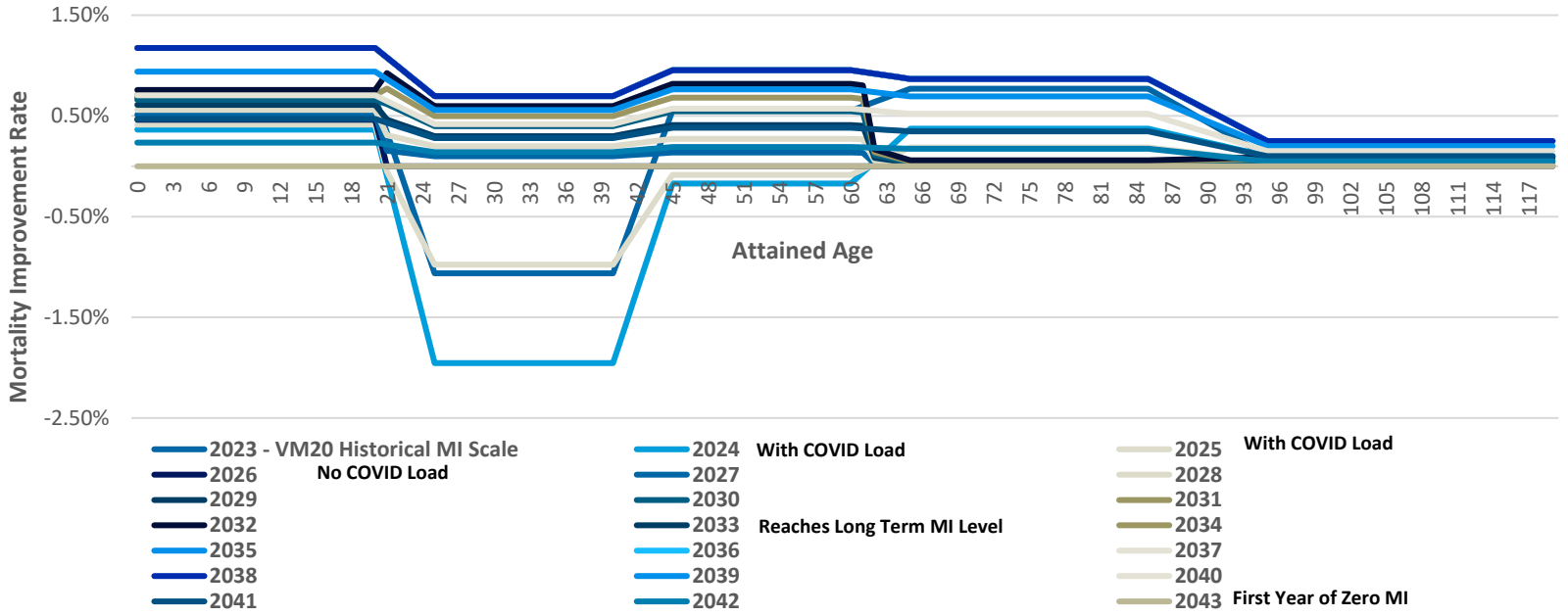
2023 vs 2022: Male—Old Smoothing Historical Mortality Improvement Rates



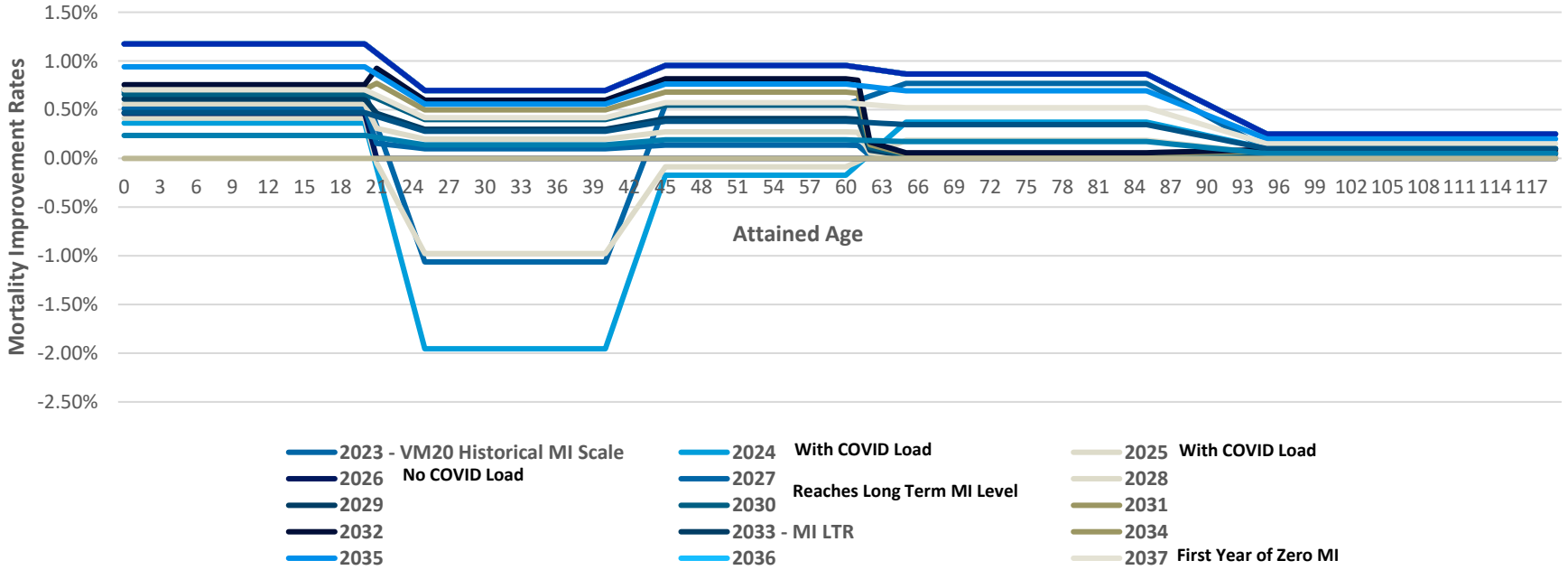
2023 vs 2022: Female—Old Smoothing Historical Mortality Improvement Rates



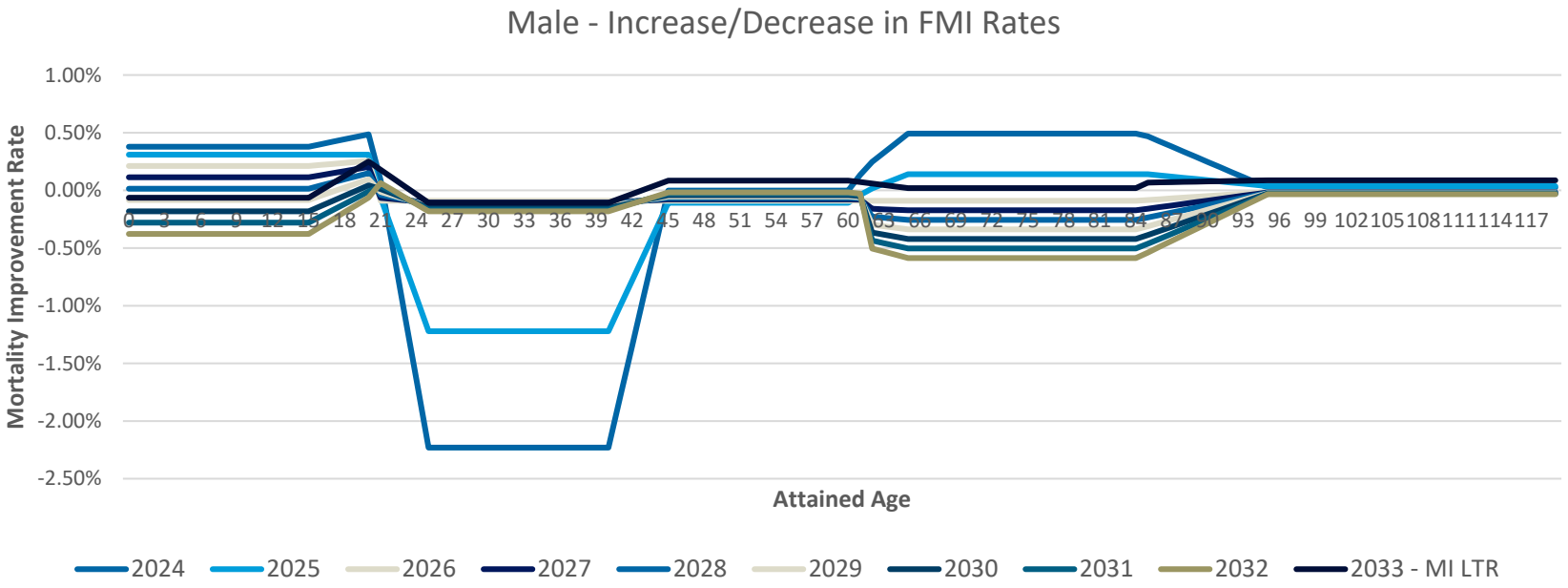
FMI 2023 Recommendation—Basic Scale Male, Future Mortality Improvement Rates



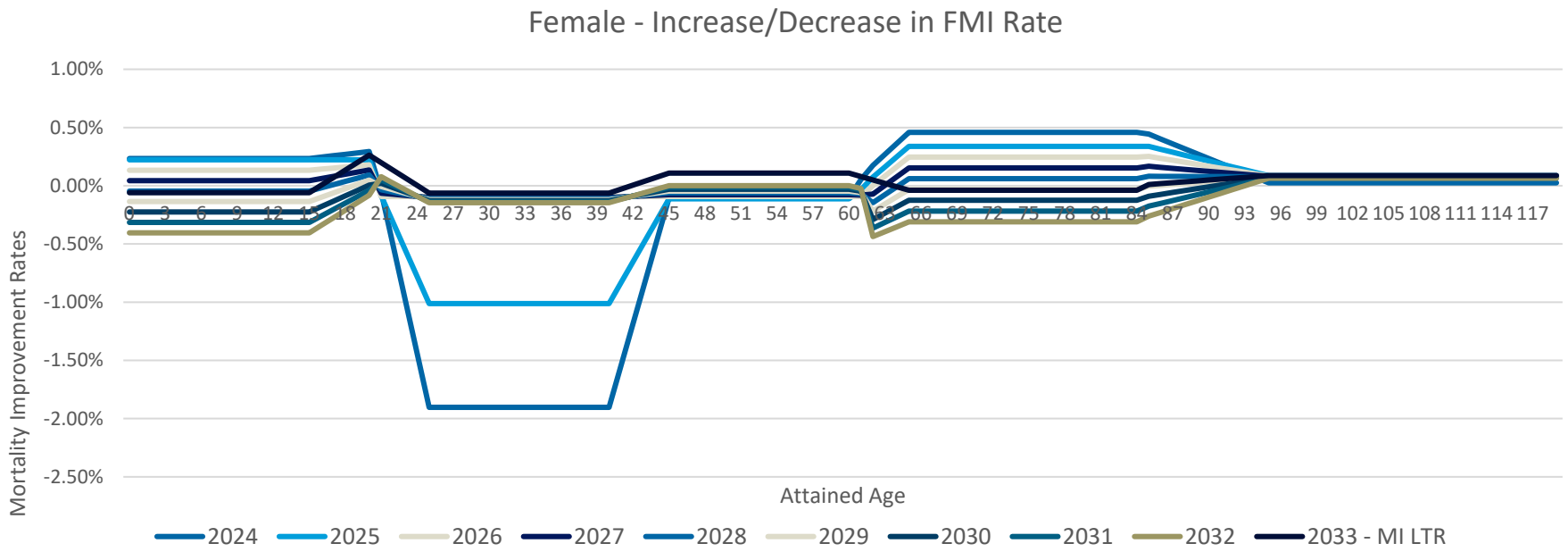
FMI 2023 Recommendation—Basic Scale Female, Future Mortality Improvement Rates



2023 vs 2022—Male
Future Mortality Improvement Rates



2023 vs 2022—Female Future Mortality Improvement Rates



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

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Questions?

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Members available to provide supplementary information and explanation as needed.

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Appendix

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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