

Future Mortality Improvement Scale Development (VM-20) 2022 HMI and FMI Recommendations



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

Agenda

- Mortality/Mortality Improvement (MI) Industry Group
 - Reflecting impact of a shock to mortality for valuation mortality
- Analysis of various historical mortality improvement (HMI) and future mortality improvement (FMI) approaches for 2022
- Alternative recommendation for HMI and FMI scales
- Next steps



Mortality/MI Industry Group

- Group representing members of the American Academy of Actuaries (“Academy”), the Society of Actuaries, and members of the National Association of Insurance Commissioners (NAIC), Life Actuarial (A) Task Force (LATF).
- Convened in January 2022.
- Focused on developing a set of consistent principles to be considered in reflecting the impact of COVID-19 or other shock to mortality in valuation assumptions



Industry Group Principles

Valuation mortality assumption should not include the excess mortality due to the initial shock.

It should include:

“the expected ongoing mortality impact”.

HMI 2022 Scale: Considered Approaches

1. Remove shock impact of COVID-19
 - Approach 1: remove 2020 from the data in determining the 10-year historical average; use average from 2009-2019
 - Approach 2: remove 2020 from the data in determining the 10-year historical average; use average from 2010-2020 – but include 2020 mortality = 2019 mortality – **results in less mortality improvement in general**
2. Include full COVID-19 shock
 - Approach 3: include 2020 data in 10-year historical average

FMI 2022 Scale: Considered Approaches

Approach 1:

- Grade from HMI MI scale to long-term (LT) MI level based on Social Security Administration (SSA) Alternative (A) Intermediate Projection (2022 Trustees Report) at year 10 (from 2025-2032).
- Loaded scale (prudent estimate)
 - above plus 25% general margin for uncertainty in trend

FMI 2022 Scale: Considered Approaches

- Approach 2:
 - Include COVID impact (deterioration in mortality) in early years of the FMI scale
 - Assume deterioration for 2023 and 2024 followed by zero improvement in 2025.
 - Then grade to long-term (LT) MI level based on Social Security Administration (SSA) Alt 2 Intermediate Projection (2022 Trustees Report) at year 10 (from 2025-2032).
 - Loaded scale (prudent estimate) = scale above plus 25% general margin for uncertainty in trend*
- Approach 3:

Use Approach 2 but assume 50% greater deterioration for 2023 and 2024 than Approach 2 followed by 0 improvement in 2025.

1. Remove shock impact of COVID

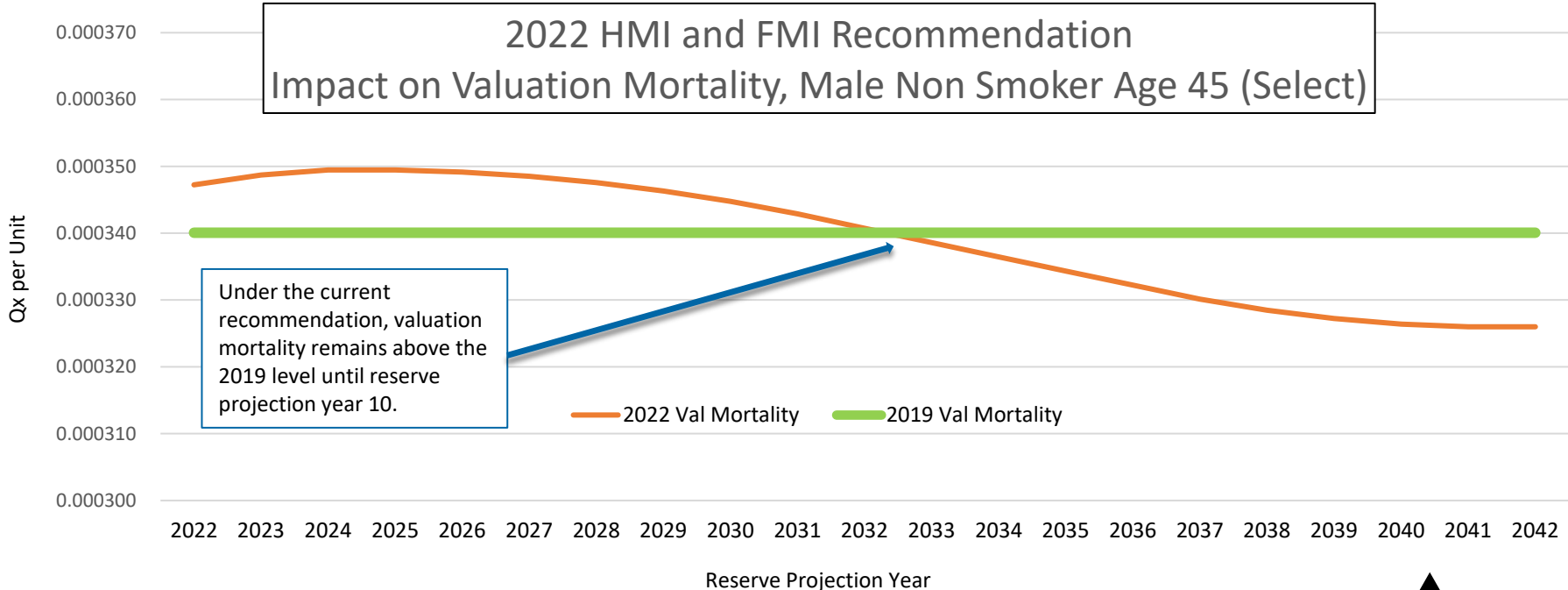
Approach 2: remove 2020 from the data in determining the 10-year historical average; use average from 2010-2020 – but include 2020 mortality = 2019 mortality

Results in less mortality improvement in general.

Approach 2:

- Include COVID impact (deterioration in mortality) in early years of the FMI scale
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- Then grade to long-term (LT) MI level based on SSA Alt 2 Intermediate Projection (2022 Trustees Report) at year 10 (from 2025-2032).
- Loaded scale (prudent estimate) = scale above plus 25% general margin for uncertainty in trend

Impact on Valuation Mortality



Reserve Impact - NAIC Model Office

- Universal Life with Secondary Guarantees (ULSG) model—long-duration product, larger potential for reserve reduction
 - Model office and assumptions same as used in the yearly renewable term (YRT) representative model analysis
 - Lifetime shadow account secondary guarantee
 - No reinsurance in the model
- Combined model office

Component	Values
Issue ages	Decennial issue ages 30 – 70
Gender	Male Female
Risk classes	Preferred non-tobacco Standard non-tobacco Standard tobacco
Face bands	Low (\$250,000) High (\$1,000,000)



Reserve Impact - NAIC Model Office

- Term Life Insurance Product with 10- and 20-year level premium periods
 - Model office and assumptions same as used in the YRT representative model analysis
 - Mature at age 95
 - 100% shock lapse at end of level term period

Component	Values
Issue ages	Decennial issue ages 20 – 60
Gender	Male Female
Risk classes	Preferred non-tobacco Standard non-tobacco Standard tobacco
Face bands	Low (\$250,000) High (\$1,000,000)
Term lengths	10 year 20 year



Reserve Impact Results Using Model Office

8/25/22 Recommendation

	ULSG	
	Normalized VM-20 DR	Percentage Change from Baseline
Mortality Improvement Basis		
Baseline: (no change from 2021) Historical Mortality Improvement (HMI): 2021 VM-20 HMI Recommendation Future Mortality Improvement (FMI): No FMI	\$ 1,000,000	----
RECOMMENDATION: HMI: Approach 2 (remove 2020 data) FMI Mod: Approach 2 (COVID impact in first 3 years) + margin for general uncertainty (25%)	\$ 940,464	-5.95%
Alternate 1: HMI: Approach 3 (full COVID impact) FMI: Approach 1 (grades to LTR at year 10 from HMI level)	\$ 993,188	-0.68%
Alternate 2: HMI: Approach 2 (remove 2020 data) FMI: No FMI	\$ 1,014,962	1.50%

2023 Plan

- Revisit HMI historical component calculation method in light of recent and expected experience
- Review applicability of MI scale methodology for 2008 VBT Limited Underwriting (LU) table
- Insured vs. general population MI recommendation
- Revisit smoothing and margin structure



Questions?



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Appendix

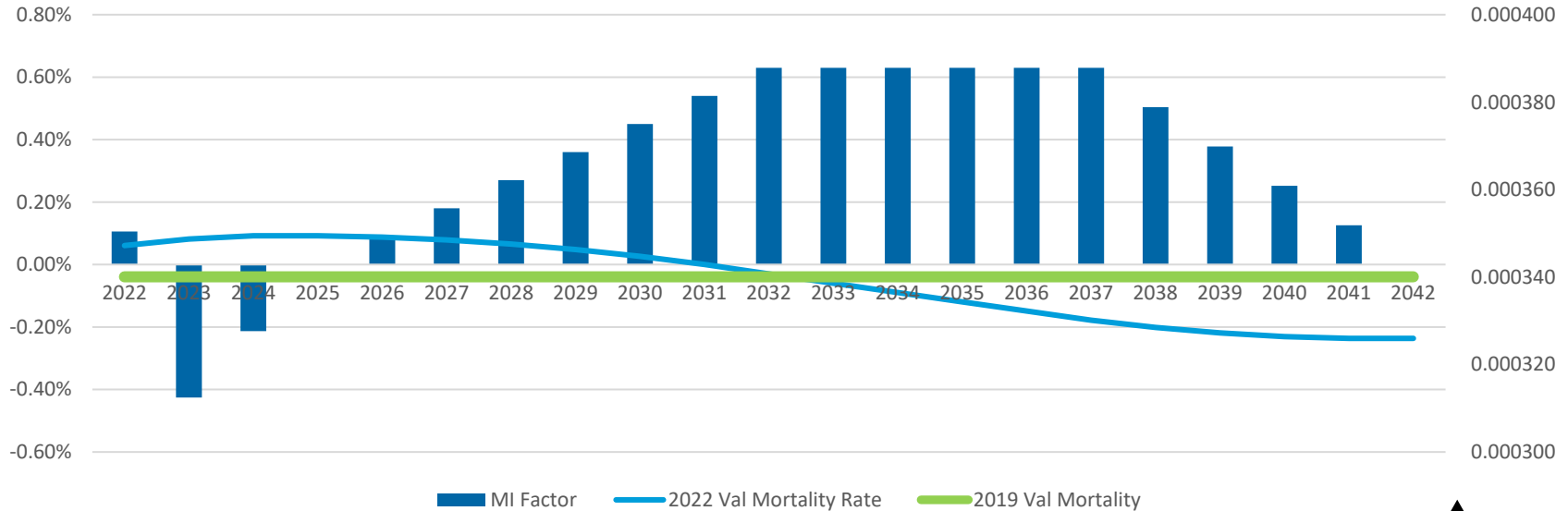
8-25-22 LATF Meeting Recommendation



8/25/22 Recommendation

MI Factor = Basic FMI (anticipated)

2022 HMI and FMI Recommendation
Impact on Valuation Mortality, Male NS Age 45 (Select)



8/25/22 Recommendation

MI Factor = Basic FMI (anticipated)

Male Age 45 (select)

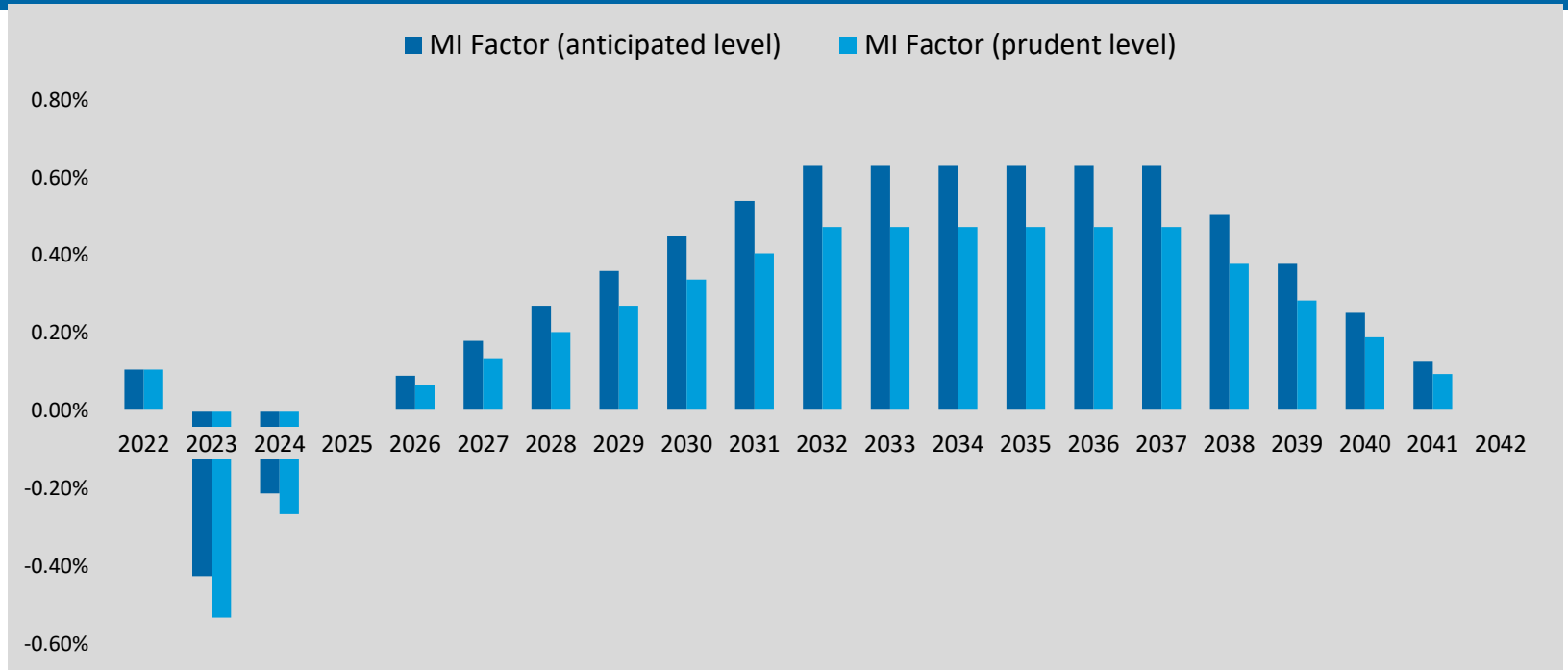
Non Smoker

	Annual MI Factor	2022 Val Mortality Rate
2022	0.11%	0.000347227
2023	-0.43%	0.000348705
2024	-0.21%	0.000349448
2025	0.00%	0.000349448
2026	0.09%	0.000349133
2027	0.18%	0.000348505
2028	0.27%	0.000347564
2029	0.36%	0.000346312
2030	0.45%	0.000344753
2031	0.54%	0.000342891
2032	0.63%	0.00034073
2033	0.63%	0.000338583
2034	0.63%	0.000336449
2035	0.63%	0.000334329
2036	0.63%	0.000332222
2037	0.63%	0.000330128
2038	0.50%	0.000328464
2039	0.38%	0.000327222
2040	0.25%	0.000326397
2041	0.13%	0.000325986
2042	0.00%	0.000325986



8/25/22 Recommendation

FMI Factors – Basic(Anticipated) and Loaded(Prudent) Levels



Appendix

Mortality/Mortality Improvement Principles

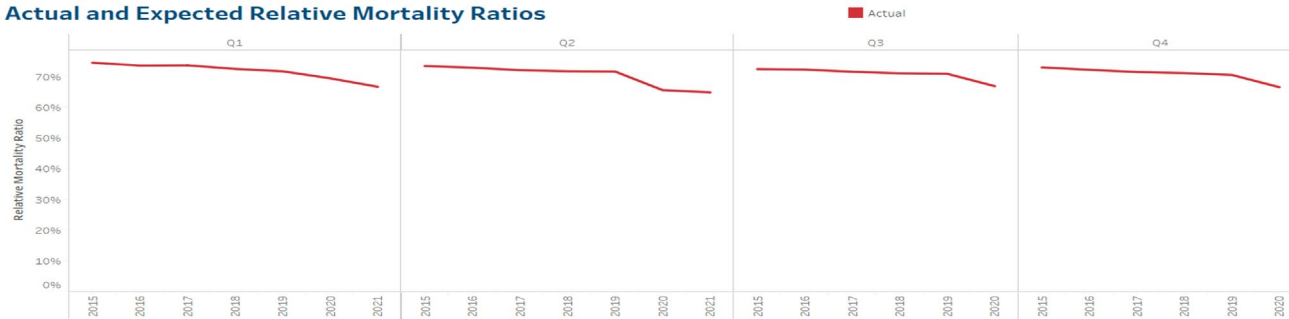


These principles are consistent with international views on mortality projection and COVID-19 impacts...

- Social Security Administration 2022 Trustees Report
 - “Projected death rates for years after 2023 are unchanged from the levels that would have been projected in the absence of the pandemic, under the assumption that increased deaths from the residual effects of living through the pandemic (both physiological and psychological) will be roughly offset by decreased deaths that instead happened sooner (during the pandemic).” <https://www.ssa.gov/OACT/TR/2022/tr2022.pdf>
- Continuous Mortality Investigation (CMI) Mortality Projections Committee
 - “If we gave full weight to 2020 data ... the reduction in life expectancy would have been in excess of what most users of the model would consider reasonable.”
 - CMI_2021 incorporates mortality data to 31 December 2021
 - 2020 and 2021 data is given 0% weight in the Core version – Consistent with approach for CMI_2020 supported by consultation – Data for 2020 and 2021 is unlikely to be indicative of future trends – Using 100% weight for 2020 and 2021 data would lead to excessive falls in life expectancy
- Mortality projections for Social Security Programs in Canada (Actuarial Studies No. 22 and 23)

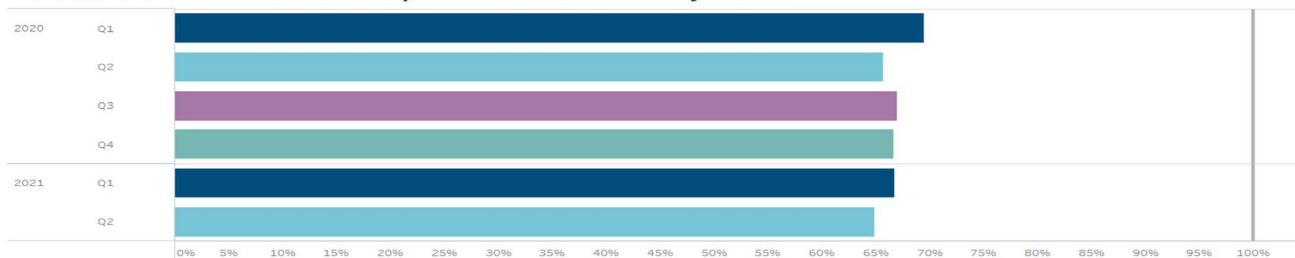
Mortality Rates: Ratio of Insured Mortality to General Population

Actual and Expected Relative Mortality Ratios



Implicit margin exists in using general population as basis for the MI scale development.

2020 & 2021 Ratio of Actual to Expected Relative Mortality Ratios



Approach for Smoothing (HMI and FMI)

- By age
- Use same approach for 2022 as past years
 - Ages 0-15 = 1.5 x adult average improvement/deterioration
 - Ages 16-20 = Grade to adult average
 - Ages 21-84 = Assumed adult average
 - Ages 85-94 = Grade to ultimate level of at 95
 - Ages 95+ = 0.1%

Additional Considerations

- Insured population mortality materially lower than general population mortality
 - Insured population is generally in higher socioeconomic categories
 - Lower mortality and higher mortality improvement seen in higher socioeconomic categories (implicit margin in our recommendations)
- MI improvement scale annual updates should not create reserve volatility
- Individual companies should also consider their own business and make appropriate additional adjustments

Appendix

NAIC Model Office: Background Information



FMI - Reserve Impact Estimates

NAIC Model Office

- Universal Life with Secondary Guarantees (ULSG) focus—long-duration product, larger potential for reserve reduction
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