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VM-22 Standard Projection Amount (SPA)

Mortality Assumption Update for Individual Annuities

Presentation to VM-22 Subgroup

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Mortality and Longevity

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Agenda

- Objectives
- Overview of Process and Progress
- Mortality Adjustment Factors for Fixed Deferred Annuities
- Mortality Adjustment Factors for Payout Annuities

Objectives

- Short-term – Develop mortality adjustment factors based on industry experience studies for use as SPA assumptions in the VM-22 Field Tests; for Individual Annuities, distinct factors are being developed for:
  - Fixed Deferred Annuities
  - Payout Annuities
  - Structured Settlements (with Standard and Substandard lives considered separately)
- Long-term – Consider more robust mortality changes, including, if appropriate, new table development

Overview of Process and Progress

Process

- Subgroups of the SOA's Individual Annuity Experience Committee (IAEC) have been meeting since late 2021 on a bi-weekly basis
- Three subgroups were established to address three distinct individual annuity product lines – fixed deferred annuities, payout annuities, and structured settlement annuities
- Another subgroup, made up of members of the SOA's Group Annuity Experience Committee (GAEC), is preparing the recommendation for group annuities
- Each of the subgroups have had active American Academy of Actuaries participation

Progress Update

- Fixed Deferred Annuities – the mortality adjustment factors we developed have been endorsed by the VM-22 SPA Mortality Assumption Drafting Group
- Individual Payout Annuities – the mortality adjustment factors we developed have been endorsed by the VM-22 SPA Mortality Assumption Drafting Group. However, we are close to completion of a new industry study, and expect to have the results in early 2023. Due to the timing of this new study, and with the delay of the field test (later than originally projected), we decided to develop updated adjustment factors to reflect the more recent experience.
- Structured Settlement Annuities – we are close to the finish line here, and expect to be able to present our proposal to the VM-22 SPA Mortality Assumption Drafting Group soon
- Group Annuities – a proposal is scheduled to be presented to the VM-22 SPA Mortality Assumption Drafting Group on Nov. 4

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Fixed Deferred Annuities (FDAs)

- Adjustment Factors applied to 2012 IAM Table based on SOA Industry Deferred Annuity Mortality Study (2011-2015)
  - Includes both Traditional Fixed Rate Annuities and Fixed Indexed Annuities (FIAs)
  - Development of factors for Fixed Deferred Annuities *without* Guaranteed Living Benefits (GLBs) were based on study results
  - Development of factors for Fixed Deferred Annuities *with* GLBs were based on Variable Annuity study results (ratios taken between VAs with and without GLBs), since concentration and credibility issues negated the ability to use the DFA with GLB experience)
- Application of Historical Mortality Improvement to bring the factors up through 12/31/2021
- Future Mortality Improvement recommendation

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Base Adjustment Factors for Fixed Deferred Annuities

Base Mortality Adjustment Factors						
		FDAs without GLBs		GLB/Non-GLB	FDAs with GLBs	
Age	Central Age	Female	Male	Ratios from Vas	Female	Male
<50		150%	105%	100%	150%	105%
50-54	52	150%	105%	100%	150%	105%
55-59	57	125%	100%	95%	120%	95%
60-64	62	105%	85%	84%	90%	70%
65-69	67	105%	90%	83%	90%	75%
70-74	72	115%	95%	83%	95%	80%
75-79	77	115%	95%	83%	95%	80%
80-84	82	110%	100%	89%	95%	90%
85-89	87	100%	105%	94%	95%	100%
90-94	92	105%	105%	94%	100%	100%
95-99	97	105%	110%	93%	100%	100%
100-104	102	100%	100%	100%	100%	100%
105+		100%	100%	100%	100%	100%

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Development of Basis for Historical Mortality Improvement for FDAs

- Base mortality centered on mid-2013, the mid-point of the 2011-2015 study, needs to be brought up to the end of 2021
- Split the historical era into two periods, first through 2019, and then 2020-2021 covering the COVID pandemic period
- Historical Mortality Improvement through 2019
  - We used data from the SOA's report on Mortality by Socioeconomic Category, authored by Magali Barbieri, to generate improvement rates by quinquennial age groups
  - U.S. counties were assigned to one of ten deciles, based on various socioeconomic criteria
  - The 10th decile (highest socioeconomic category) aligned best with this population
  - Mortality data for this study was sourced from the National Center for Health Statistics (NCHS), which had a fairly good alignment with Social Security data except at older ages (above age 80)

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Development of Basis for Historical Mortality Improvement for FDAs, continued

- Historical Mortality Improvement for 2020 and 2021
  - Objective is to set a new baseline as of 12/31/2021, to be the new "jumping-off" point for mortality projections
  - Actual experience was obviously severely impacted by the pandemic
  - Even if specific COVID-related deaths could be identified with precision and factored out, other aspects of the pandemic environment affected overall mortality drivers
- Decided to use 50% of average annual 2013-2019 experience, floored at 0% if/where negative improvement occurred
  - This was based on the assumption that progress was made during the 2020-2021 period on some of the more significant drivers of mortality improvement, albeit at a lower level than would have occurred without the pandemic

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Historical Mortality Improvement Proposal

	G2 Improvement Rates		Improvement Rates for 2013 to 2019		Improvement Rates for 2020 and 2021	
Age	F	M	F	M	F	M
50	1.00%	1.00%	1.51%	0.95%	0.76%	0.48%
51	1.00%	1.10%	1.51%	1.10%	0.76%	0.55%
52	1.10%	1.10%	1.51%	1.25%	0.76%	0.63%
57	1.20%	1.40%	1.00%	1.05%	0.50%	0.53%
62	1.30%	1.50%	0.97%	0.68%	0.49%	0.34%
67	1.30%	1.50%	1.39%	0.45%	0.70%	0.23%
72	1.30%	1.50%	1.30%	0.69%	0.65%	0.35%
77	1.30%	1.50%	0.98%	0.80%	0.49%	0.40%
82	1.20%	1.30%	0.83%	0.78%	0.42%	0.39%
87	0.80%	0.90%	0.55%	0.54%	0.28%	0.27%
92	0.50%	0.60%	0.35%	0.36%	0.18%	0.18%
97	0.30%	0.30%	0.21%	0.18%	0.11%	0.09%
102	0.10%	0.10%	0.07%	0.06%	0.04%	0.03%

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FDA without GLB Adjustment Factors with Historical Mortality Improvement compared to Existing Basis

	FDA non-GLB Base Mortality Adjustment Factors		G2 Improvement Rates		Mortality Improvement Rates for 2013 to 2019		Mortality Improvement Rates for 2020 and 2021		FDA non-GLB Mortality Rates Projected to 12/31/2021 as % of Mort Rates Projected with G2		**Attribution Analysis** FDA non-GLB Base Mortality Adjustment Factors		**Attribution Analysis** Impact of MI as Compared to G2	
Age	F	M	F	M	F	M	F	M	F	M	F	M	F	M
50	150%	105%	1.00%	1.00%	1.51%	0.95%	0.76%	0.48%	145.8%	106.5%	150%	105%	97.2%	101.4%
51	150%	105%	1.00%	1.10%	1.51%	1.10%	0.76%	0.55%	145.8%	106.2%	150%	105%	97.2%	101.1%
52	150%	105%	1.10%	1.10%	1.51%	1.25%	0.76%	0.63%	147.0%	105.0%	150%	105%	98.0%	100.0%
57	125%	100%	1.20%	1.40%	1.00%	1.05%	0.50%	0.53%	128.5%	104.1%	125%	100%	102.8%	104.1%
62	105%	85%	1.30%	1.50%	0.97%	0.68%	0.49%	0.34%	109.1%	91.8%	105%	85%	103.9%	108.0%
67	105%	90%	1.30%	1.50%	1.39%	0.45%	0.70%	0.23%	105.7%	98.9%	105%	90%	100.6%	109.9%
72	115%	95%	1.30%	1.50%	1.30%	0.69%	0.65%	0.35%	116.5%	102.5%	115%	95%	101.3%	107.9%
77	115%	95%	1.30%	1.50%	0.98%	0.80%	0.49%	0.40%	119.4%	101.7%	115%	95%	103.8%	107.1%
82	110%	100%	1.20%	1.30%	0.83%	0.78%	0.42%	0.39%	114.5%	105.4%	110%	100%	104.1%	105.4%
87	100%	105%	0.80%	0.90%	0.55%	0.54%	0.28%	0.27%	102.7%	108.9%	100%	105%	102.7%	103.7%
92	105%	105%	0.50%	0.60%	0.35%	0.36%	0.18%	0.18%	106.7%	107.6%	105%	105%	101.6%	102.4%
97	105%	110%	0.30%	0.30%	0.21%	0.18%	0.11%	0.09%	106.0%	111.3%	105%	110%	101.0%	101.2%
102	100%	100%	0.10%	0.10%	0.07%	0.06%	0.04%	0.03%	100.3%	100.4%	100%	100%	100.3%	100.4%

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FDA with GLB Adjustment Factors with Historical Mortality Improvement compared to Existing Basis

	FDA with GLB Base Mortality Adjustment Factors		G2 Improvement Rates		Mortality Improvement Rates for 2013 to 2019		Mortality Improvement Rates for 2020 and 2021		FDA with GLB Mortality Rates Projected to 12/31/2021 as % of Mort Rates Projected with G2		**Attribution Analysis** FDA with GLB Base Mortality Adjustment Factors		**Attribution Analysis** Impact of MI as Compared to G2	
Age	F	M	F	M	F	M	F	M	F	M	F	M	F	M
50	150%	105%	1.00%	1.00%	1.51%	0.95%	0.76%	0.48%	145.8%	106.5%	150%	105%	97.2%	101.4%
51	150%	105%	1.00%	1.10%	1.51%	1.10%	0.76%	0.55%	145.8%	106.2%	150%	105%	97.2%	101.1%
52	150%	105%	1.10%	1.10%	1.51%	1.25%	0.76%	0.63%	147.0%	105.0%	150%	105%	98.0%	100.0%
57	120%	95%	1.20%	1.40%	1.00%	1.05%	0.50%	0.53%	123.3%	98.9%	120%	95%	102.8%	104.1%
62	90%	70%	1.30%	1.50%	0.97%	0.68%	0.49%	0.34%	93.5%	75.6%	90%	70%	103.9%	108.0%
67	90%	75%	1.30%	1.50%	1.39%	0.45%	0.70%	0.23%	90.6%	82.4%	90%	75%	100.6%	109.9%
72	95%	80%	1.30%	1.50%	1.30%	0.69%	0.65%	0.35%	96.3%	86.4%	95%	80%	101.3%	107.9%
77	95%	80%	1.30%	1.50%	0.98%	0.80%	0.49%	0.40%	98.6%	85.6%	95%	80%	103.8%	107.1%
82	95%	90%	1.20%	1.30%	0.83%	0.78%	0.42%	0.39%	98.9%	94.9%	95%	90%	104.1%	105.4%
87	95%	100%	0.80%	0.90%	0.55%	0.54%	0.28%	0.27%	97.6%	103.7%	95%	100%	102.7%	103.7%
92	100%	100%	0.50%	0.60%	0.35%	0.36%	0.18%	0.18%	101.6%	102.4%	100%	100%	101.6%	102.4%
97	100%	100%	0.30%	0.30%	0.21%	0.18%	0.11%	0.09%	101.0%	101.2%	100%	100%	101.0%	101.2%
102	100%	100%	0.10%	0.10%	0.07%	0.06%	0.04%	0.03%	100.3%	100.4%	100%	100%	100.3%	100.4%

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Future Mortality Improvement Assumption

- Recommend the continued use of the G2 Improvement Scale for all Individual Annuity product lines
  - It is widely accepted in the industry
  - There's not a sufficiently compelling reason to move away from it at this time
  - Development of a new scale will require a thorough analysis that would be better suited for the longer-term update objective

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Development of Base Factors for Payout Annuities

- Based on SOA's published study covering the 2009-2013 experience period, using Amount-based results (as versus Count-based results)
- Experience compared to the 2012 Individual Annuity Mortality (IAM) Basic table with Improvement Scale G2
- Payout Annuities include
  - Single Premium Immediate Annuities (SPIAs)
  - Deferred Income Annuities (DIAs)
  - Annuitizations of Deferred Annuities, including exercise of Guaranteed Minimum Income Benefits (GMIBs)
  - Life Annuity Settlement Options from Life Insurance policies
- Decision made to develop one set of factors for Payout Annuities
  - Assessment was that any greater granularity wasn't warranted
  - Combining similar liability types allows for greater credibility of data

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Base Adjustment Factors for Payout Annuities

Base Mortality Adjustment Factors			
Age	Central Age	Female	Male
<50		150%	150%
50-54	52	150%	150%
55-59	57	150%	150%
60-64	62	100%	110%
65-69	67	95%	110%
70-74	72	95%	106%
75-79	77	100%	106%
80-84	82	100%	106%
85-89	87	102%	108%
90-94	92	110%	108%
95-99	97	110%	108%
100-104	102	100%	100%
105+		100%	100%

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Development of Basis for Historical Mortality Improvement for Payout Annuities

- Follows the same methodology as was used for Fixed Deferred Annuities, using the SOA's report on Mortality by Socioeconomic Category
- Base mortality centered on mid-2011, the mid-point of the 2009-2013 study, thus it needed to be brought up to the end of 2021
- As the case with Fixed Deferred Annuities, the 10th decile (highest socioeconomic category) aligned with the Payout Annuity population, based on the mortality experience from the 2009-2013 industry study
- For the 2020-2021 pandemic period, we followed the same methodology as was used for FDAs (i.e. using 50% of the average annual 2011-2019 experience, floored at 0% if/where negative improvement occurred)

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Historical Mortality Improvement Proposal

	G2 Improvement Rates		Improvement Rates for 2011 to 2019		Improvement Rates for 2020 and 2021	
Age	F	M	F	M	F	M
50	1.00%	1.00%	1.56%	1.12%	0.78%	0.56%
51	1.00%	1.10%	1.54%	1.22%	0.77%	0.61%
52	1.10%	1.10%	1.51%	1.34%	0.76%	0.67%
57	1.20%	1.40%	0.94%	1.06%	0.47%	0.53%
62	1.30%	1.50%	1.03%	0.67%	0.52%	0.34%
67	1.30%	1.50%	1.51%	0.62%	0.76%	0.31%
72	1.30%	1.50%	1.48%	0.93%	0.74%	0.47%
77	1.30%	1.50%	1.21%	1.06%	0.61%	0.53%
82	1.20%	1.30%	0.92%	1.04%	0.46%	0.52%
87	0.80%	0.90%	0.62%	0.72%	0.31%	0.36%
92	0.50%	0.60%	0.38%	0.48%	0.19%	0.24%
97	0.30%	0.30%	0.23%	0.24%	0.12%	0.12%
102	0.10%	0.10%	0.08%	0.08%	0.04%	0.04%
103	0.10%	0.10%	0.08%	0.08%	0.04%	0.04%
104	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

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Payout Annuities Adjustment Factors with Historical Mortality Improvement compared to Existing Basis

	Payout Annuities Base Mortality Adjustment Factors		G2 Improvement Rates		Mortality Improvement Rates for 2011 to 2019		Mortality Improvement Rates for 2020 and 2021		Payout Annuities Mortality Rates Projected to 12/31/2021 as % of Mort Rates Projected with G2		**Attribution Analysis** Payout Annuities Base Mortality Adjustment Factors		**Attribution Analysis** Impact of MI as Compared to G2	
Age	F	M	F	M	F	M	F	M	F	M	F	M	F	M
50	150%	150%	1.00%	1.00%	1.56%	1.12%	0.78%	0.56%	143.6%	149.8%	150%	150%	95.7%	99.9%
51	150%	150%	1.00%	1.10%	1.54%	1.22%	0.77%	0.61%	143.9%	149.9%	150%	150%	95.9%	100.0%
52	150%	150%	1.10%	1.10%	1.51%	1.34%	0.76%	0.67%	145.8%	148.2%	150%	150%	97.2%	98.8%
57	150%	150%	1.20%	1.40%	0.94%	1.06%	0.47%	0.53%	155.7%	157.2%	150%	150%	103.8%	104.8%
62	100%	110%	1.30%	1.50%	1.03%	0.67%	0.52%	0.34%	104.0%	120.9%	100%	110%	104.0%	109.9%
67	95%	110%	1.30%	1.50%	1.51%	0.62%	0.76%	0.31%	94.3%	121.5%	95%	110%	99.3%	110.5%
72	95%	106%	1.30%	1.50%	1.48%	0.93%	0.74%	0.47%	94.6%	113.7%	95%	106%	99.6%	107.2%
77	100%	106%	1.30%	1.50%	1.21%	1.06%	0.61%	0.53%	102.2%	112.3%	100%	106%	102.2%	105.9%
82	100%	106%	1.20%	1.30%	0.92%	1.04%	0.46%	0.52%	104.0%	110.1%	100%	106%	104.0%	103.9%
87	102%	108%	0.80%	0.90%	0.62%	0.72%	0.31%	0.36%	104.6%	110.9%	102%	108%	102.6%	102.7%
92	110%	108%	0.50%	0.60%	0.38%	0.48%	0.19%	0.24%	111.8%	109.9%	110%	108%	101.7%	101.8%
97	110%	108%	0.30%	0.30%	0.23%	0.24%	0.12%	0.12%	111.1%	108.9%	110%	108%	101.0%	100.9%
102	100%	100%	0.10%	0.10%	0.08%	0.08%	0.04%	0.04%	100.3%	100.3%	100%	100%	100.3%	100.3%

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Payout Annuity Mortality Adjustment Factors – Impact of New Industry Study

- The SOA is currently conducting a Payout Annuity mortality study covering the period 2014-2019
- We would like to consider whether the results of the new study warrant updating the Payout Annuity adjustment factors, with an expectation that we will have a verdict (and possibly updated factors) by early 2023

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