58 - Setting Assumptions for Annuities under VM-21

OLIVER WYMAN

SESSION 58 – ASSUMPTIONS SETTING UNDER VM-21

2019 SOA VALUATION ACTUARY SYMPOSIUM
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Agenda

1 VM-21 background

2 VM-21 prescribed assumptions for Standard Projection

3 VM-21 assumptions for stochastic projection

4 State of the industry

5 Case studies “What would you do?”

6 Professional resources

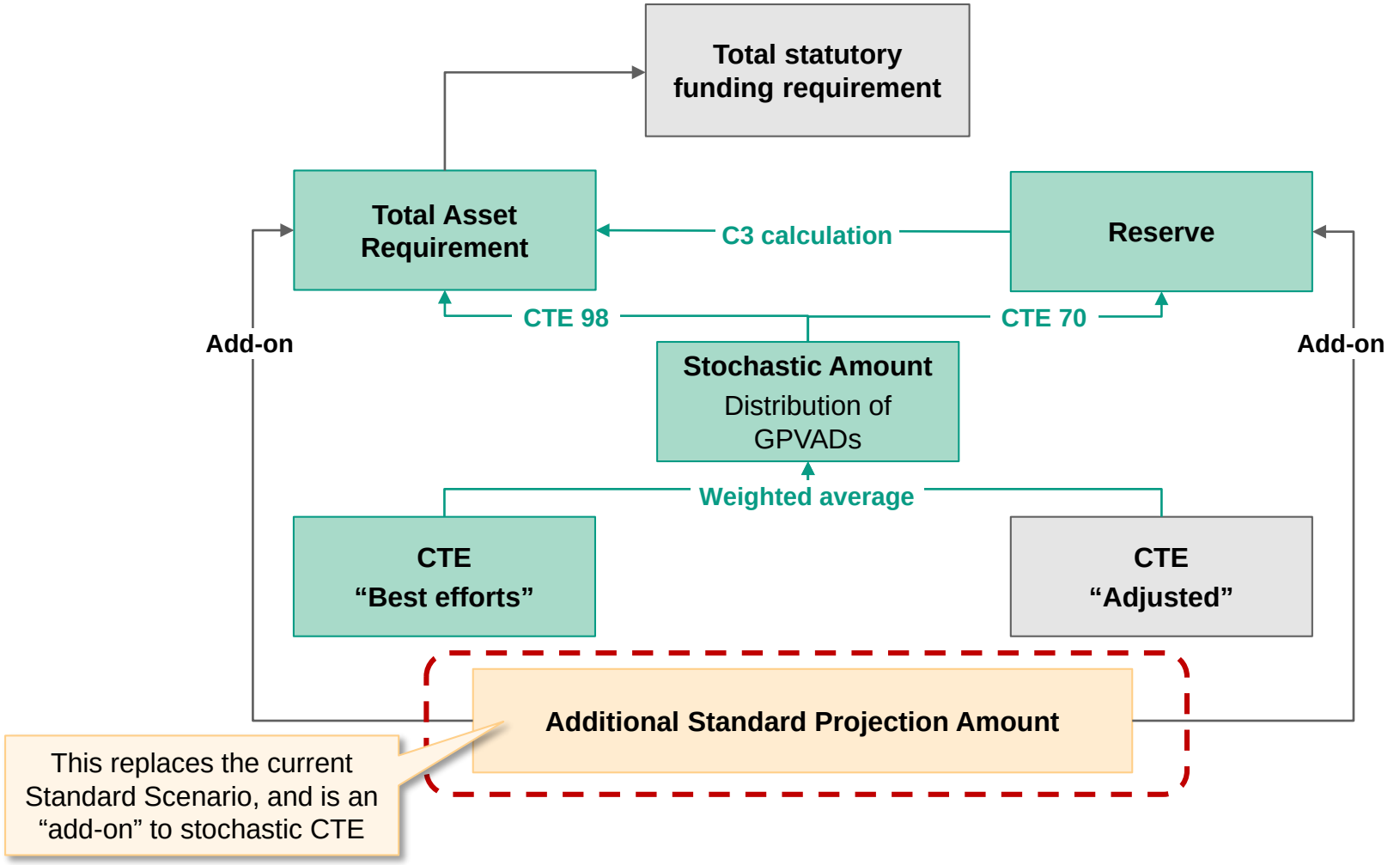
7 Q&A and outlook

Section 1 | VM-21 background

NAIC has adopted revisions to VM-21, effective January 1, 2020

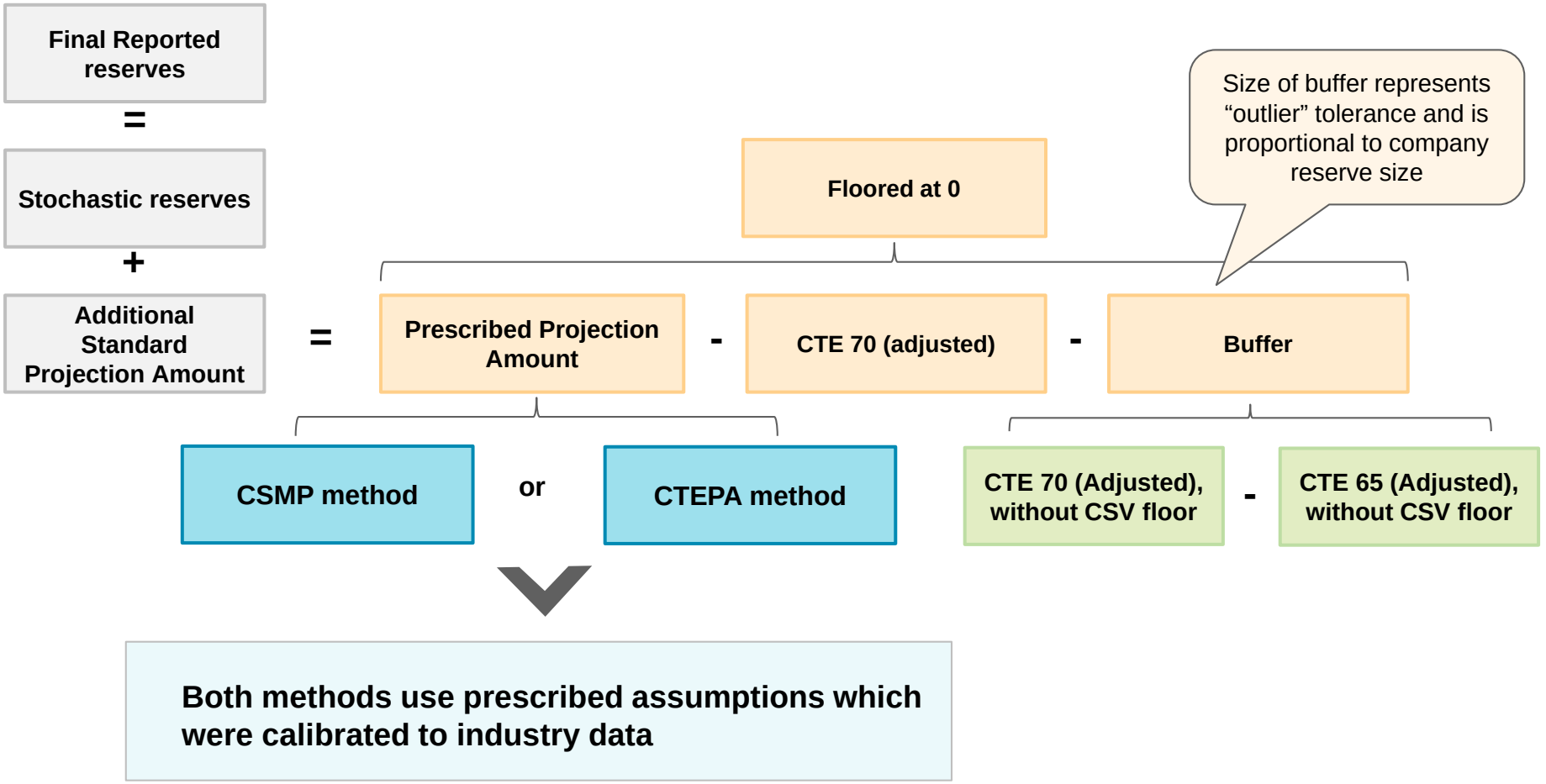
The revisions include significant changes to stochastic CTE and standard scenario, while maintaining the current statutory construct

Revised VM-21 framework



Additional Standard Projection Amount

Calculated via one of the two prescribed methods and intended to govern model choices and actuarial assumptions



Section 2 | VM-21 prescribed assumptions for Standard Projection

Overview of revisions

Prescribed policyholder behavior assumptions have been refreshed to align with industry experience

Current framework

- Behavior assumptions differentiate between four classes of products:

Product class	General characteristics of behavior assumptions
Standalone GMDBs	No withdrawals and high lapses
GMABs	No withdrawals and low lapses
GMIBs	No withdrawals, moderate lapses, high annuitization
GMWBs	Immediate – or as early as possible – and largely efficient withdrawals; moderate lapses

- Mortality is 70% of 1994 GMDB through age 85 graded to 100% at age 115

Revised framework

- Differentiate assumptions more finely by product type, and reflect industry experience collected and studied extensively during QIS II

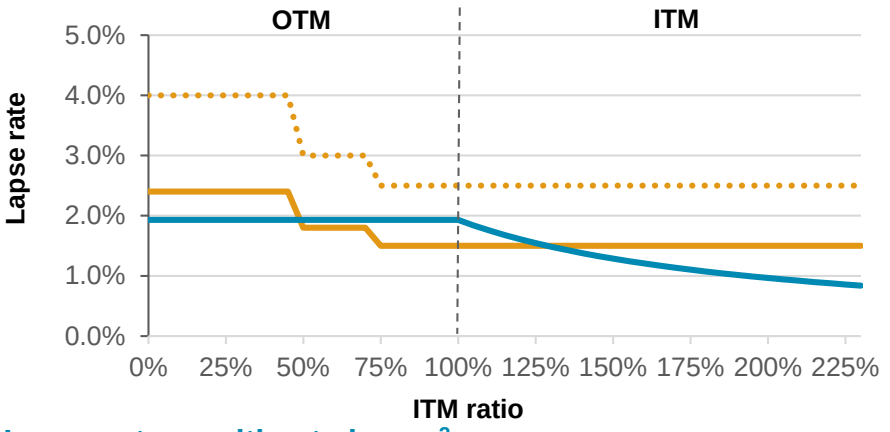
Product class	General characteristics of revisions
Non-rollup GMDBs	Moderate withdrawals and moneyness-sensitive lapses
Rollup GMDBs	Lower withdrawals and lapses than non-rollup GMDBs
GMABs	Moderate withdrawals
Traditional GMIBs	Moderate withdrawals and lower annuitizations
Hybrid GMIBs	Overall behavior aligns closely to comparable GMWBs
GMWBs	Withdrawals reflect incentives; more sensitive lapses

- Distinct assumptions for 403(b) business
- Mortality is 2012 IAM Basic with scale G2

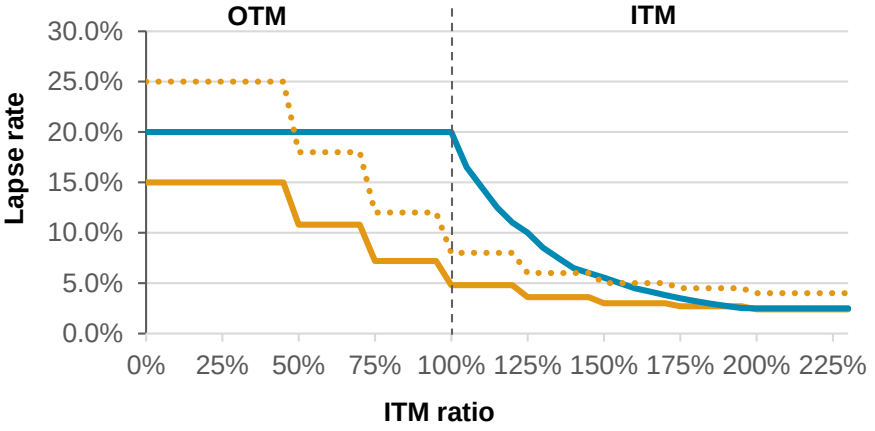
Lapse / full surrender

Lapse assumption varies by benefit type, duration and in-the-moneyness (ITM) of the guaranteed benefit

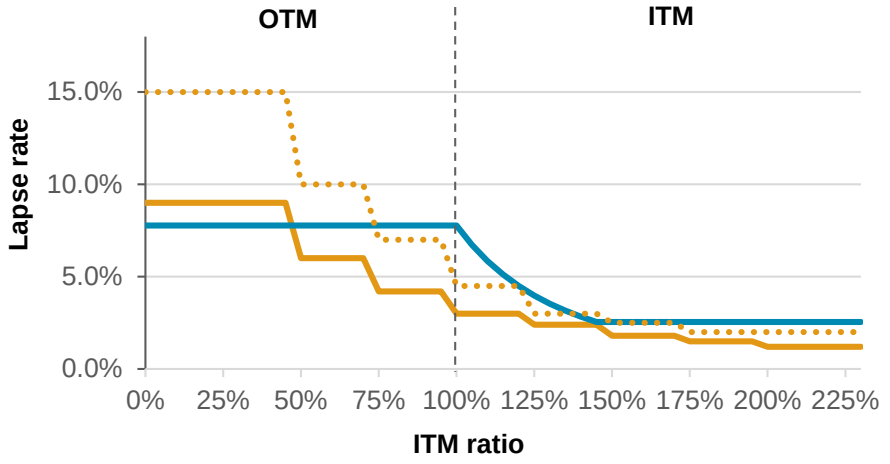
Lapse rates – in surrender charge period [1]

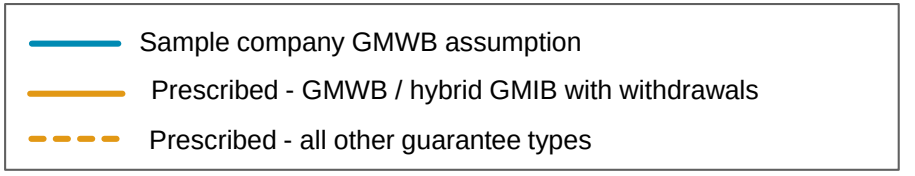


Lapse rates – shock lapse



Lapse rates – ultimate lapse [2]





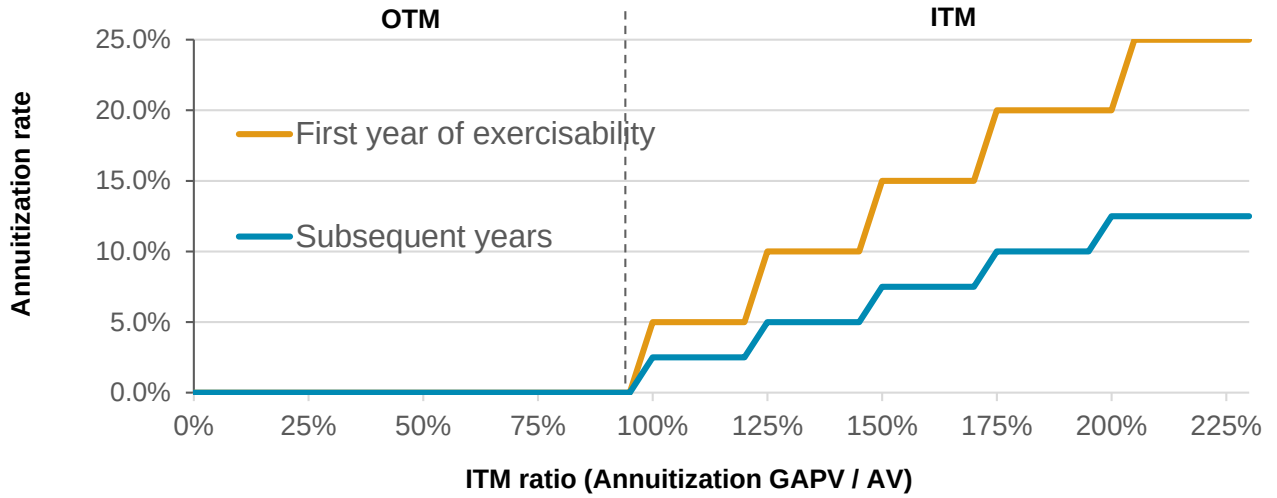
- ITM is defined as GAPV / AV * adjustment factor. The adjustment factor varies by benefit type.
- Guaranteed Actuarial Present Value (GAPV) is the actuarial present value from a GMxB, discounted at 10-year CMT and decremented with mortality (2012 IAM Basic with scale G2 improved to 2017).
- Lapse for 403(b) is the lower of the lapse based on GMDB's ITM, or a separate lapse table that varies by attained age and in/out of SC period

1. Also covers contract years 1-3 for contracts without surrender charges
2. Applicable after the first year following the surrender charge period. Also convers contract years 4+ for contracts without surrender charges.

Annuitization (1/2)
Traditional GMIB

For traditional GMIB that is immediately exercisable, two sets of prescribed annuitization rates:

1. Contract in the first year in which the GMIB is exercisable
2. Contract in a subsequent year



Annuitization rate is zero if the GMIB is not exercisable

Annuitization (2/2)
Hybrid GMIB

For hybrid GMIB that is immediately exercisable:

Is the contract in the last three years in which GMIB is exercisable?

No

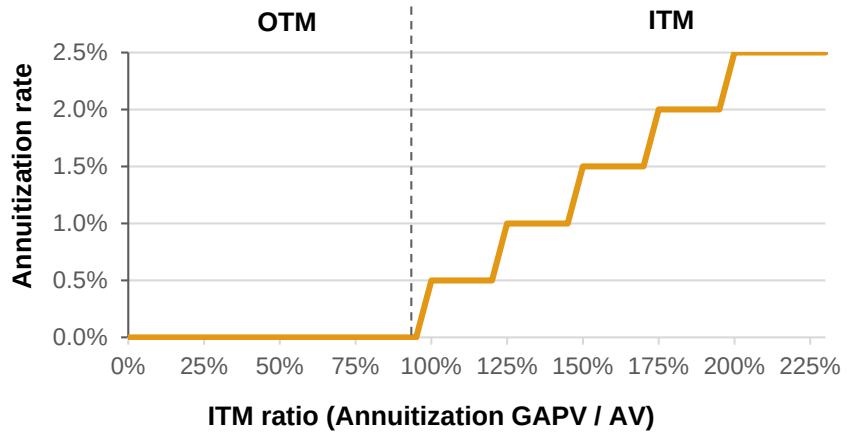
GMIB's Annuitization GAPV > = Withdrawal GAPV?

No

0.25% if ITM
0% if OTM

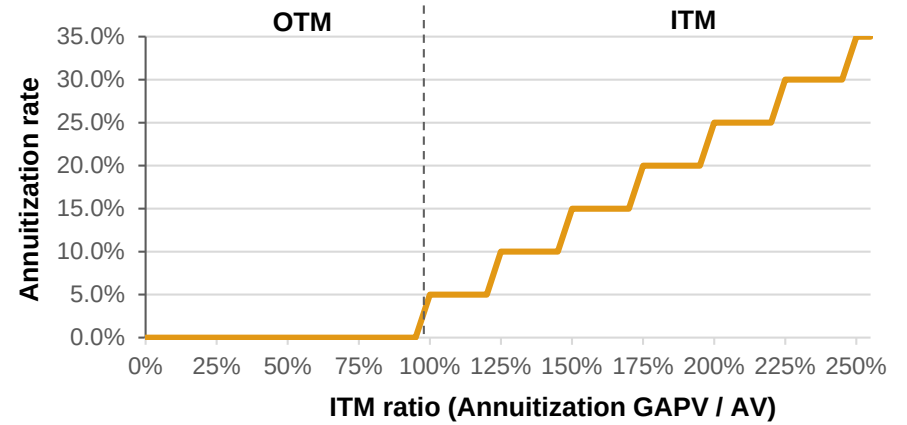
Yes

Hybrid GMIB standard table A



Yes

Hybrid GMIB standard table B



Annuitization rate is zero if the GMIB is not exercisable

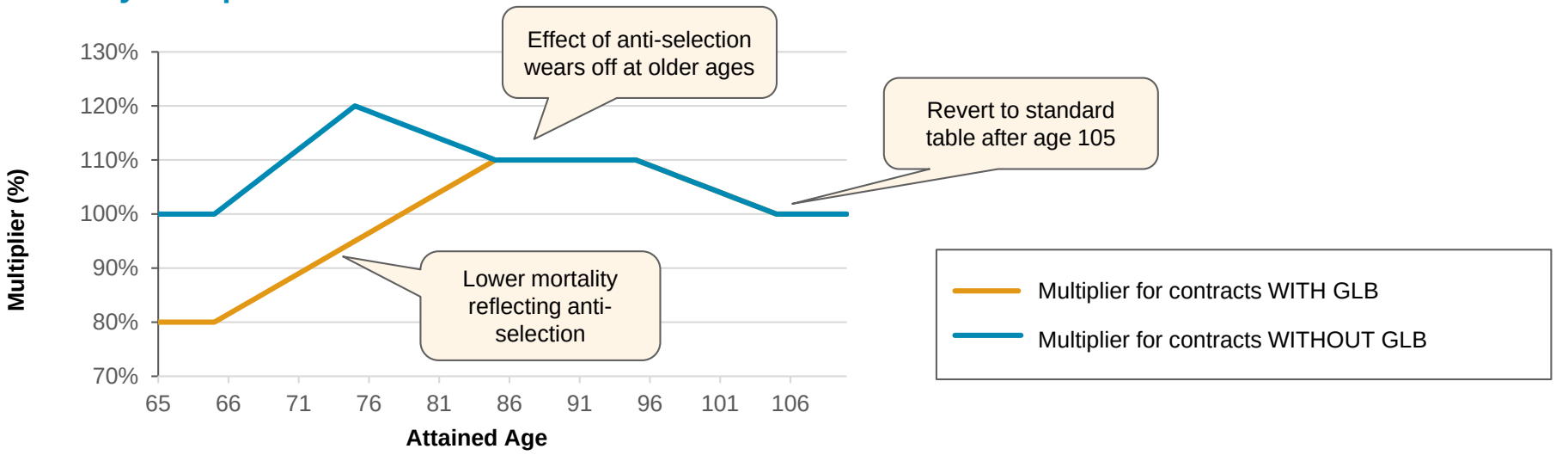
Mortality
Mortality assumption is updated to 2012 IAM and scale G2

Mortality should be calculated as follows:

$$q_x^{2012+n} = q_x^{2012}(1 - G2_x)^n * F_x$$

	Component	Prescribed assumption
q_x	Base mortality table	2012 IAM Basic
G2	Mortality improvement	Scale G2
n	MI years	Numbers of years between 2012 and projection year[1]
F_x	Multiplier	Prescribed and vary by with GLB and without GLB

Mortality multiplier table



1. Mortality improvement is only applied to 2017 for GAPV calculation

Partial withdrawal (1/2)

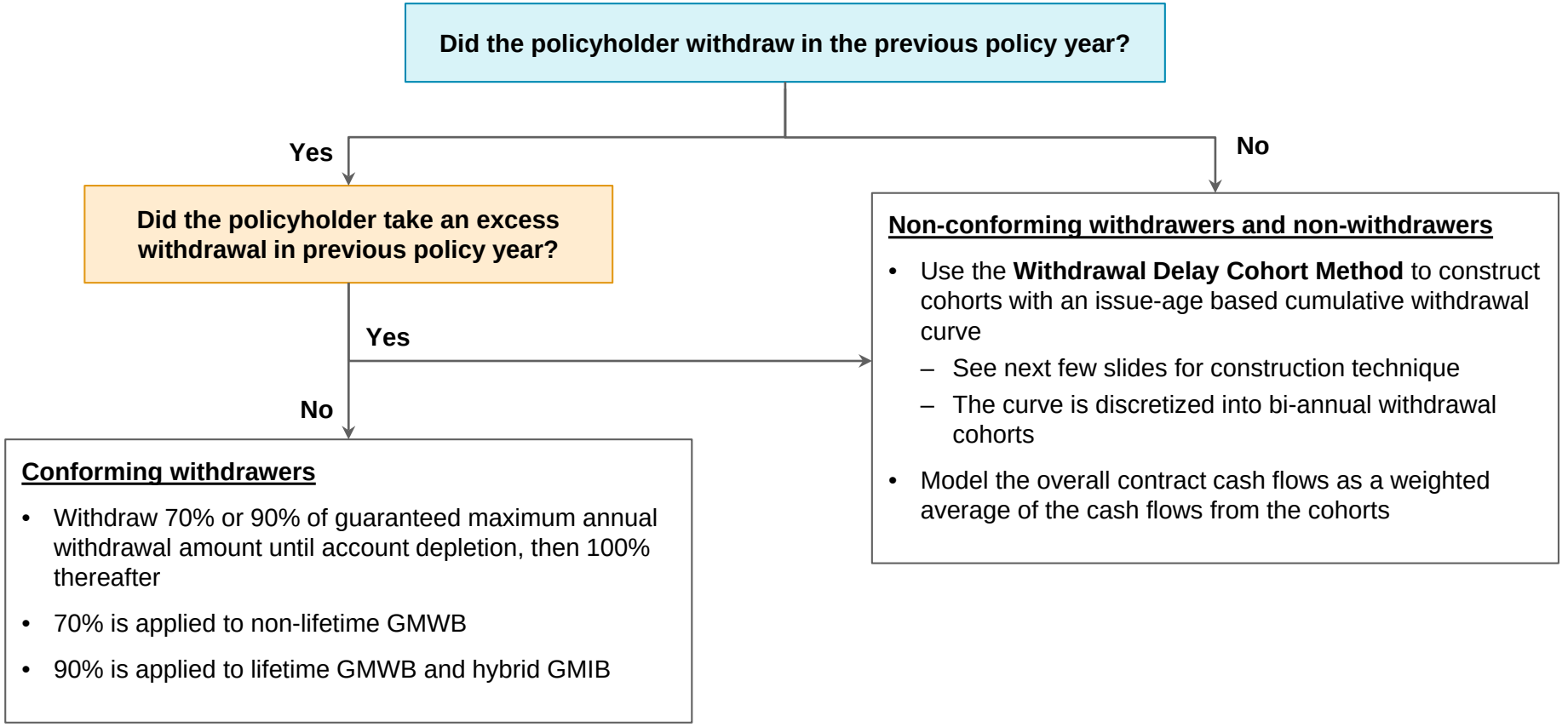
Partial withdrawal assumptions are much more granular and reflective of contract and benefit types

	Contract / benefit type	Partial withdrawal assumption
1	Contracts with contractual or previously elected automatic withdrawals	• Contractual or automatic withdrawal should be assumed to continue • Excess withdrawal should not be assumed to continue
2	403(b) contracts	• % of account value, increasing by attained age brackets • 0.5% for age <=59; 2.0% age 60-69; 3.0% age 70-74; 4.0% age >=75)
3	Non-rollup GMDB	• 3.5% of account value
4	Rollup GMDB	• 2% of account value
5	Non-rollup traditional GMIB or GMAB	• 2% of account value
6	Rollup traditional GMIB	• 1.5% of account value
7	GMWB when AV =0	• 100% of guaranteed maximum annual withdrawal amount (GMAWA)
8	GMWB / hybrid GMIB when AV > 0	• See next slide

Partial withdrawal (2/2)

GMWB/hybrid GMIB partial withdrawal assumptions are differentiated by withdrawal status

Summary of GMWB / hybrid GMIB withdrawal assumptions



Withdrawal Delay Cohort Method

To produce the cumulative withdrawal curve used for cohort construction, there is a three-step process using the GAPV profile across different years

Steps to construct the cumulative withdrawal curve

1 Calculate GAPV for each year of starting withdrawals

- For each policy, calculate the discounted and decremented GAPV as of the issue year for each potential attained age of initiating withdrawals up to age 120 or the end of projection assuming a fixed 10-year CMT of 3.0%
- Each GAPV calculated should account for all benefit logic – including rollups and one-time bonuses, changes in withdrawal rate, presence of a lifetime guarantee, and presence of an embedded GMDB

2 Transform and normalize GAPV to construct the initial cumulative withdrawal curve

- Apply the following adjustments to the GAPV profile obtained in Step 1:
  - Raise each GAPV calculated to the second power
  - Reduce the $GAPV^2$ values calculated for all attained ages below 60 by 50%
- Apply a multiplier to all of the adjusted $GAPV^2$ values such that the sum of these $GAPV^2$ values is 80% for non-qualified GMWB and 95% for qualified GMWB (use 60% and 85% respectively for hybrid GMIB)
- Construct the initial cumulative withdrawal curve as the sequential sum of the normalized $GAPV^2$ values

3 Adjust curve for deferral bonus termination and RMDs

- At the following ages, increase the withdrawal rate in the initial curve by a factor × remaining withdrawal curve. The factor is 35% and 50%, respectively for the two cases below.
  - For policies with rollups or bonuses, immediately after either the rollup or bonus termination – *whichever one gives rise to the higher GAPV*
  - For all qualified policies, at attained age 71
- Scale the remainder of the cumulative withdrawal curve such that the cumulative withdrawal rate remains constant at 80% for non-qualified GMWB / 95% for qualified GMWB (60% and 85% for hybrid GMIB)

1 Calculate the GAPV for each year of starting withdrawals
For an illustrative lifetime GMWB policy

Sample policy

Issue age: 58

Tax status: non-qualified

Rollup rate: 6% compounded

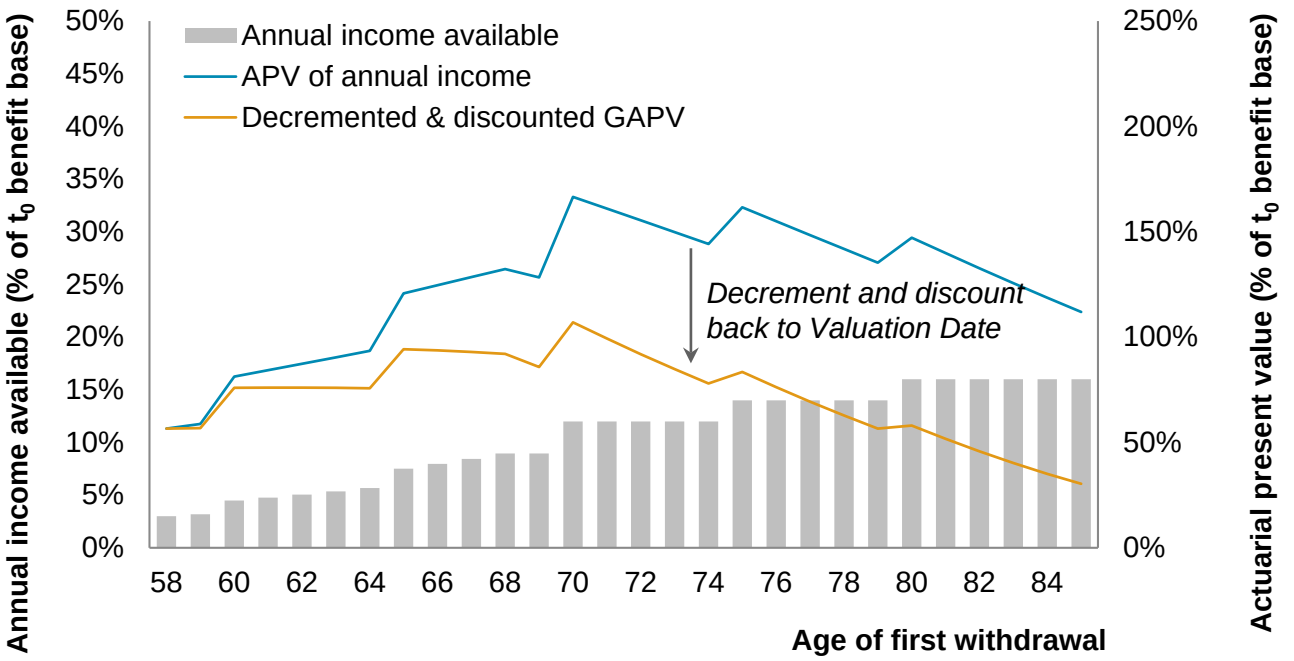
Rollup term: 10 years

One-time bonus: 200% if no withdrawal before age 70

Payout rates:

55-59	3.0%
60-64	4.0%
65-69	5.0%
70-74	6.0%
75-79	7.0%
80+	8.0%

GAPV profile calculated for the sample policy



Annual income available	Payout rate (t) × Benefit base (t)
APV of annual income	Annual income × Annuity factor
Decremented & discounted GAPV	APV annual income × Survivorship × Df

2 Transform and normalize GAPV for initial cumulative withdrawal curve
For an illustrative lifetime GMWB policy

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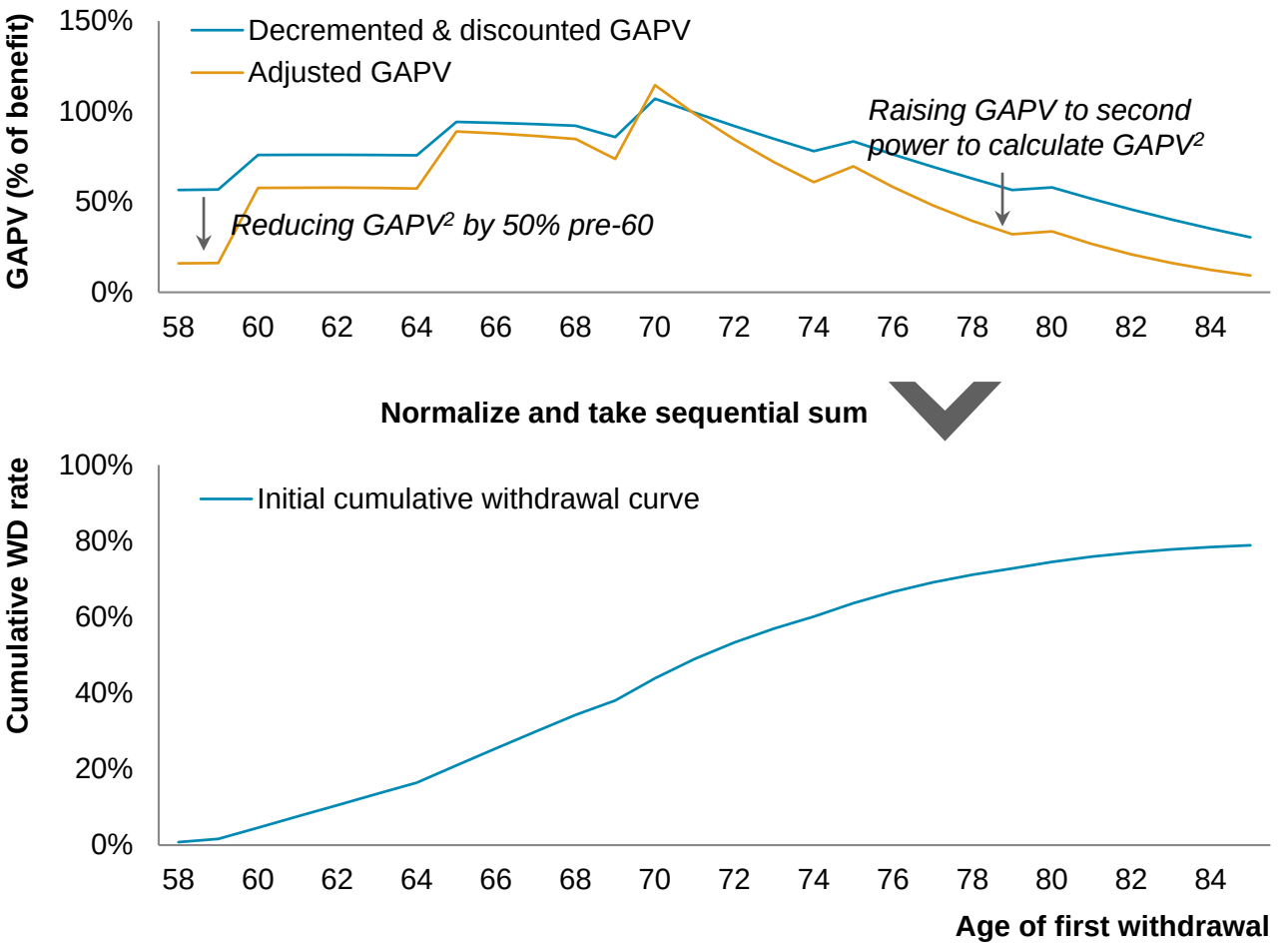

3 Adjust initial curve for deferral bonus termination and RMDs
For an illustrative lifetime GMWB policy

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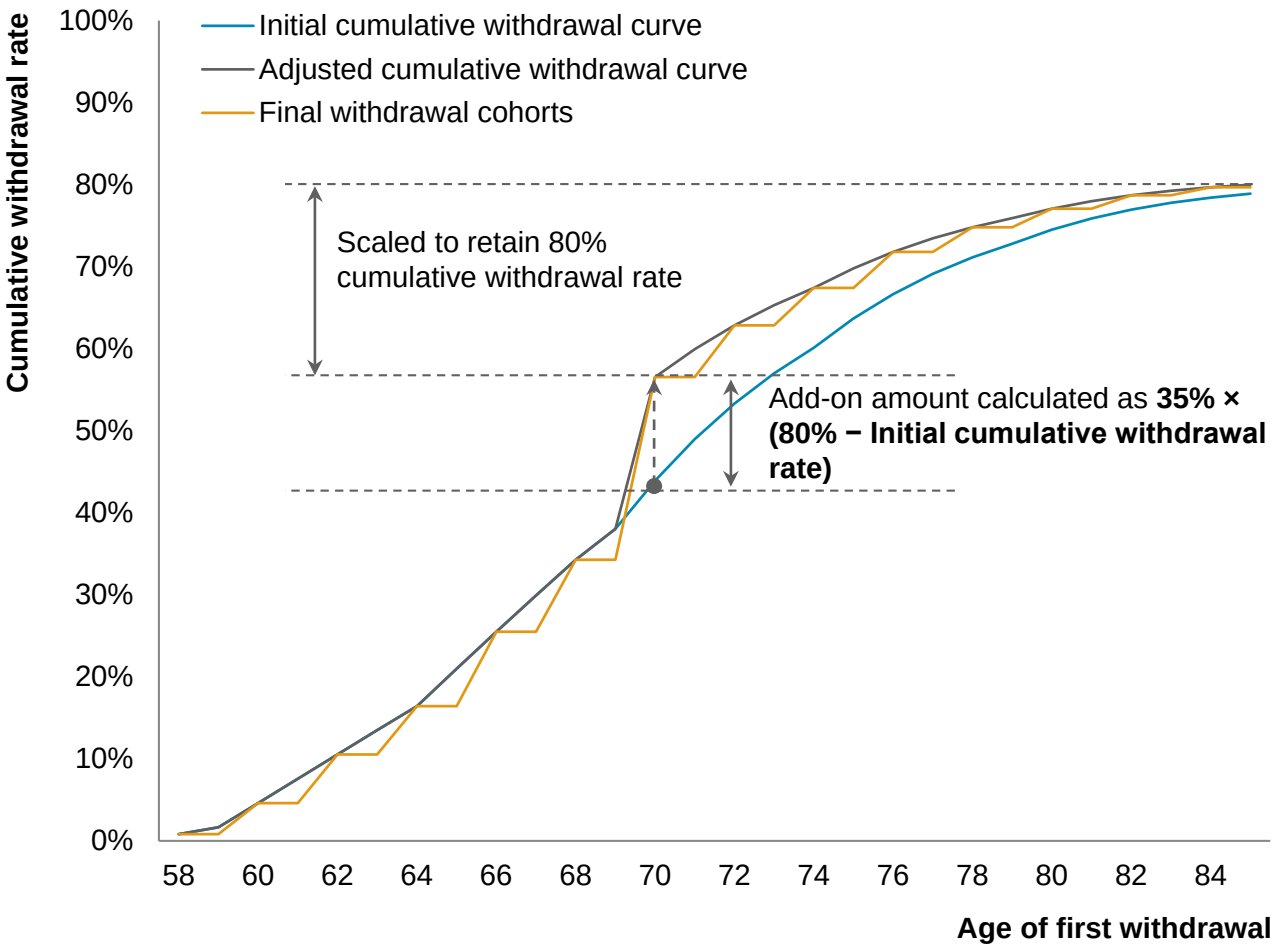
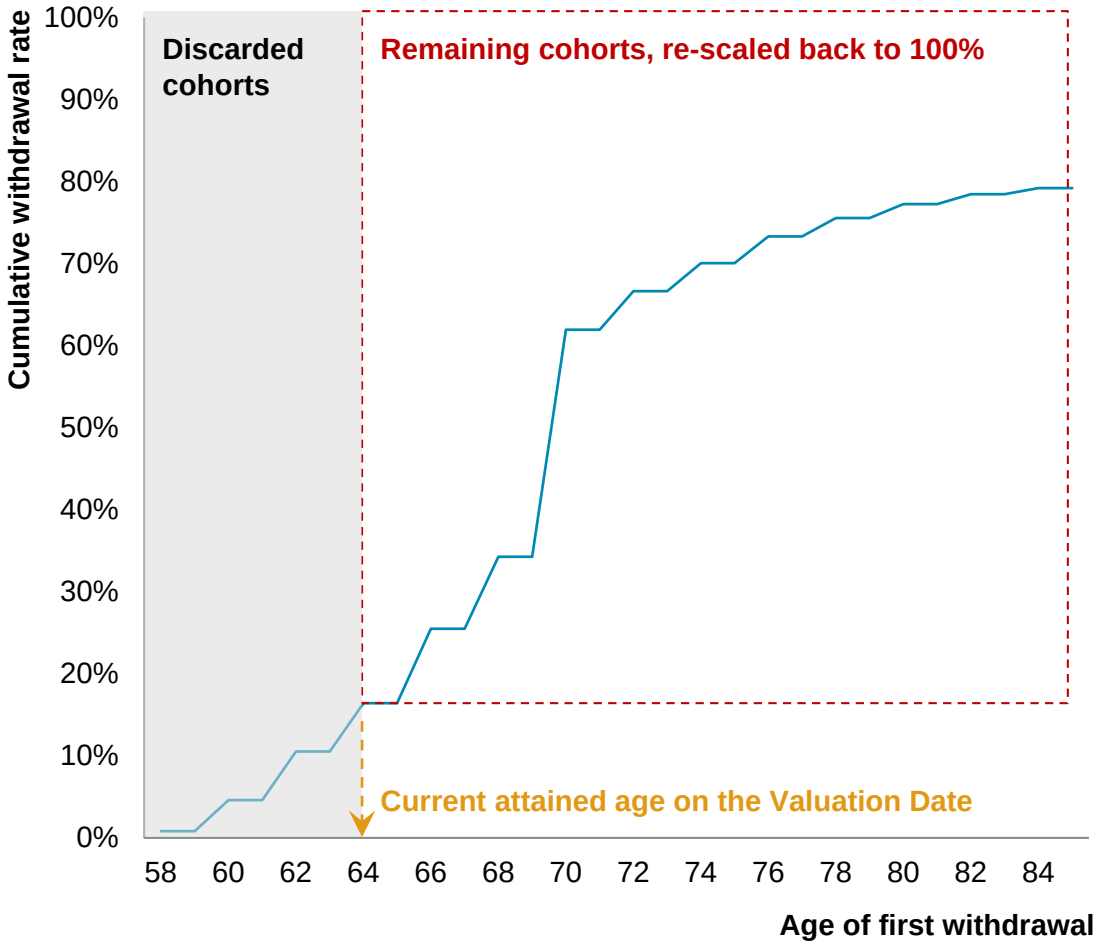
Projected cumulative withdrawal rates for the sample policy



Once the cohorts have been established, they may be reused at future valuation dates simply by scaling and without need for reconstruction

Projected cumulative withdrawal rates for the sample policy



Commentary

- The cumulative withdrawal curve and resultant cohorts are based on issue age
- The discount rate used for GAPV is fixed
- Hence, for each set of policies with same issue age, rider, and tax status, cohorts only need to be determined once at issue
- At subsequent valuation dates, if a policy begins conforming withdrawals, it is modeled to continue withdrawing
- For policies that remain non-withdrawing:
  - Cohorts with ages younger than the current attained age are discarded
  - Remaining cohorts are scaled back up to 100% and applied
- For instance, for our sample policy with issue age 58, at age 64 the remaining cohorts should be rescaled as:

$$\mathbf{F'(x) = \frac{F(x) - F(63)}{1 - F(63)}}$$

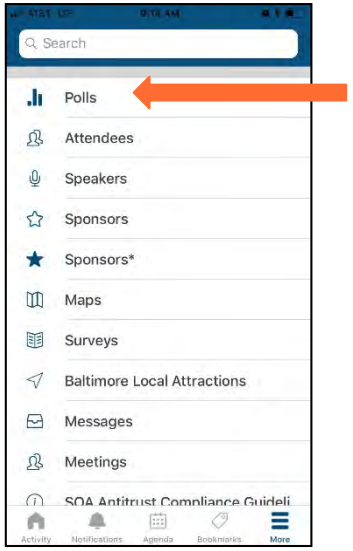
Where $\mathbf{F(x)}$ is the cumulative withdrawal rate at age $\mathbf{x}$

Section 3 | VM-21 assumptions for stochastic projection

Polling

To Participate, look for Polls in the SOA Event App or visit **valact.cnf.io** in your browser

Find The Polls Feature Under **More** In The Event App



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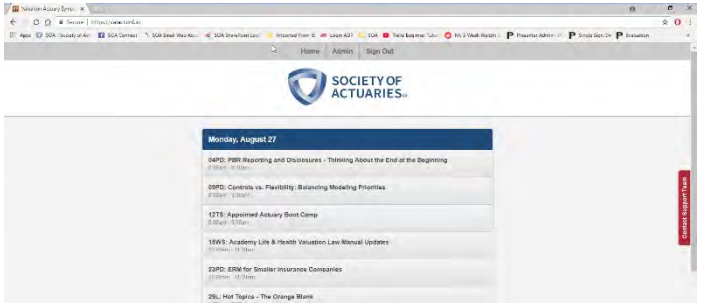
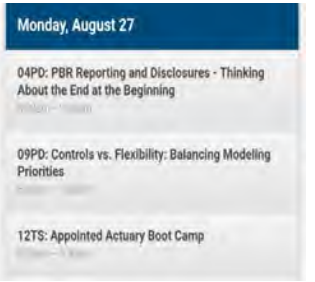




Choose your session (58)

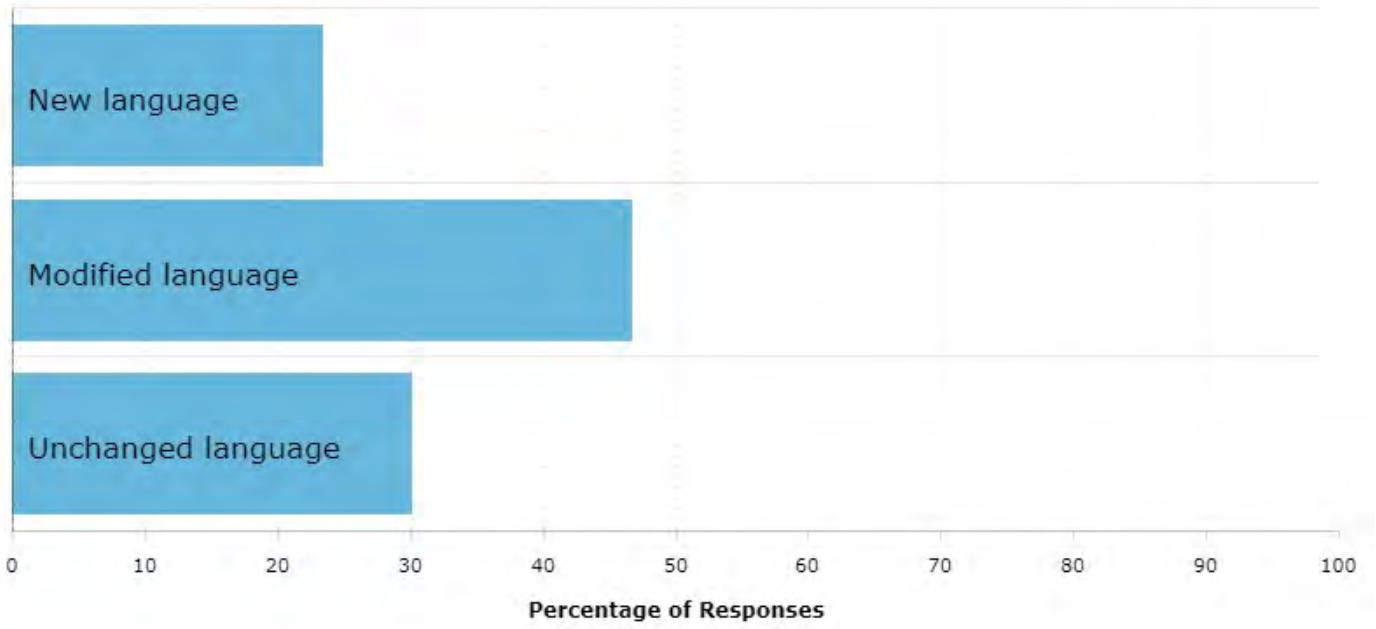
Respond to Polls when they appear

New, modified, or unchanged
You decide! – Question 1

Guidance and Requirements for Setting Prudent Estimate Mortality Assumptions

"The intent is for prudent estimate mortality assumptions to be based on facts, circumstances and appropriate actuarial practice, with only a limited role for unsupported actuarial judgment."

Poll: New, modified, or unchanged - Q1

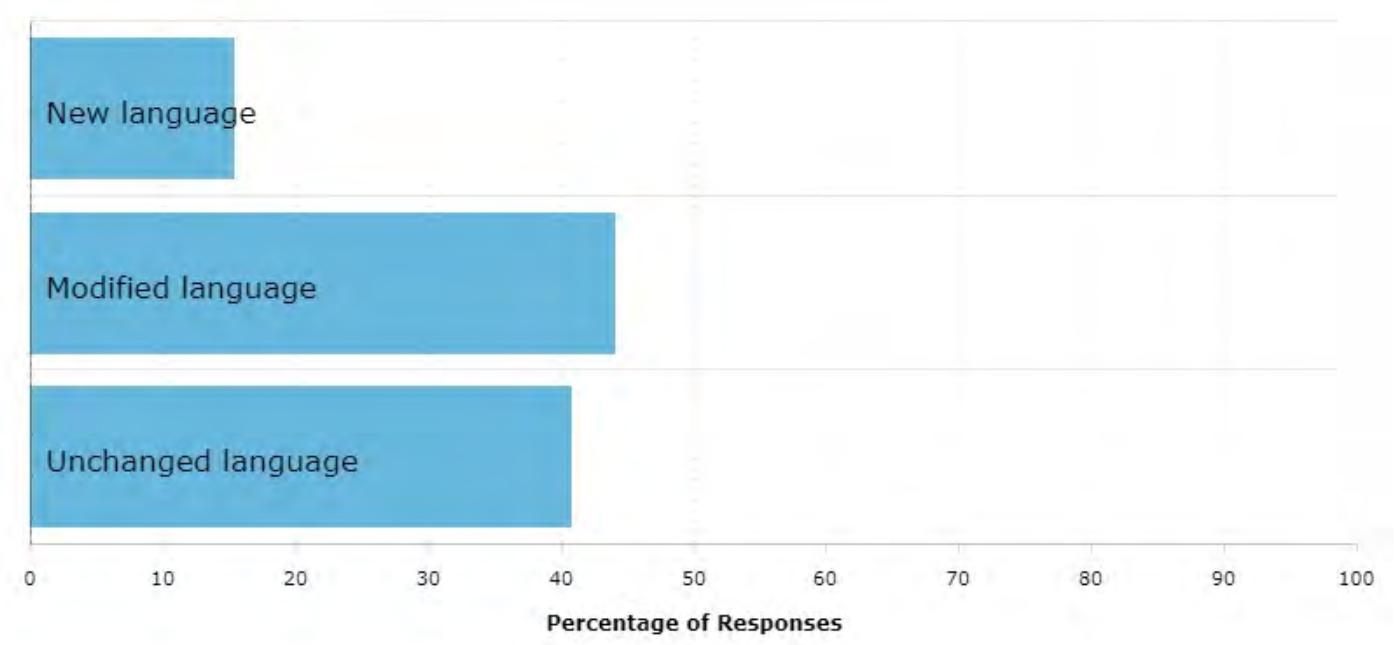


New, modified, or unchanged
You decide! – Question 2

Section 1 Background

"Principle 3: The implementation of a model involves decisions about the experience assumptions and the modeling techniques to be used in measuring the risks to which the company is exposed. Generally, assumptions are to be based on the conservative end of the confidence interval. The choice of a conservative estimate for each assumption may result in a distorted measure of the total risk. Conceptually, the choice of assumptions and the modeling decisions should be made so that the final result approximates what would be obtained for the stochastic reserve at the required CTE level if it were possible to calculate results over the joint distribution of all future outcomes. In applying this concept to the actual calculation of the stochastic reserve, the company should be guided by evolving practice and expanding knowledge base in the measurement and management of risk."

Poll: New, modified, or unchanged - Q2

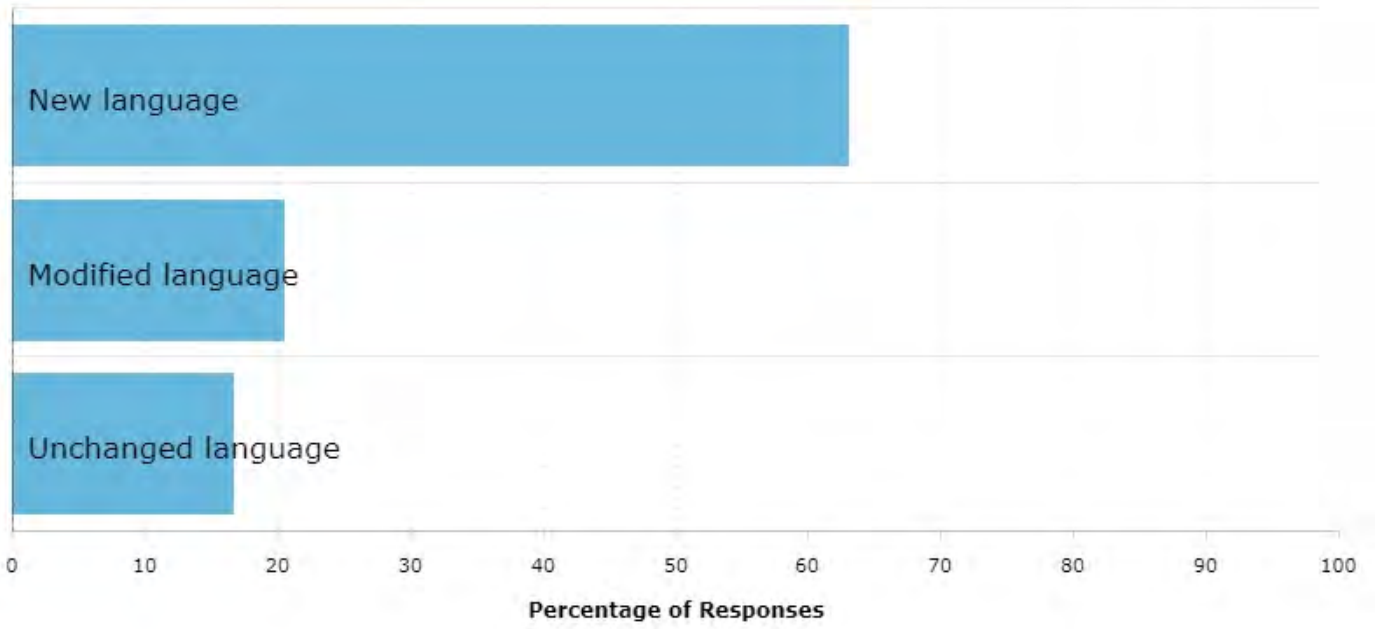


New, modified, or unchanged
You decide! – Question 3

Contract Holder Behavior Assumptions

"Ideally, contract holder behavior would be modeled dynamically according to the simulated economic environment and/or other conditions. It is important to note, however, that contract holder behavior should neither assume that all contract holders act with 100% efficiency in a financially rational manner nor assume that contract holders will always act irrationally. These extreme assumptions may be used for modeling efficiency if the result is more conservative."

Poll: New, modified, or unchanged - Q3



New, modified, or unchanged
You decide! – Question 3: Added language

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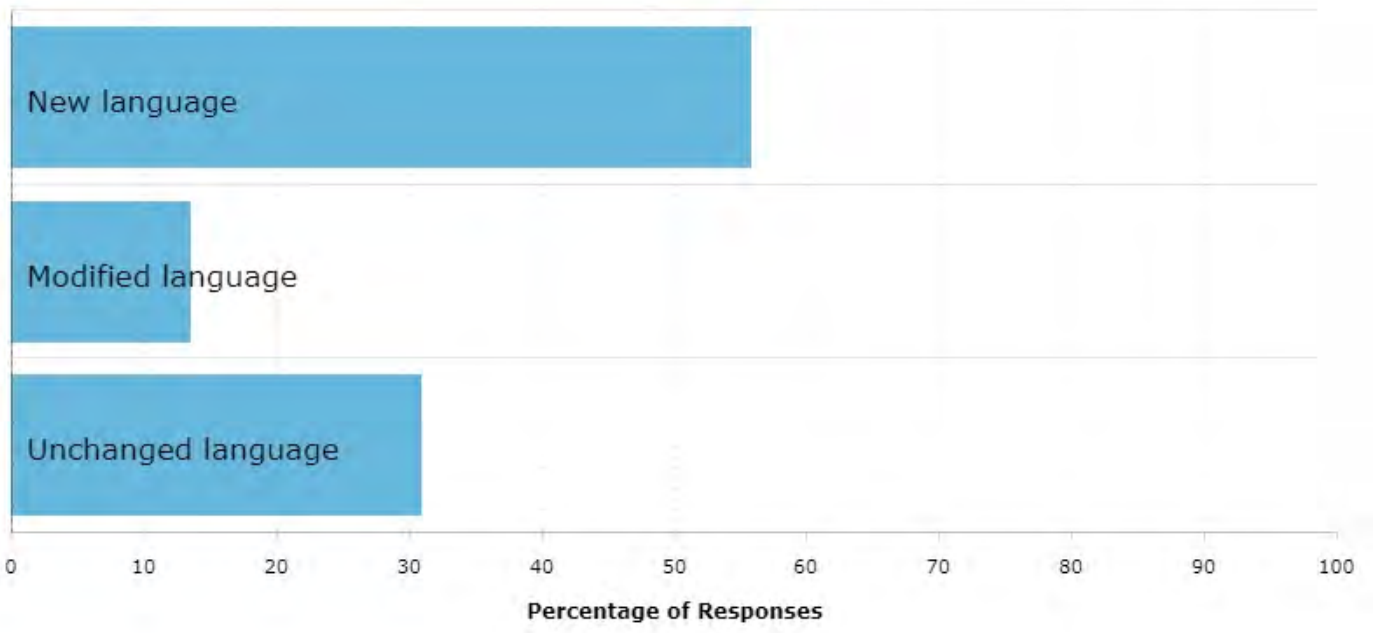
New, modified, or unchanged
You decide! – Question 4

Guidance and Requirements for Setting Prudent Estimate Mortality Assumptions

Business Segment

"The grouping, at a minimum, should differentiate whether the contracts contain VAGLBs or do not, where the no-VAGLB segments would include both contracts with no guaranteed benefits and contracts with only GMDBs."

Poll: New, modified or unchanged - Q4



New, modified, or unchanged
Answer key

- Q1: “The intent is for prudent estimate mortality assumptions…” **Unchanged.**

- Q2: “Principle 3:…” **Unchanged or Modified**
  - Minor wordsmithing removing CTE and replacing with stochastic reserve.
  - Common wording change was shifting from “actuary” to “company” references

- Q3: Contract holder behavior, section 10.D: – **Modified**. The last sentence is added to the paragraph

- Q4: **New.** It is a new sentence inserted in the paragraph as below

  Business Segments

  For purposes of setting prudent estimate mortality assumptions, the products falling under the scope of these requirements shall be grouped into business segments with different mortality assumptions. **The grouping, at a minimum, should differentiate whether the contracts contain VAGLBs or do not, where the no-VAGLB segments would include both contracts with no guaranteed benefits and contracts with only GMDBs**. The grouping should also generally follow the pricing, marketing, management and/or reinsurance programs of the company.

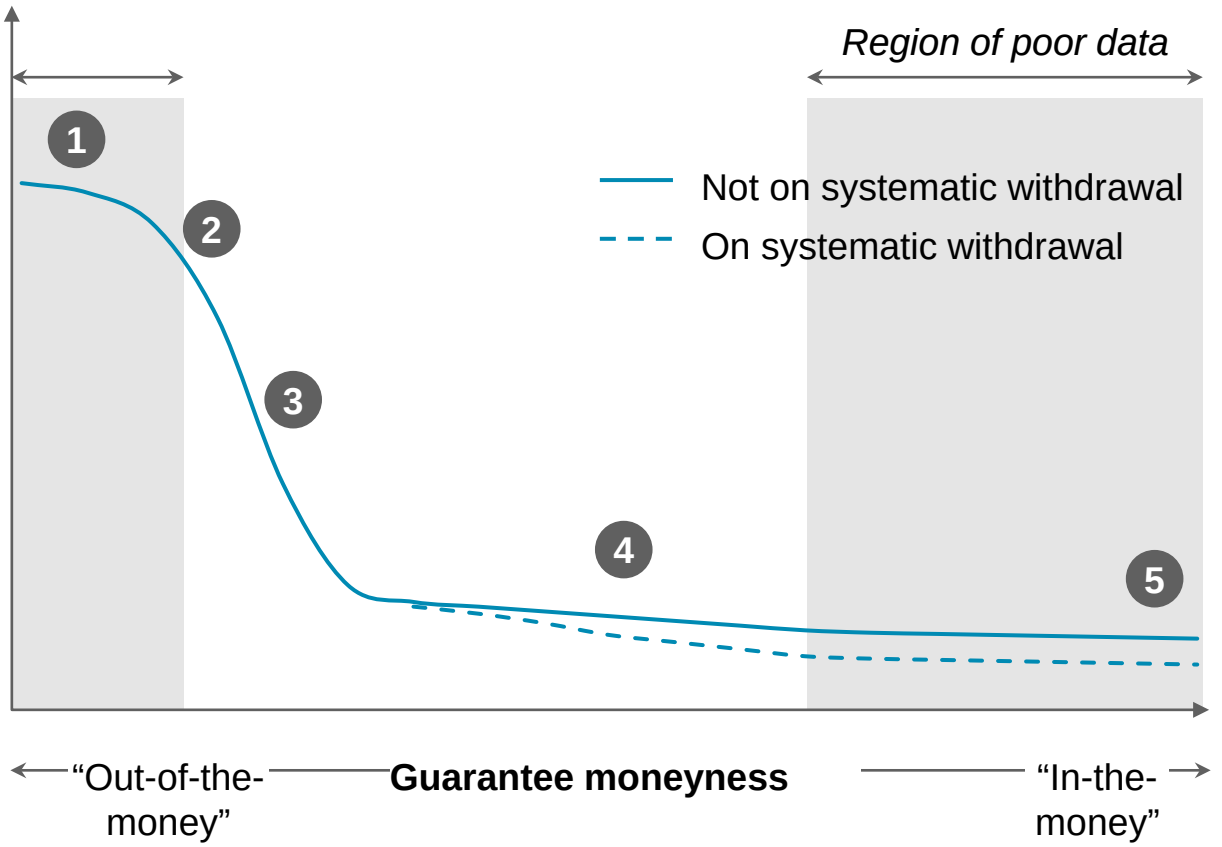
Section 4 | State of the industry

State of the data

Do we have sufficient data?

State of the data – Surrenders
Deep in-the-money data exists but is still emerging

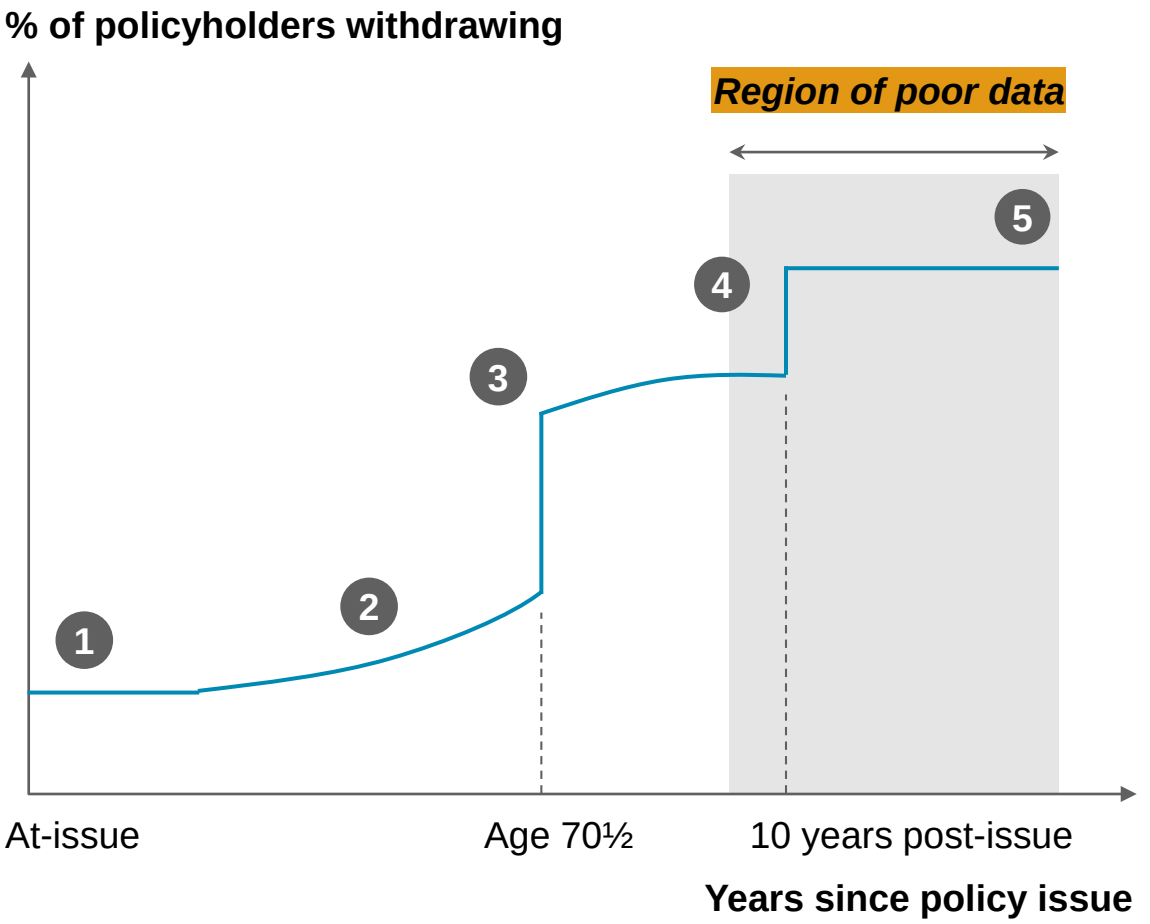
Surrender rates across guarantee "in-the-moneyness"



1. **Better alternatives**
2. **Equilibrium point**
3. **Cliff decline**
4. **Corridor of insensitivity**
5. **Ultimate decline**

State of the data – Withdrawals
Data post-rollup termination is still emerging

Illustration of withdrawal decisions across policy lifespan



1. **At-issue**:
2. **Retirement ages**
3. **Required minimum distributions**
4. **Roll-up termination**
5. **Old ages**

Industry trends

Assumption		Trends
1	Mortality	• Greater bifurcation between GMDB/GLBs and deferral vs. payout phase
2	Surrenders	• Assumptions updated for longer durations and benefit richness • Floors gradually decreased • Some have introduced interest rate sensitivity • Use of predictive analytics widespread
3	Withdrawals	• Industry moved to use experience for percentage of maximum withdrawals • Utilization curves updated for emerging data, including some post-deferral utilization data • Various approaches to model inefficient usage (e.g., excess withdrawals) • Frameworks refined / modeling approaches deployed
4	GMIB annuitizations	• Traditional GMIB: Data is considerable. Utilization split between first and subsequent opportunities • Hybrid GMIB: Greater tailoring to product economics and utilization opportunities

Interest rates

What is the impact of historically low interest rates?

Section 5 | Case studies: “What would you do?”

“What would you do” background lesson
Application of credibility (limited fluctuation method)

Number of events for full credibility at specified confidence levels

Relative Accuracy	Confidence levels		
	85%	90%	95%
3%	2,304	3,007	4,268
5%	829	1,082	1,537
10%	207	271	384

Define “relative accuracy” at X% confidence level to imply that empirical frequency is within +/- Y% of the true frequency X% of the time

Guidance for credibility in VM-21 was not specific. VM-20 prescribes the use of a method with 95% confidence level and 5% relative accuracy to determine the level of credibility (next slide)

Calculation of credibility factor “Z” under VM-20

Confidence level: 95%
Relative accuracy: 5% (1)
$\Phi^{-1}((1 + \text{confidence level})/2)$: 1.96 (2)

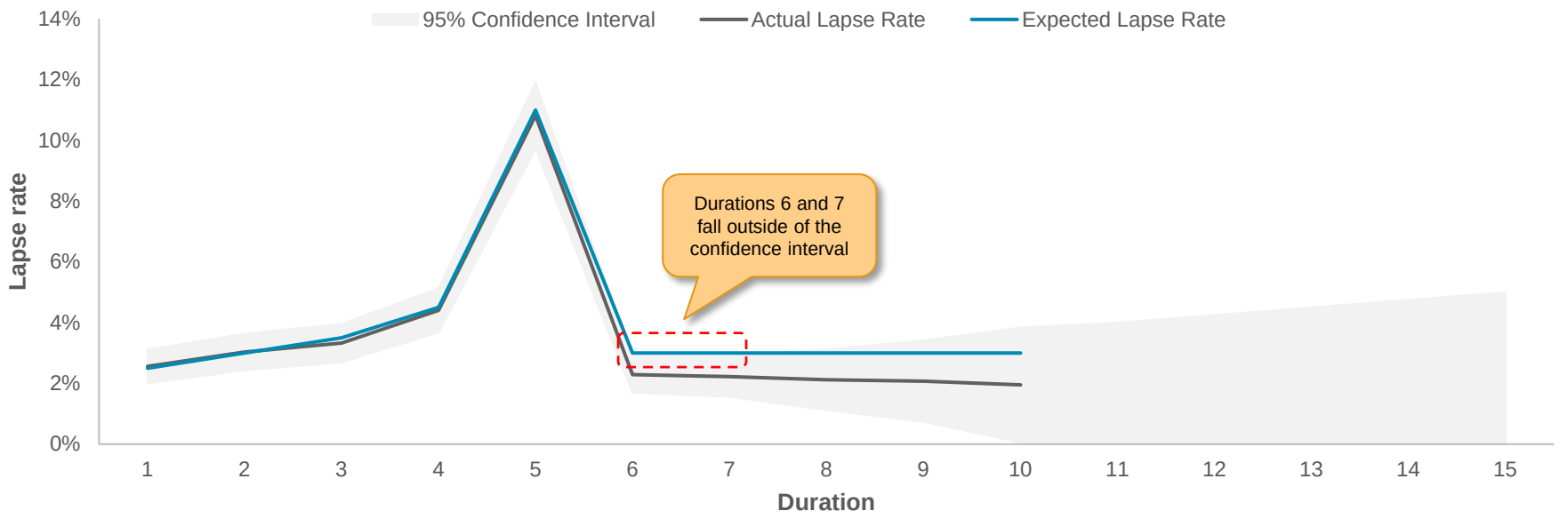
Duration	Claim Count	Z Credibility Factor
1	50	0.18
2	200	0.36
3	100	0.26
Total	**350** (3)	**0.48**

Z Credibility Factor
$= [1] \times [3]^{1/2} / [2]$
$= 0.05 \times (350)^{1/2} / 1.96$

An alternative is to consider statistical confidence intervals

Lapse assumption update – case 1
Lapse experience has emerged up to 10 years

Q: How should company ABC update its durational lapse assumption based on recent experience?



	Potential action items
1	Keep lapse assumption as is
2	Update lapse assumption for durations 6 and 7 to reflect recent actuals, keep lapse assumption as is for durations 8+
3	Update lapse assumption for durations 6-10 to reflect recent actuals, update lapse rates for durations 11+ based on extrapolation

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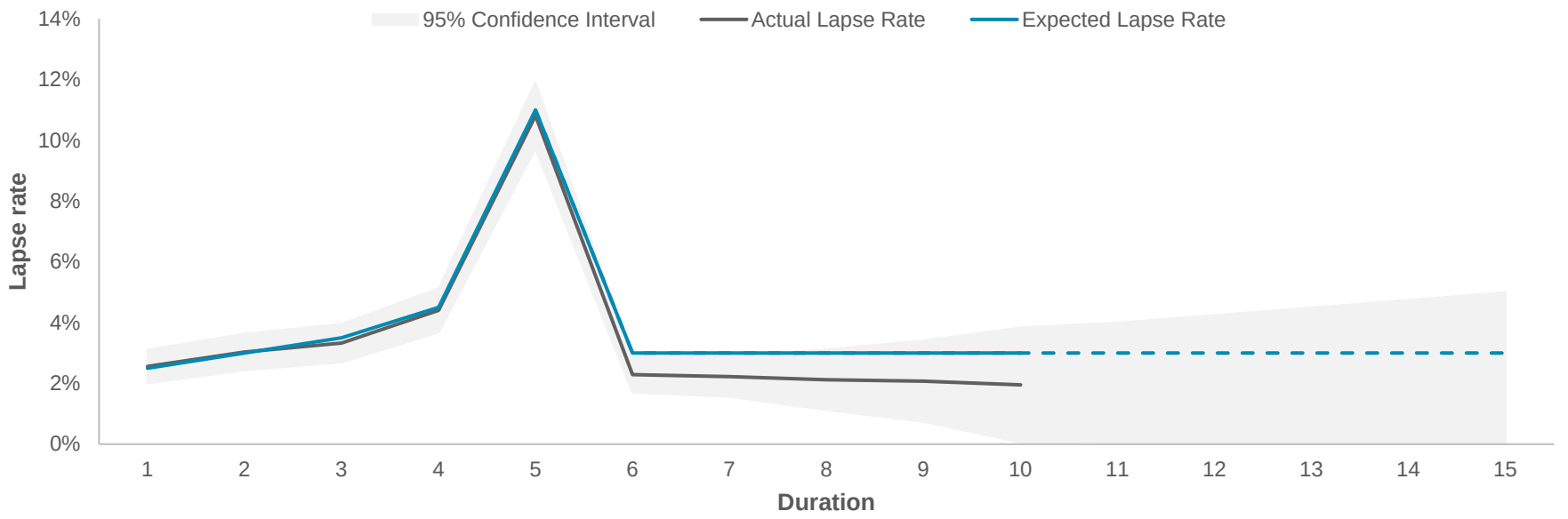

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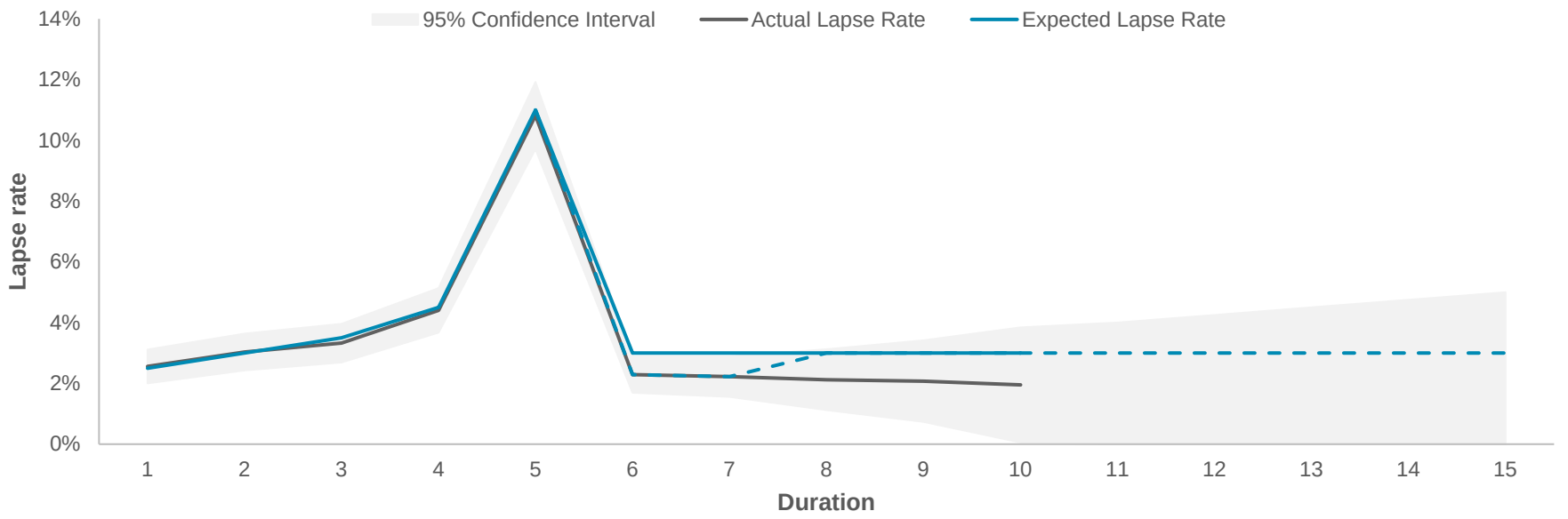

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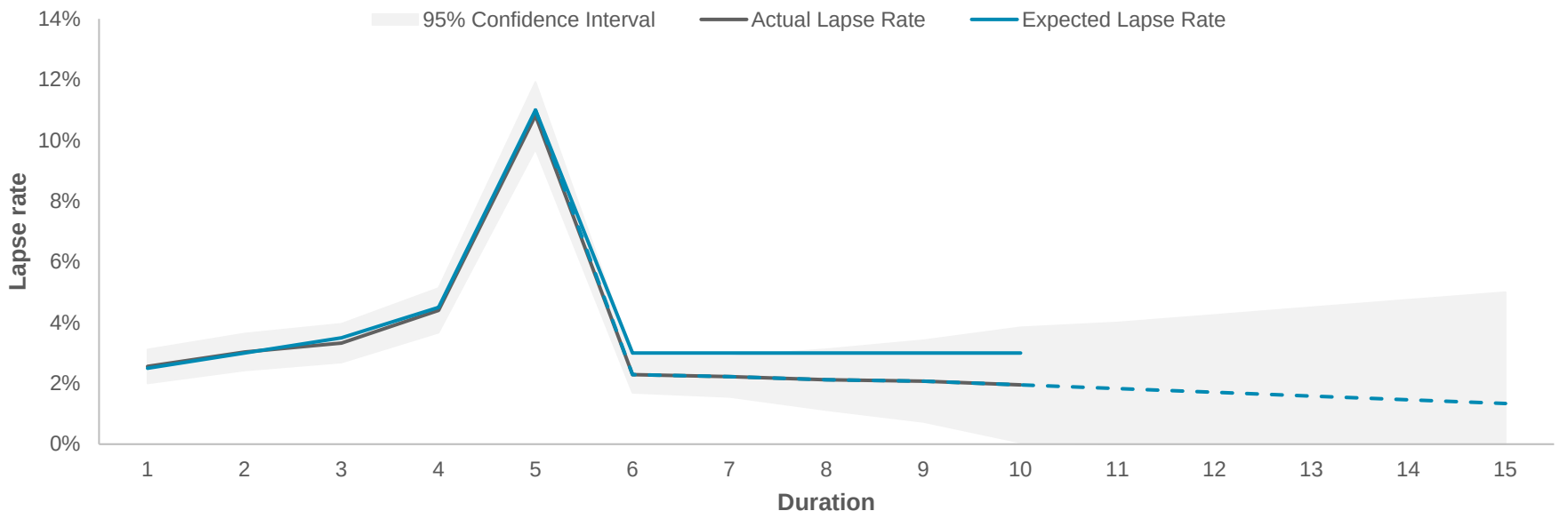
Lapse assumption update – case 1
Lapse experience has emerged up to 10 years

Q: How should company ABC update its durational lapse assumption based on recent experience?



	Potential action items
1	Keep lapse assumption as is
2	Update lapse assumption for durations 6 and 7 to reflect recent actuals, keep lapse assumption as is for durations 8+
3	**Update lapse assumption for durations 6-10 to reflect recent actuals, update lapse rates for durations 11+ based on extrapolation**

Lapse assumption update – case 1
Lapse experience has emerged up to 10 years

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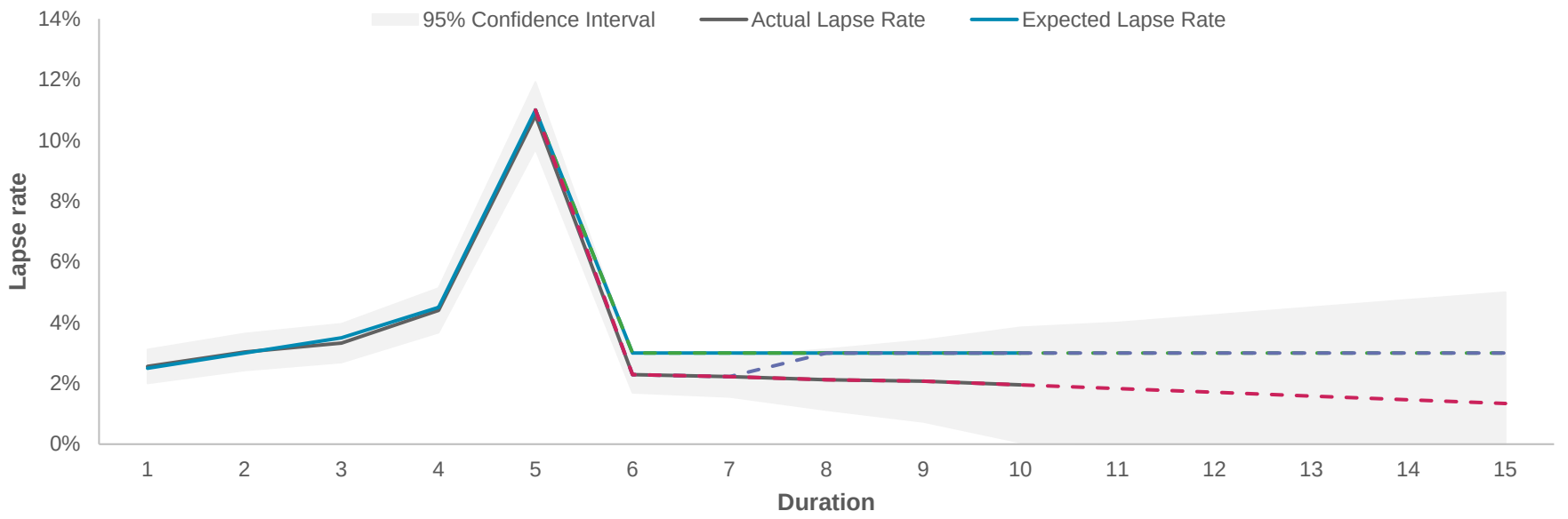
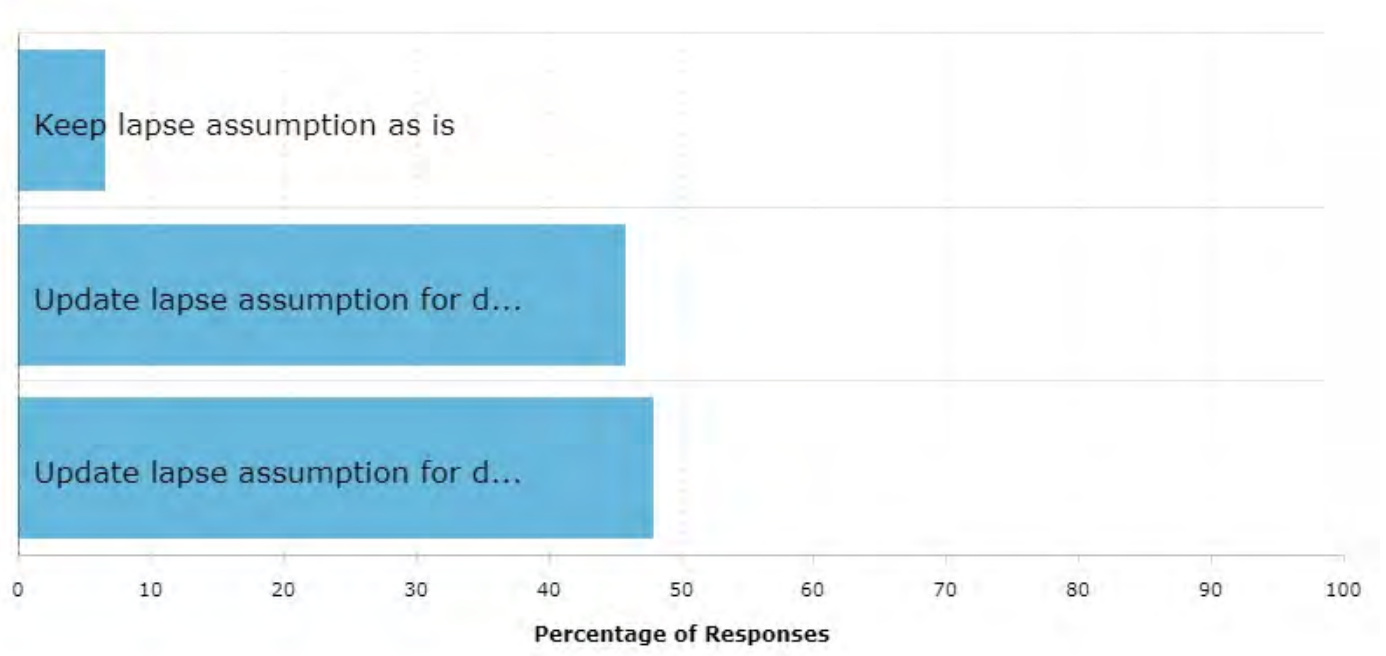


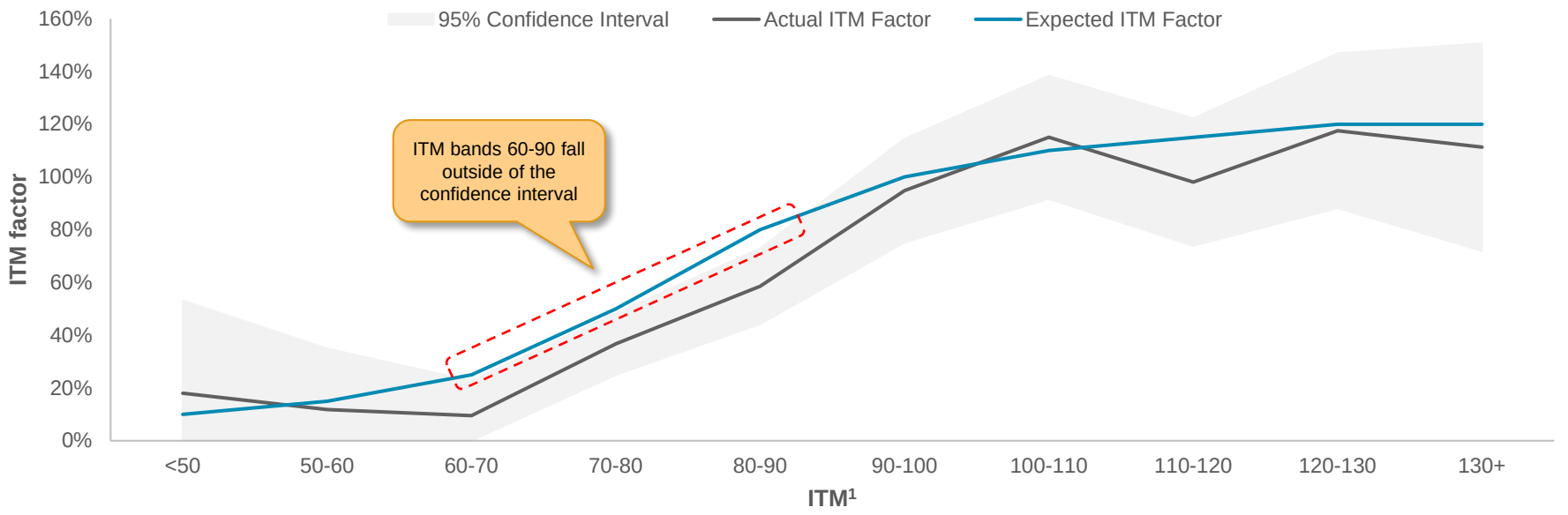
	Potential action items
1	Keep lapse assumption as is
2	Update lapse assumption for durations 6 and 7 to reflect recent actuals, keep lapse assumption as is for durations 8+
3	Update lapse assumption for durations 6-10 to reflect recent actuals, update lapse rates for durations 11+ based on extrapolation

Poll: Lapse assumption update - case 1



Lapse assumption update – case 2
Lapse experience has emerged for deeper ITM policies

Q: How should company ABC update its ITM lapse assumption based on recent experience?

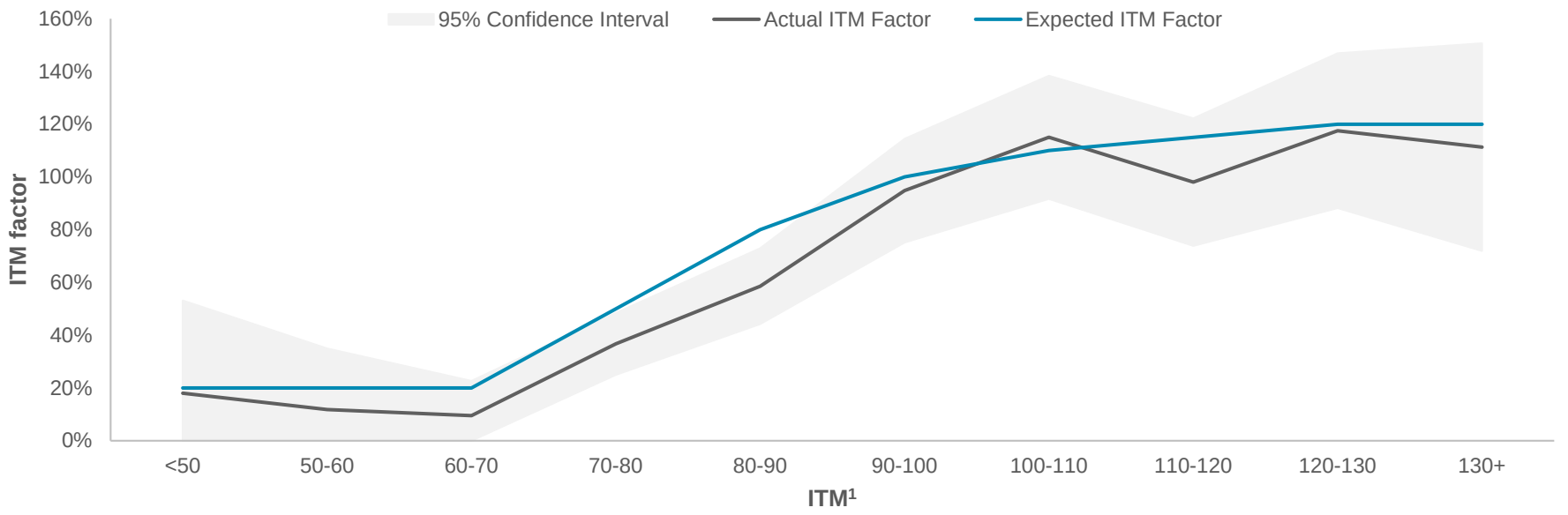


	Potential action items
1	Keep lapse assumption as is
2	Update lapse assumption for ITM bands 60-90 to reflect recent actuals
3	Recalibrate the ITM formula to reflect recent actuals for all ITM bands

[1]ITM is defined as AV / BB

Lapse assumption update – case 2
Lapse experience has emerged for deeper ITM policies

Q: How should company ABC update its ITM lapse assumption based on recent experience?



	Potential action items
1	**Keep lapse assumption as is**
2	Update lapse assumption for ITM bands 60-90 to reflect recent actuals
3	Recalibrate the ITM formula to reflect recent actuals for all ITM bands

[1]ITM is defined as AV / BB

Lapse assumption update – case 2
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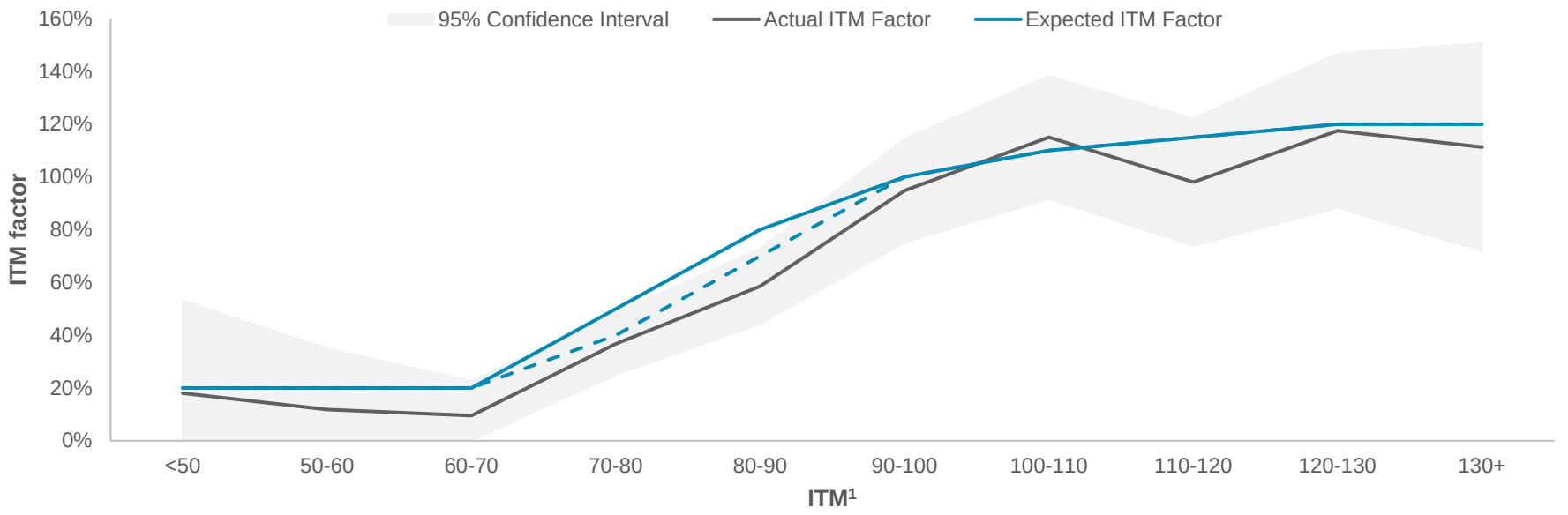

	Potential action items
1	Keep lapse assumption as is
2	**Update lapse assumption for ITM bands 60-90 to reflect recent actuals**
3	Recalibrate the ITM formula to reflect recent actuals for all ITM bands

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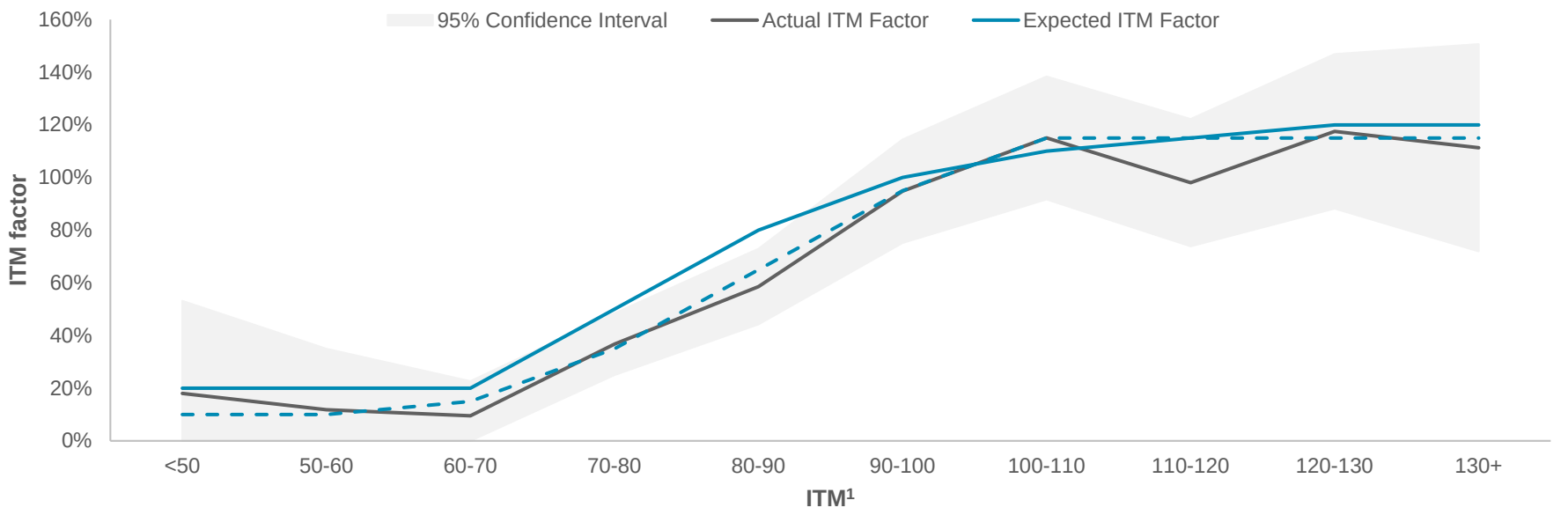

	Potential action items
1	Keep lapse assumption as is
2	Update lapse assumption for ITM bands 60-90 to reflect recent actuals
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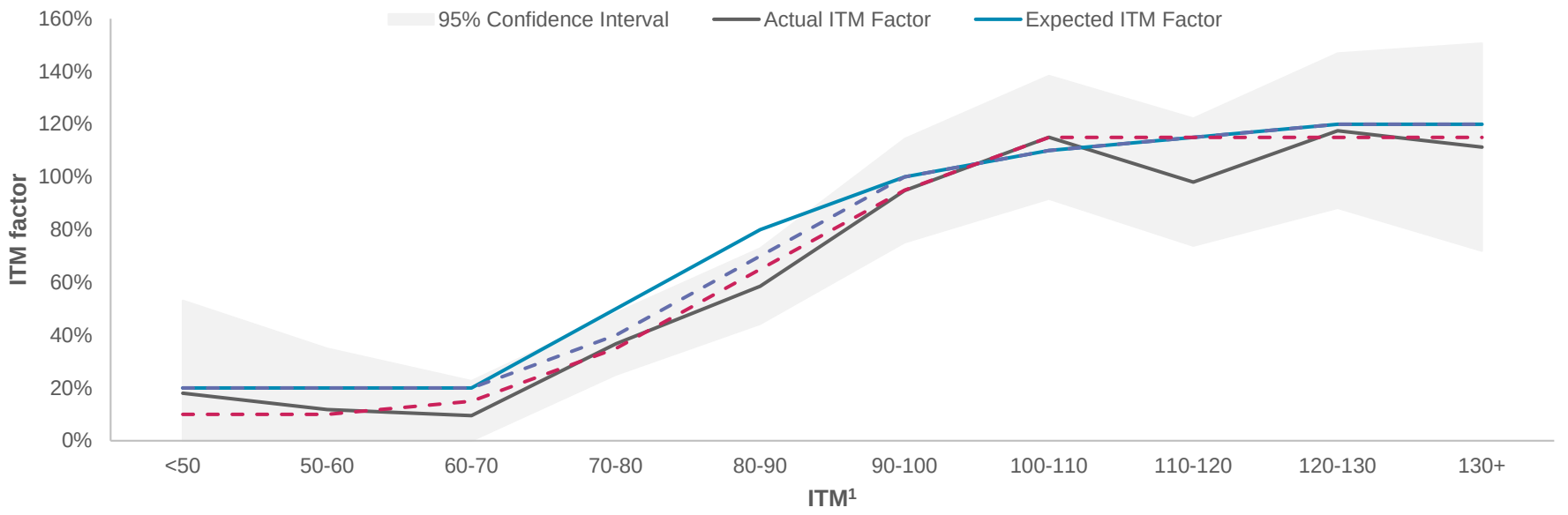

Potential action items	
1	Keep lapse assumption as is
2	Update lapse assumption for ITM bands 60-90 to reflect recent actuals
3	Recalibrate the ITM formula to reflect recent actuals for all ITM bands

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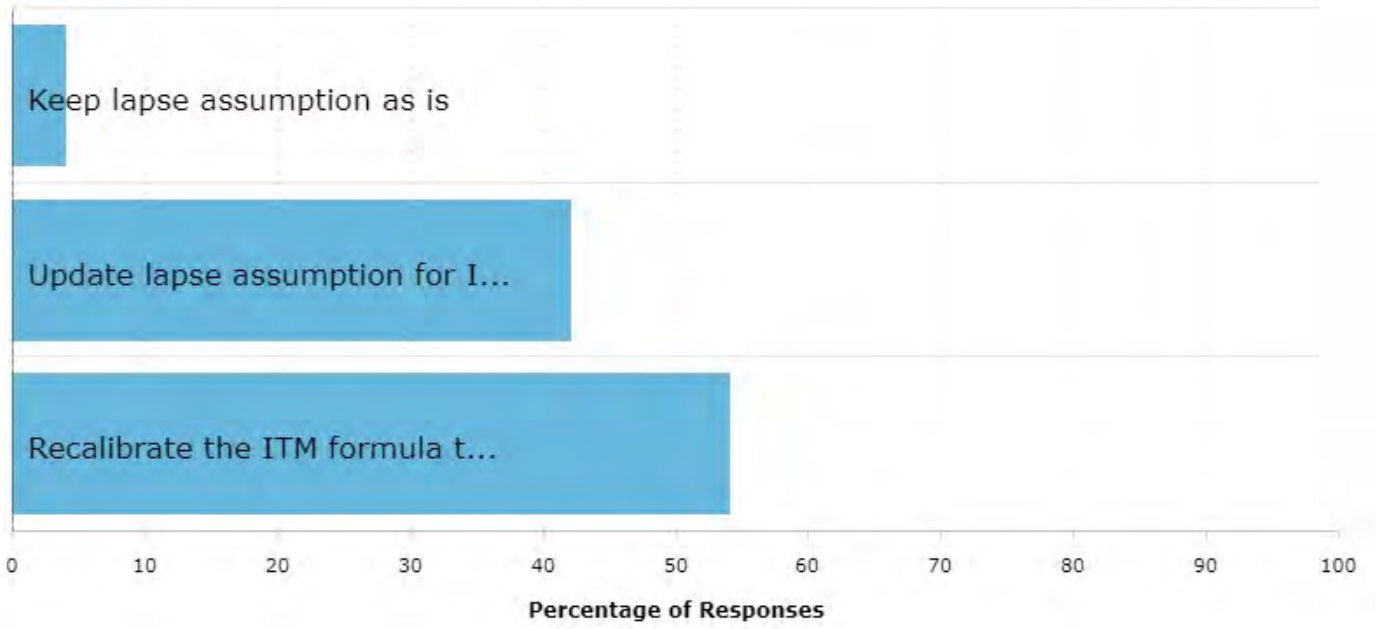
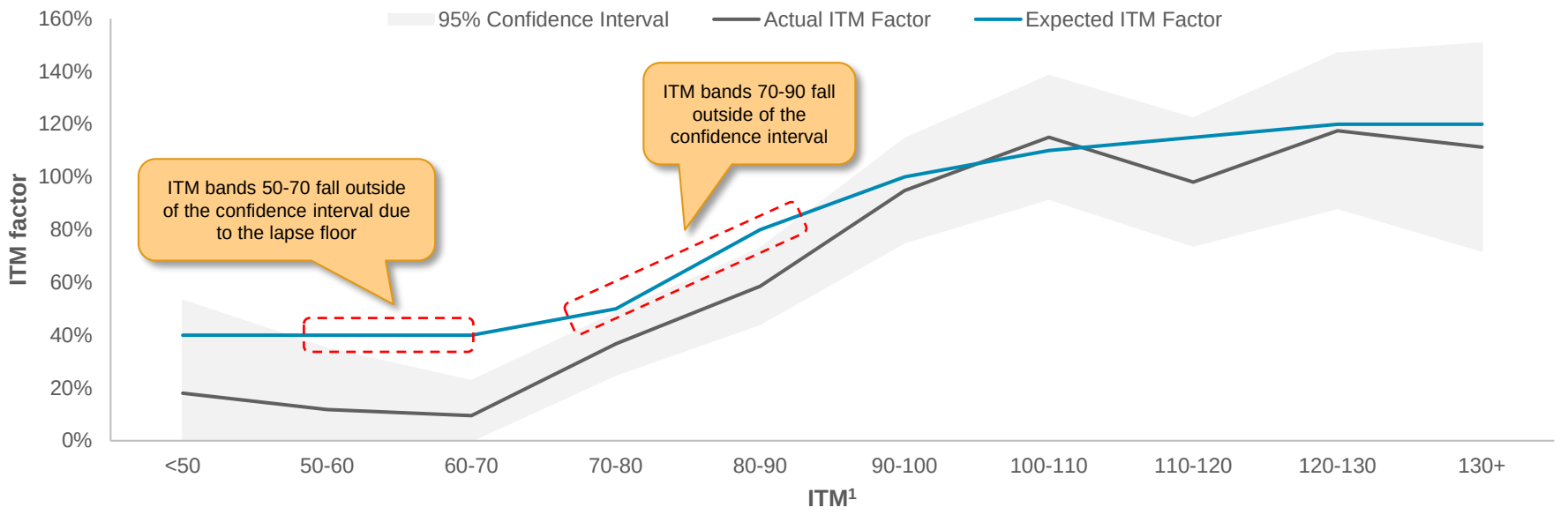
Poll: Lapse assumption update - case 2



Lapse assumption update – case 2a

Lapse experience has emerged for deeper ITM policies, with a lapse floor assumption in effect

Q: How should company ABC update its ITM lapse assumption based on recent experience?



Potential action items	
1	Keep lapse assumption and lapse floor as is
2	Update lapse floor to fall within the confidence interval, update lapse assumption for ITM bands 70-90 to reflect recent actuals
3	Update lapse floor to align with recent actuals, update lapse assumption for ITM bands 70-90 to reflect recent actuals

[1]ITM is defined as AV / BB

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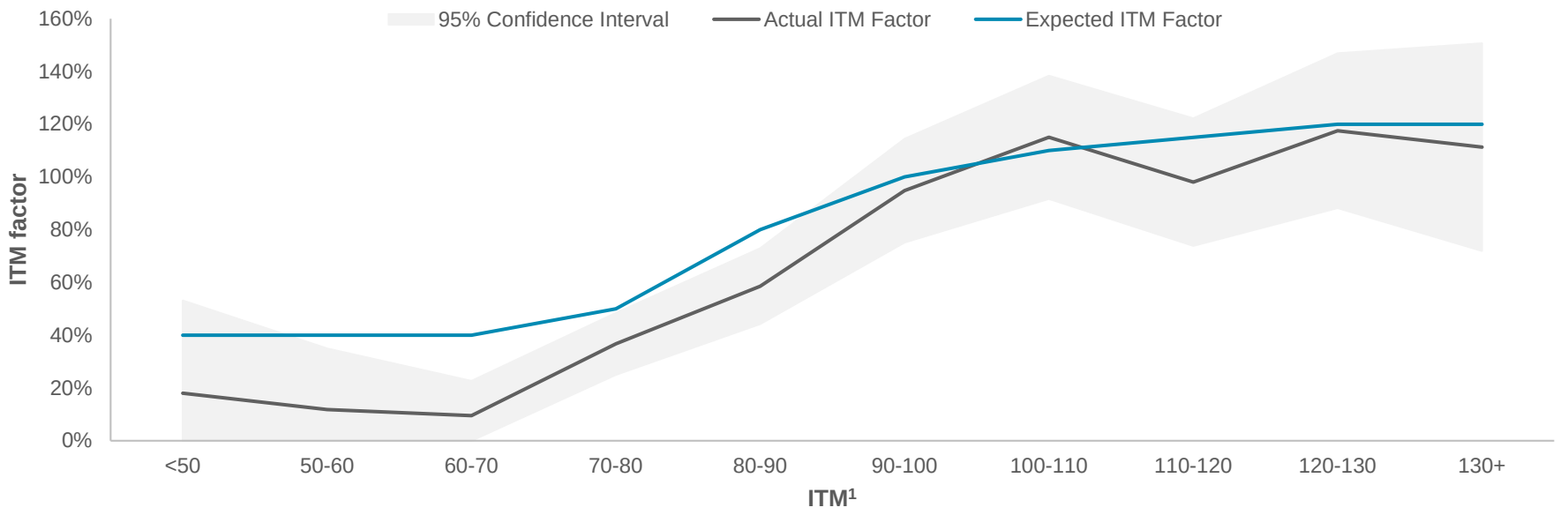

	Potential action items
1	**Keep lapse assumption and lapse floor as is**
2	Update lapse floor to fall within the confidence interval, update lapse assumption for ITM bands 70-90 to reflect recent actuals
3	Update lapse floor to align with recent actuals, update lapse assumption for ITM bands 70-90 to reflect recent actuals

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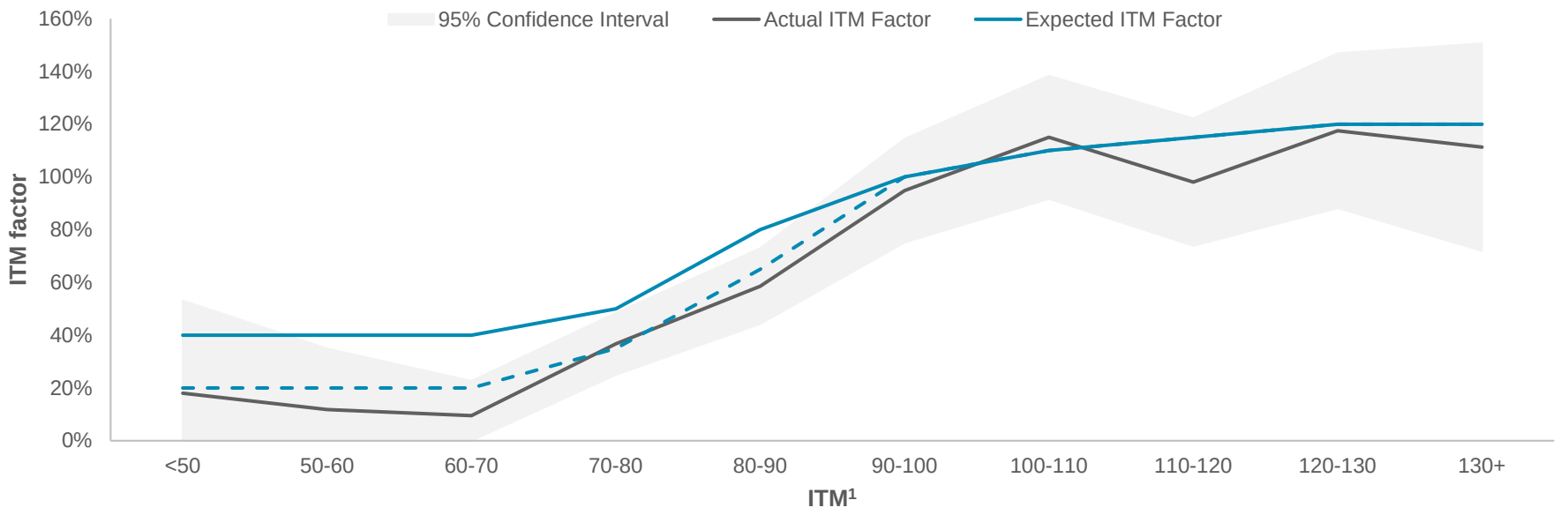

	Potential action items
1	Keep lapse assumption and lapse floor as is
2	**Update lapse floor to fall within the confidence interval, update lapse assumption for ITM bands 70-90 to reflect recent actuals**
3	Update lapse floor to align with recent actuals, update lapse assumption for ITM bands 70-90 to reflect recent actuals

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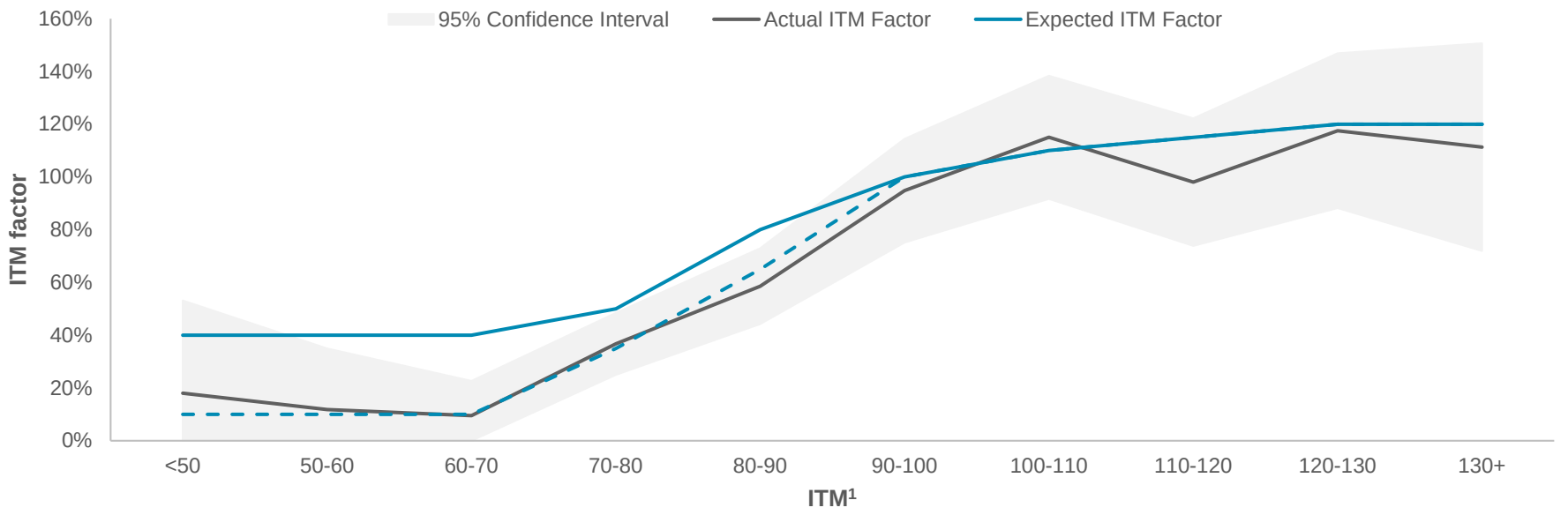

	Potential action items
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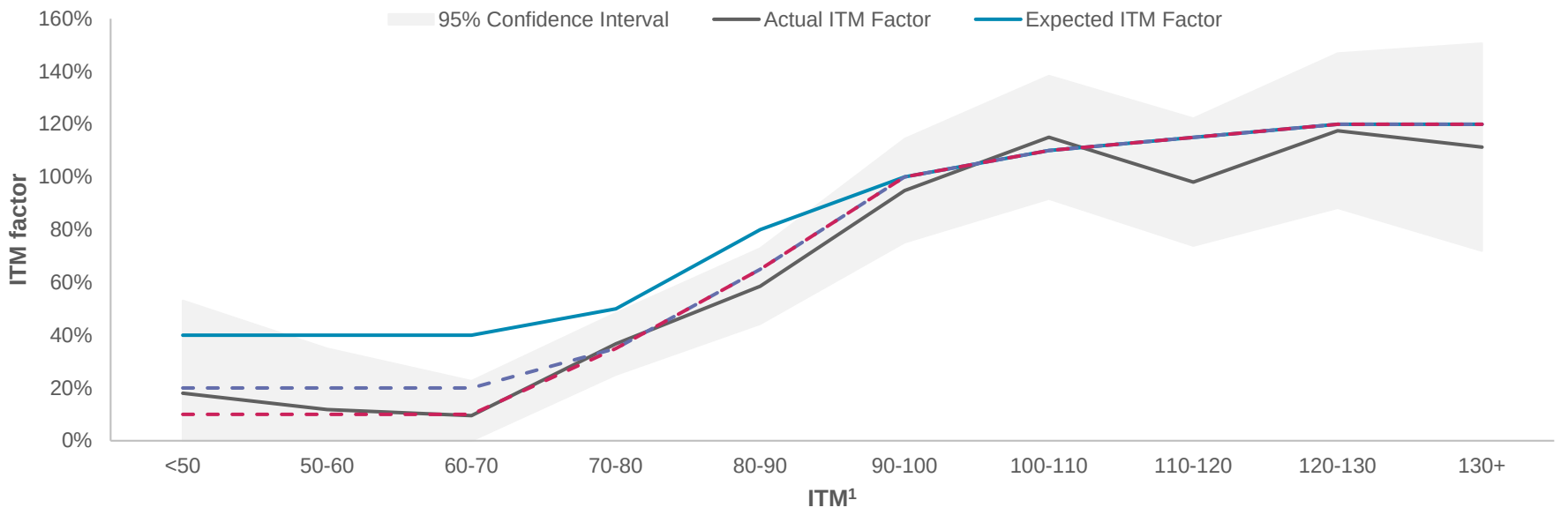

Potential action items	
1	Keep lapse assumption and lapse floor as is
2	Update lapse floor to fall within the confidence interval, update lapse assumption for ITM bands 70-90 to reflect recent actuals
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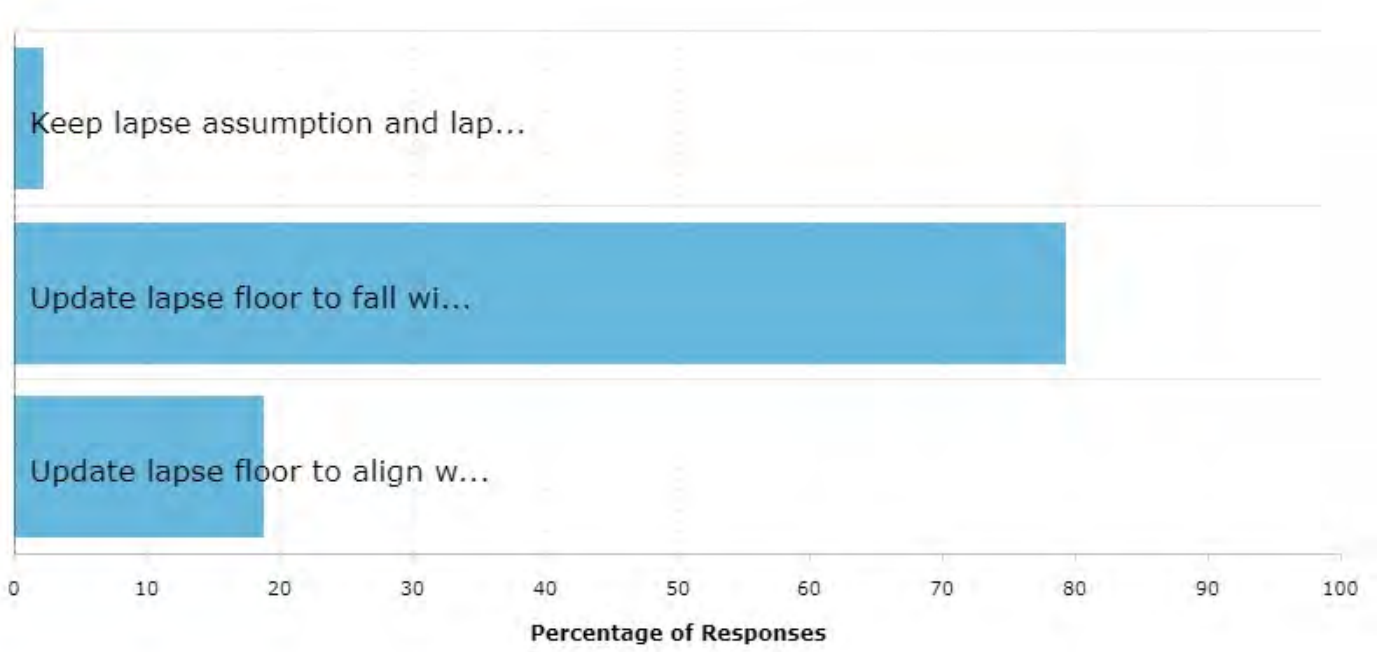
Poll: Lapse assumption update - case 2a



GMIB annuitization update – Case 3

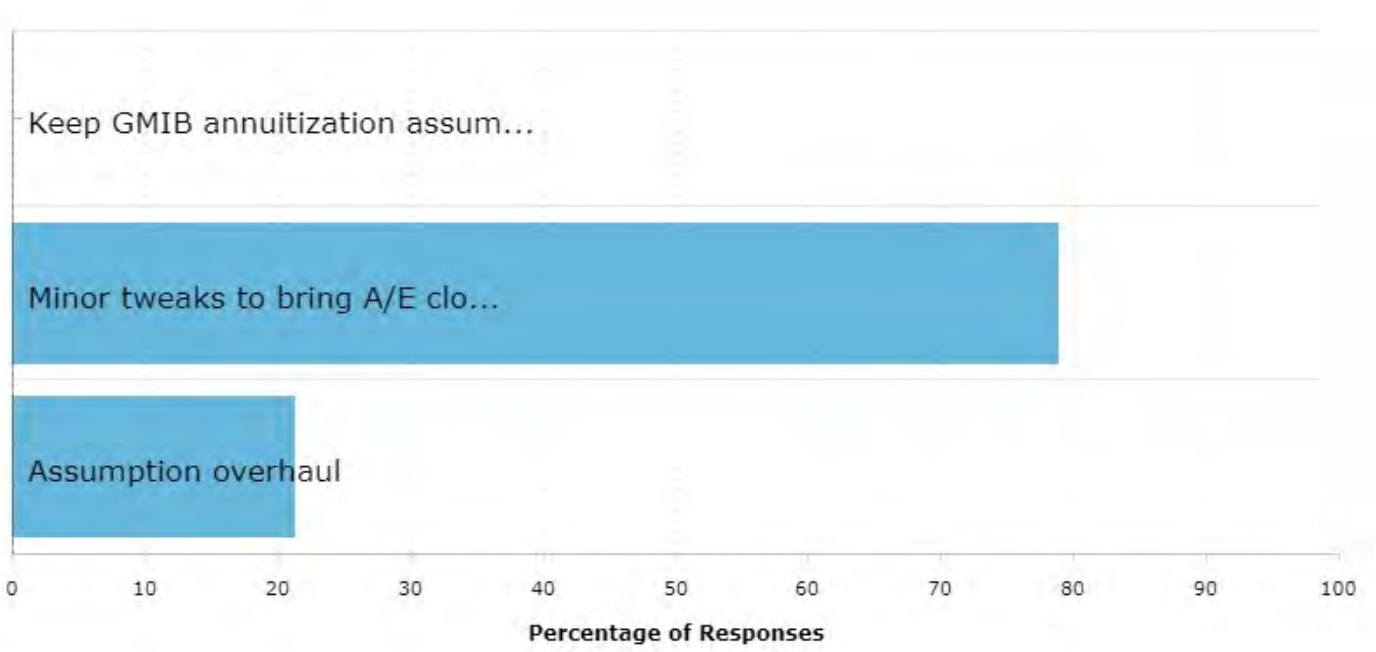
GMIB annuitization experience has emerged, A/E ratios shown below

Category	High ITM	Moderate ITM	Low ITM	OTM	Total
Traditional GMIB					
First opportunity	160%	105%	90%	55%	**110%**
Subsequent	130%	95%	75%	40%	**80%**
Total traditional	**150%**	**100%**	**80%**	**45%**	**95%**
Hybrid GMIB					
Ages 60-70	55%	55%	55%	30%	**50%**
Ages 71-80	55%	55%	55%	30%	**50%**
Ages 81-84	55%	55%	55%	30%	**50%**
Age 85 (last opportunity)	160%	165%	180%	105%	**145%**
Total hybrid	**80%**	**120%**	**140%**	**90%**	**105%**
All GMIB	**120%**	**105%**	**110%**	**65%**	**100%**

Partially credible Fully credible

	Potential action items
1	Keep GMIB annuitization assumption as is
2	Minor tweaks to bring A/Es closer to 100%
3	Assumption overhaul

Poll: GMIB annuitization update - case 3

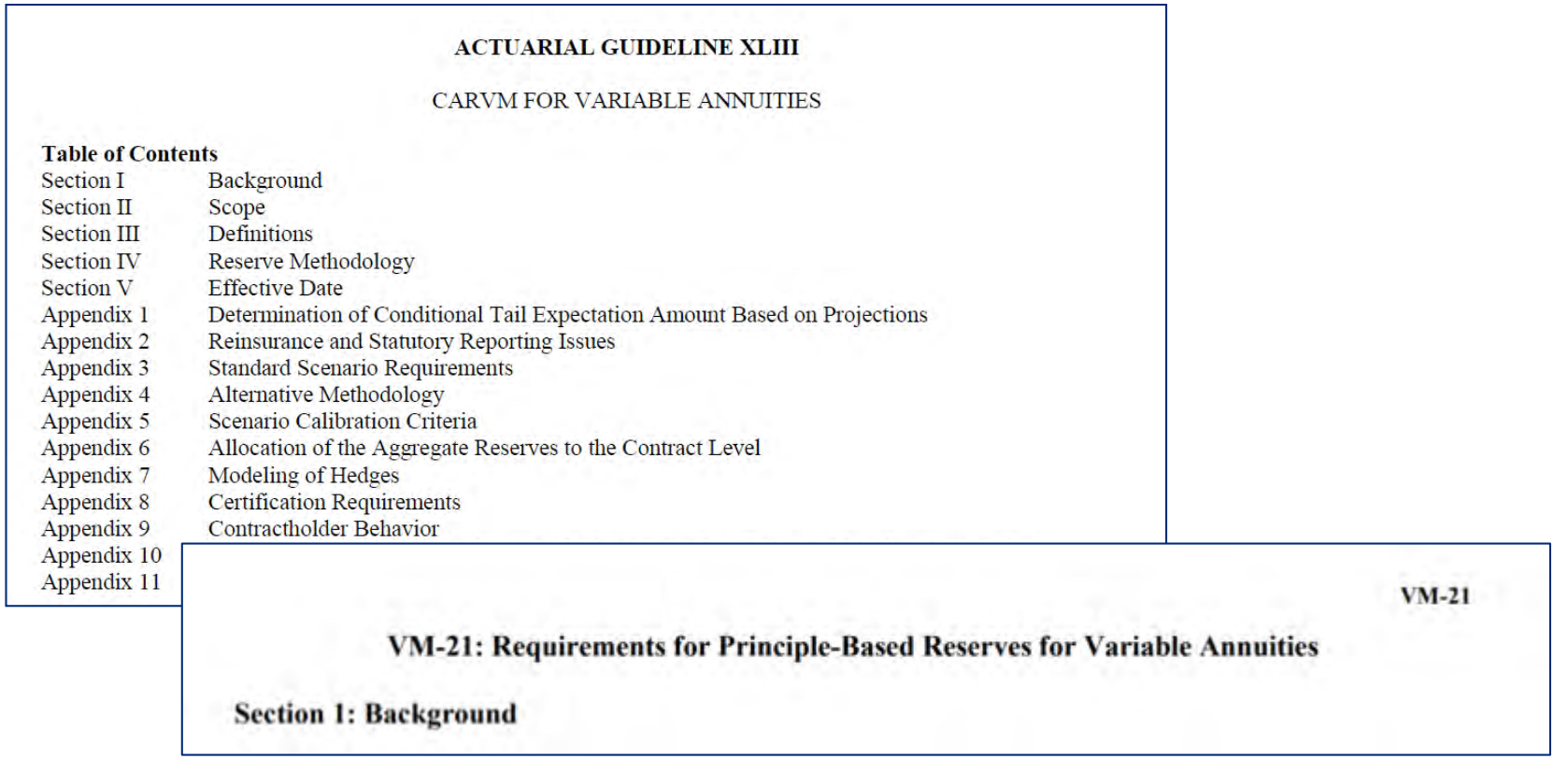


Section 6 | Professional resources

Professional resources

Category	Description
Valuation Manual / Actuarial Guidelines	• VM-21/Actuarial Guideline XLIII • VM-20 • VM-31
Practice Notes	• The Application of C3-Phase 2 and Actuarial Guideline XLIII (March 2011) • Life Principles-Based Reserves Under VM-20 (January 2019) • American Academy of Actuaries PBR Assumptions Resource Manual
ASOPs	• Multiple relevant ASOPs may apply to setting assumptions. A sample can include: – ASOP No 23: Data Quality – ASOP No.25: Credibility Procedures – ASOP No. 41: Actuarial Communications – ASOP No. 52: Principles-Based Reserves for Life Products under the NAIC Valuation Manual – (Second Exposure Draft): Setting Assumptions

VM-21 / Actuarial Guideline 43



ACTUARIAL GUIDELINE XLIII

CARVM FOR VARIABLE ANNUITIES

Table of Contents

VM-21

VM-21: Requirements for Principle-Based Reserves for Variable Annuities

Section 1: Background

VM-21: https://www.naic.org/documents/cmte_a_latf_related_val_2019_edition.pdf
AG 43 Proposal: http://www.naic.org/documents/cmte_e_va_issues_wg_related_redlined_ag43_160926.pdf

VM-20

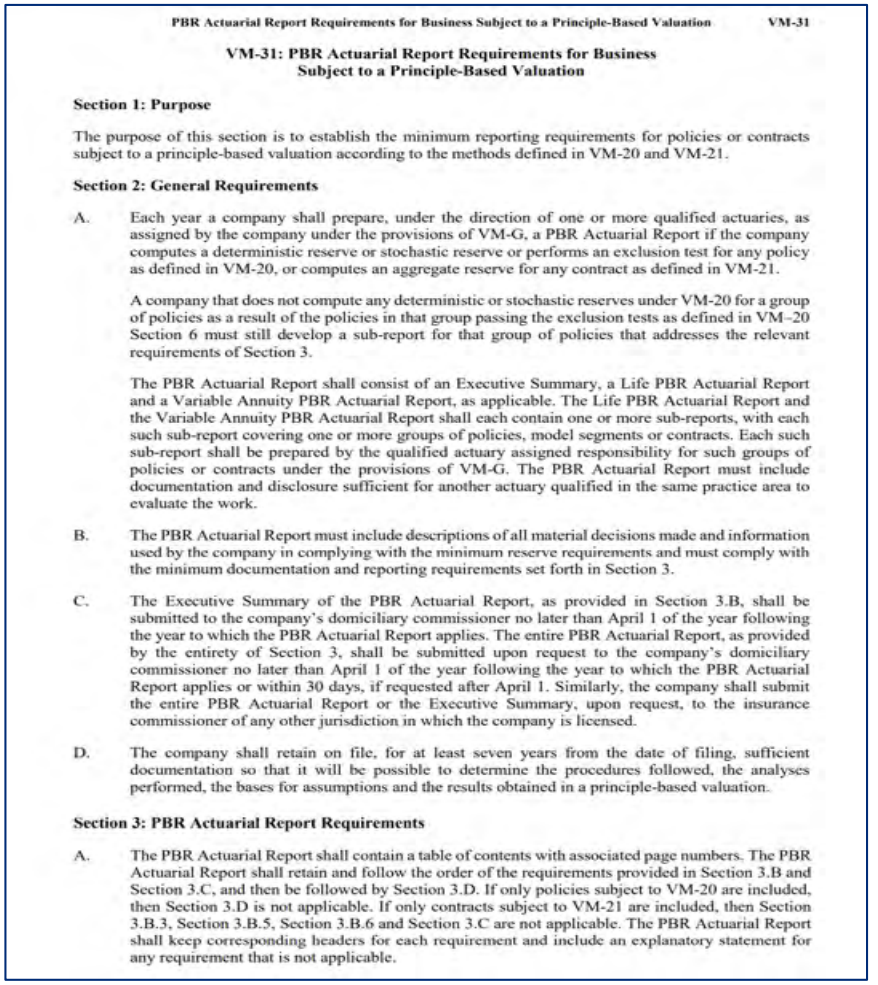
VM-20: Requirements for Principle-Based Reserves for Life Products

Section 1: Purpose

A. These requirements establish the minimum reserve valuation standard for individual life insurance policies issued on or after the operative date of the *Valuation Manual* and subject to a principle-based valuation with an NPR floor under Model #820. These requirements constitute the Commissioners Reserve Valuation Method (CRVM) for policies of individual life insurance.

https://www.naic.org/documents/cmte_a_latf_related_val_2019_edition.pdf

VM-31



PBR Actuarial Report Requirements for Business Subject to a Principle-Based Valuation VM-31

VM-31: PBR Actuarial Report Requirements for Business Subject to a Principle-Based Valuation

Section 1: Purpose

The purpose of this section is to establish the minimum reporting requirements for policies or contracts subject to a principle-based valuation according to the methods defined in VM-20 and VM-21.

Section 2: General Requirements

A. Each year a company shall prepare, under the direction of one or more qualified actuaries, as assigned by the company under the provisions of VM-G, a PBR Actuarial Report if the company computes a deterministic reserve or stochastic reserve or performs an exclusion test for any policy as defined in VM-20, or computes an aggregate reserve for any contract as defined in VM-21.

A company that does not compute any deterministic or stochastic reserves under VM-20 for a group of policies as a result of the policies in that group passing the exclusion tests as defined in VM–20 Section 6 must still develop a sub-report for that group of policies that addresses the relevant requirements of Section 3.

The PBR Actuarial Report shall consist of an Executive Summary, a Life PBR Actuarial Report and a Variable Annuity PBR Actuarial Report, as applicable. The Life PBR Actuarial Report and the Variable Annuity PBR Actuarial Report shall each contain one or more sub-reports, with each such sub-report covering one or more groups of policies, model segments or contracts. Each such sub-report shall be prepared by the qualified actuary assigned responsibility for such groups of policies or contracts under the provisions of VM-G. The PBR Actuarial Report must include documentation and disclosure sufficient for another actuary qualified in the same practice area to evaluate the work.

B. The PBR Actuarial Report must include descriptions of all material decisions made and information used by the company in complying with the minimum reserve requirements and must comply with the minimum documentation and reporting requirements set forth in Section 3.

C. The Executive Summary of the PBR Actuarial Report, as provided in Section 3.B, shall be submitted to the company's domiciliary commissioner no later than April 1 of the year following the year to which the PBR Actuarial Report applies. The entire PBR Actuarial Report, as provided by the entirety of Section 3, shall be submitted upon request to the company's domiciliary commissioner no later than April 1 of the year following the year to which the PBR Actuarial Report applies or within 30 days, if requested after April 1. Similarly, the company shall submit the entire PBR Actuarial Report or the Executive Summary, upon request, to the insurance commissioner of any other jurisdiction in which the company is licensed.

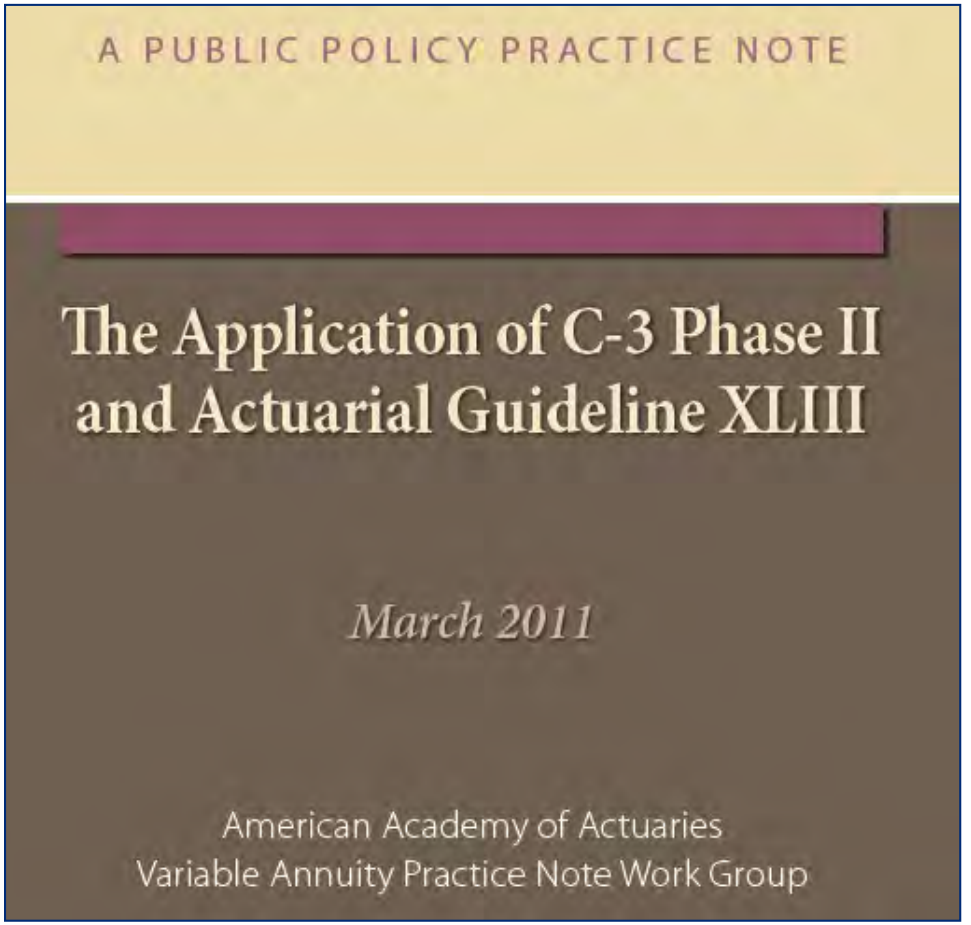
D. The company shall retain on file, for at least seven years from the date of filing, sufficient documentation so that it will be possible to determine the procedures followed, the analyses performed, the bases for assumptions and the results obtained in a principle-based valuation.

Section 3: PBR Actuarial Report Requirements

A. The PBR Actuarial Report shall contain a table of contents with associated page numbers. The PBR Actuarial Report shall retain and follow the order of the requirements provided in Section 3.B and Section 3.C, and then be followed by Section 3.D. If only policies subject to VM-20 are included, then Section 3.D is not applicable. If only contracts subject to VM-21 are included, then Section 3.B.3, Section 3.B.5, Section 3.B.6 and Section 3.C are not applicable. The PBR Actuarial Report shall keep corresponding headers for each requirement and include an explanatory statement for any requirement that is not applicable.

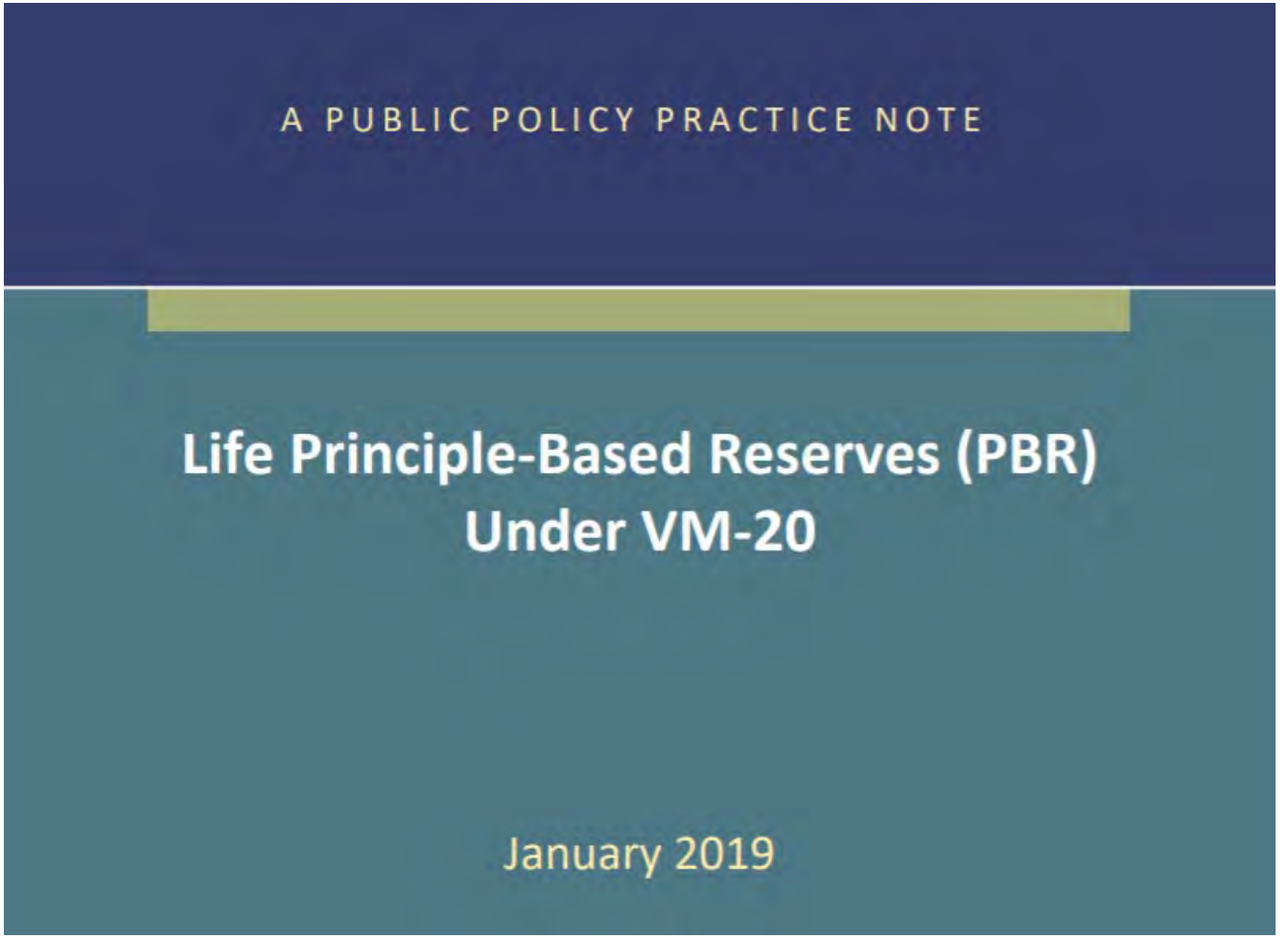
https://www.naic.org/documents/cmte_a_latf_related_val_2019_edition.pdf

American Academy of Actuaries C3-Phase II and Actuarial Guideline XLIII Practice Note



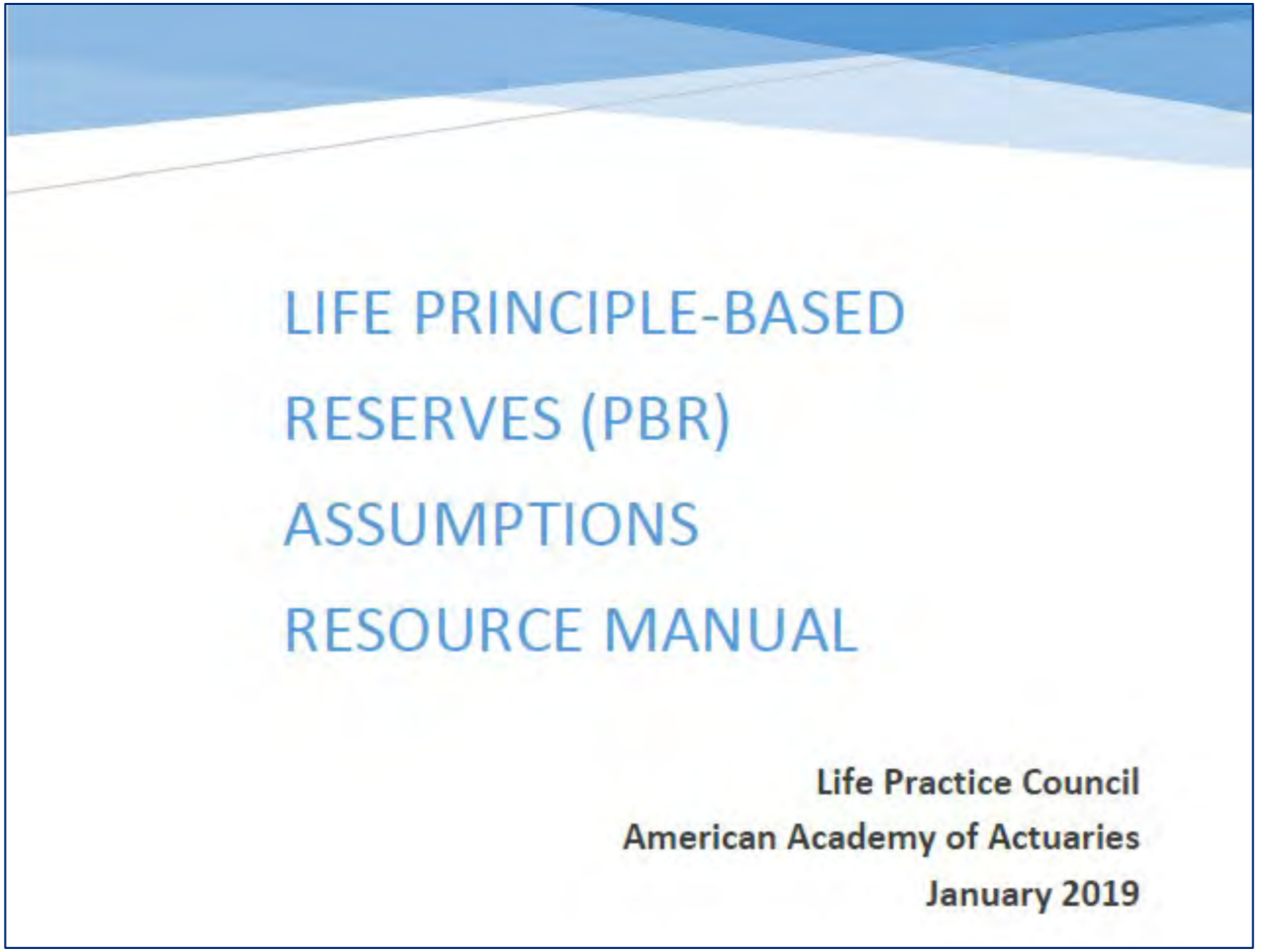
https://www.actuary.org/files/VAPN%20FINAL%20WEB%20040511.4.pdf/VAPN%20FINAL%20WEB%20040511.4.pdf

American Academy of Actuaries VM-20 Practice Note



https://www.actuary.org/sites/default/files/files/publications/VM_20_PN_Revised_January_2019_Final.pdf

American Academy of Actuaries PBR Assumptions Resource Manual



https://www.actuary.org/sites/default/files/files/publications/PBR_Assumptions_Resource_Manual_012919.pdf

Actuarial Standards of Practice (ASOPs)

Section 7 | Outlook and Q&A

Outlook

1 VM-21

2 Emergence of data

3 Low interest rates

4 Tailoring to product designs

Questions?