

# AMERICAN ACADEMY OF ACTUARIES LONG-TERM CARE (LTC) VALUATION WORK GROUP

# SOCIETY OF ACTUARIES LONG-TERM CARE (LTC) VALUATION WORK GROUP

# PRESENTATION TO NAIC LTC ACTUARIAL WORKING GROUP



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Bob Yee, MAAA, FSA  
Member, LTC Valuation Work Group

# Agenda

- 1 Summary**
- 2 Mortality**
- 3 Lapse**



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- 1 Summary**
- 2 Mortality
- 3 Lapse



# Charges to the LTC Valuation Work Group

- Develop a replacement mortality table for LTC active life reserves
  - Based on the 2012 Annuitant Mortality Table
  - Recommend a margin for conservatism
- Develop a replacement lapse table
  - Recommend a margin for conservatism
- Consider developing tables for valuation on total lives basis as well as active lives basis



# Progress to Date

- ☑ Reviewed and selected data from SOA 2000–2011 Intercompany Study
- ☑ Develop raw rates
- ☑ Smooth rates
- ☑ Determined proposed adjustment factors for tables
- ☑ Develop adjustment factors
- ☑ Compare actual lapses to expected determined from preliminary proposed rates



# Proposed Adjustment Factors for Tables

Factor	Mortality		
	Individual & Group	Lapse Individual	Lapse Group
Issue Age	✓	✓	✓
Policy Duration	✓	✓	✓
Gender	✓		
Marital Status	✓	✓	
Risk Class	✓	✓	

Factors are applied to the base mortality and lapse rates to reflect the profile of the policyholder.



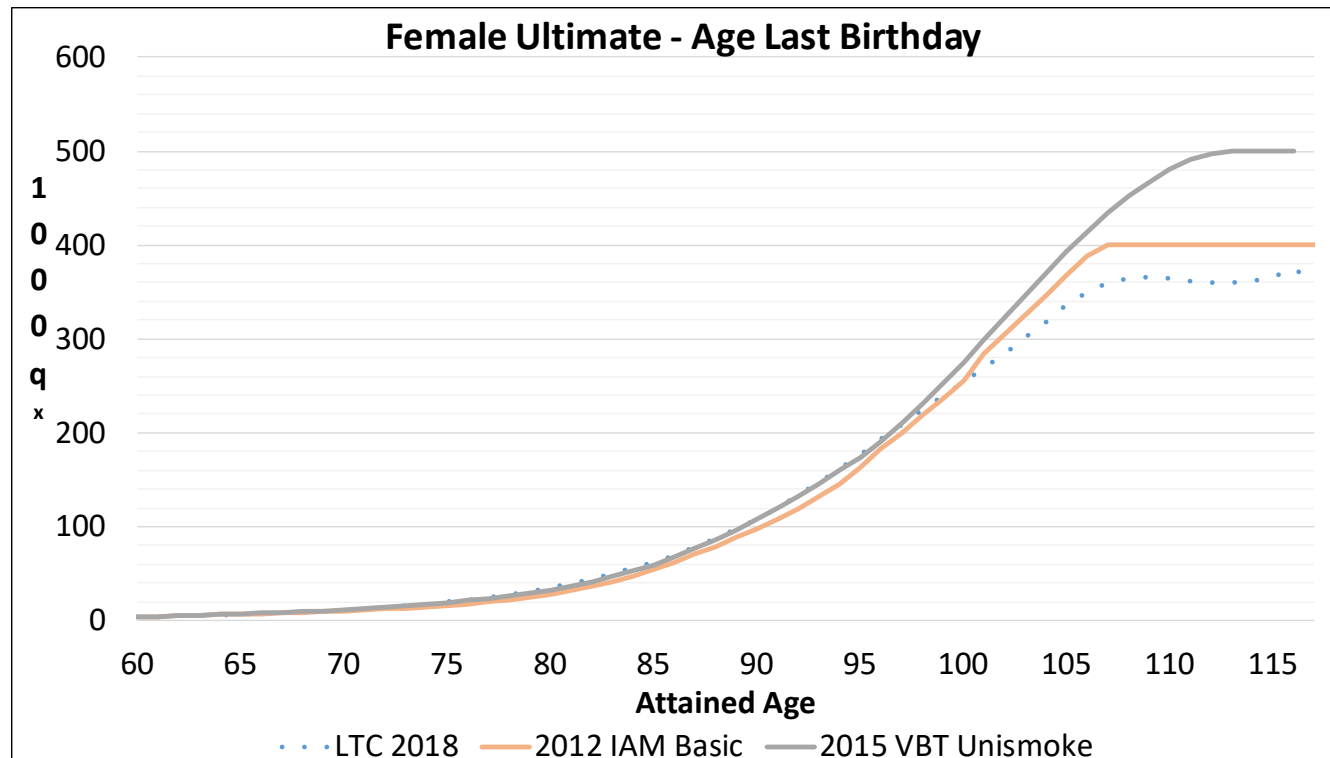
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# Base Mortality Rates

- Developed from 48,000 deaths among companies with reasonable data (“DEFN 2” companies\*) during policy years 15 and beyond for experience period 2008–2011.

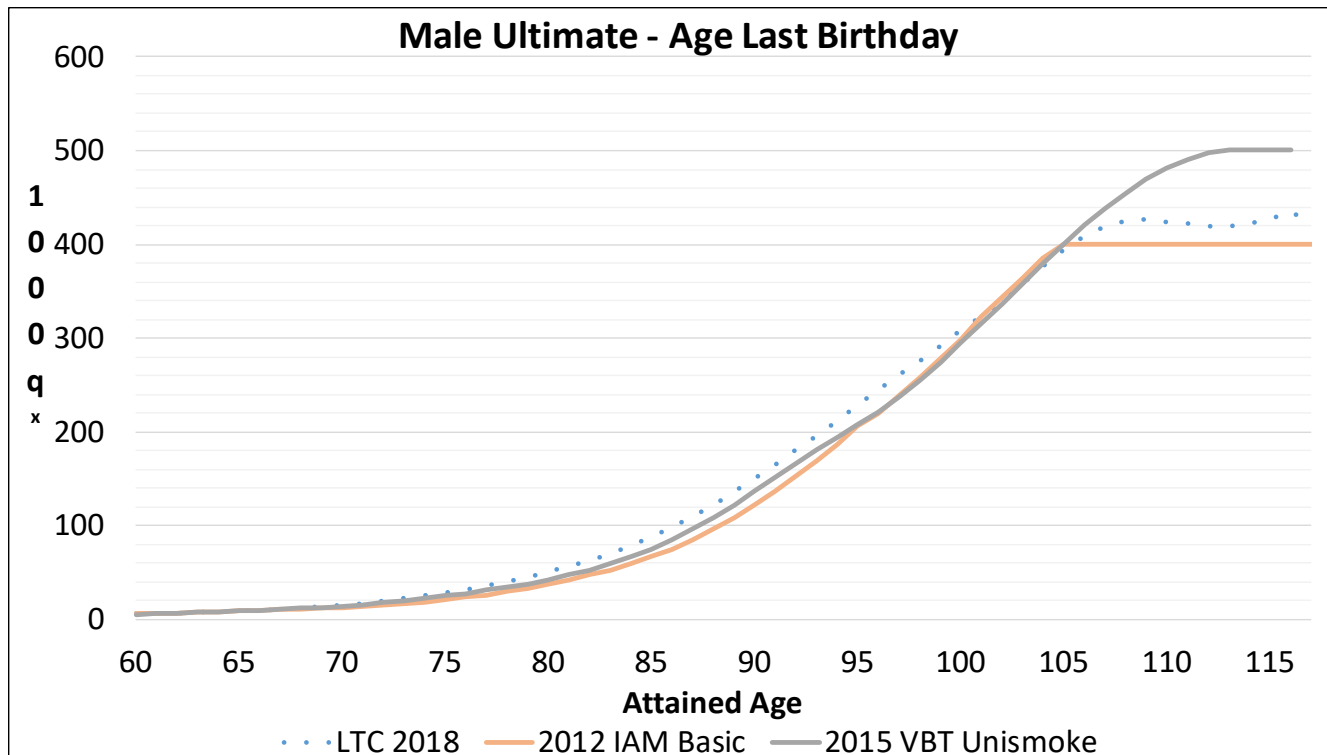


- \* 10 companies’ data were deemed to be reasonably reliable:
  - Identified deaths from lapses, and
  - Less than 25% unknown terminations.



# Base Mortality Rates

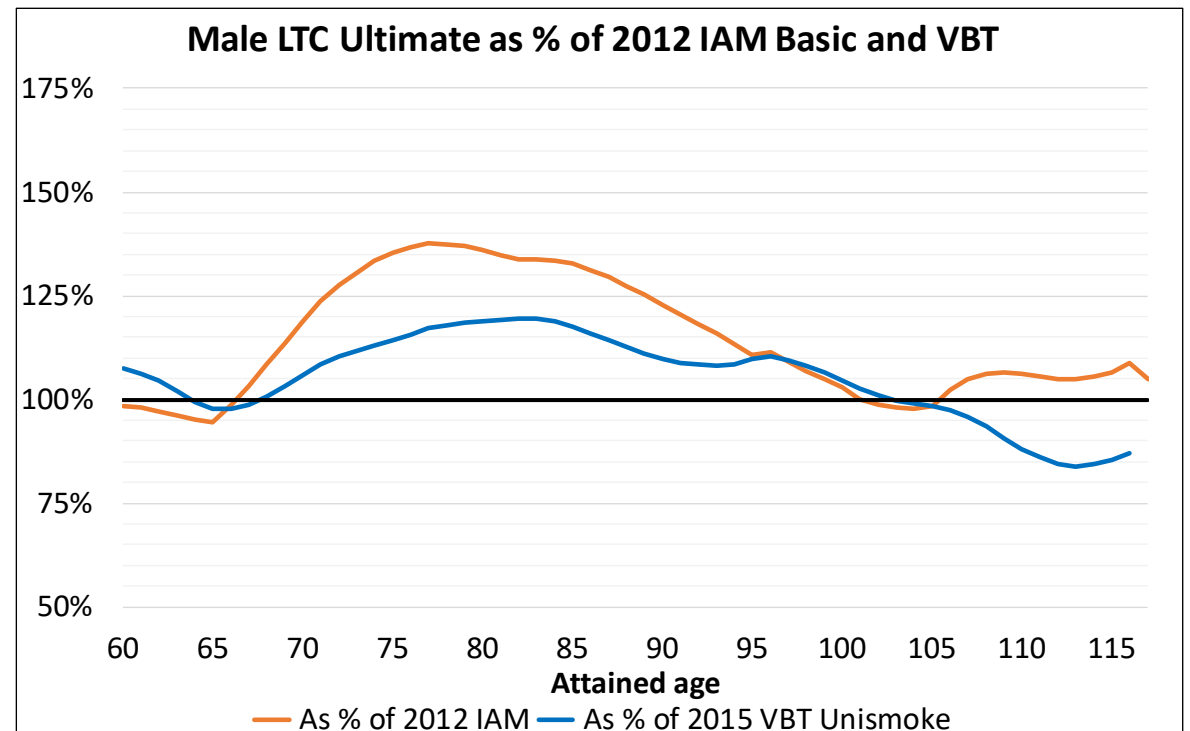
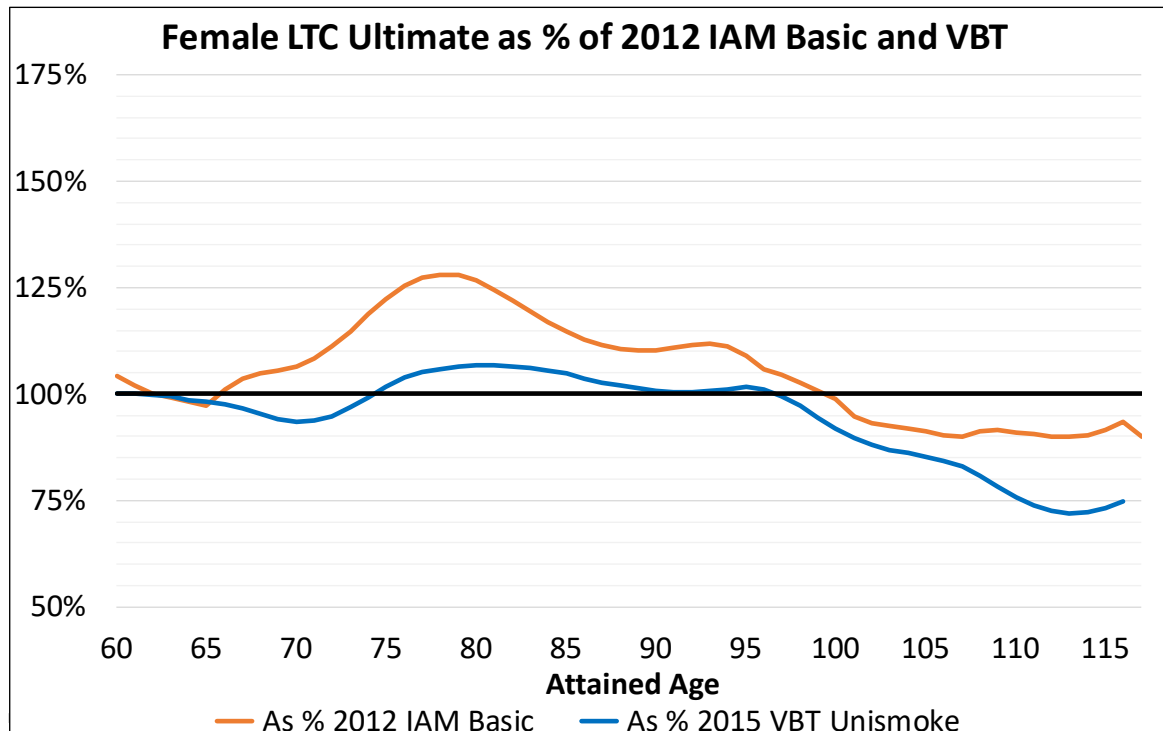
- Use 2012 IAM as a guide when data is sparse.
- Generally higher than corresponding 2012 IAM rates.



Data for ages 95 & over is fairly credible with 2,878 and 1,278 deaths for female and male respectively.

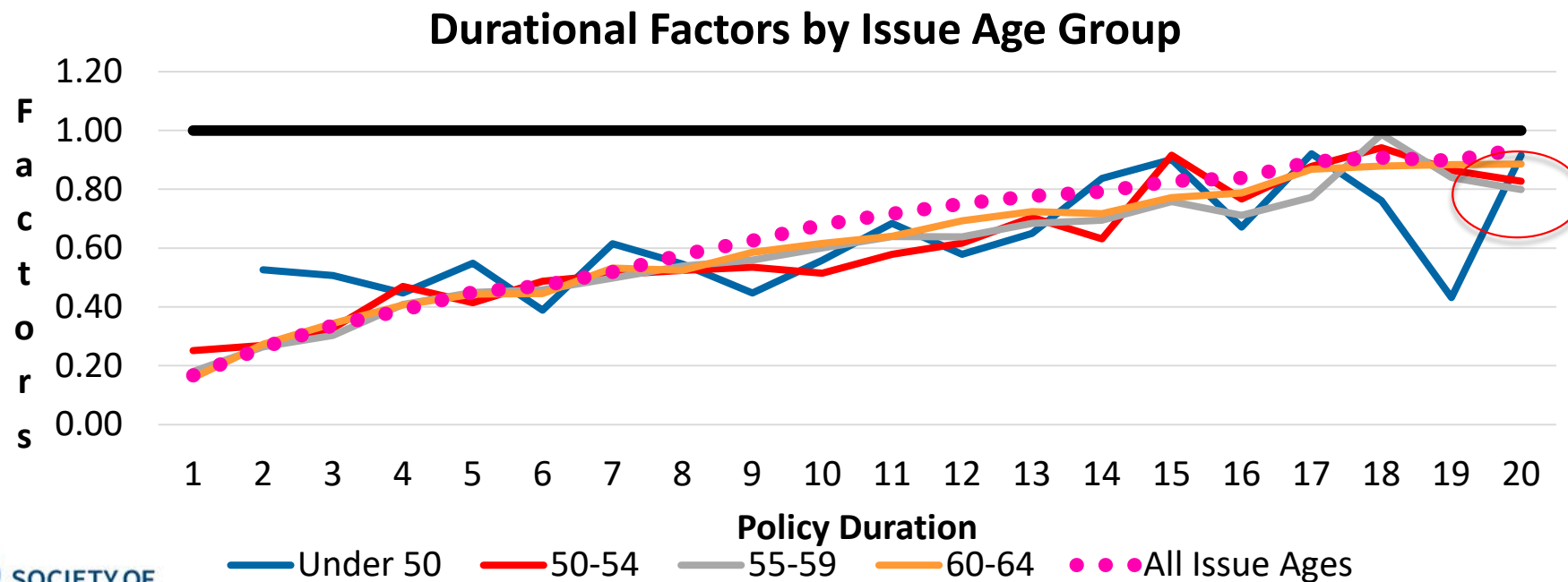
# Base Mortality Rates

- LTC mortality rates are generally higher than corresponding 2012 IAM Basic and 2015 VBT Unismoker except for female ages past 100.



# Durational Factors—Younger Issue Ages

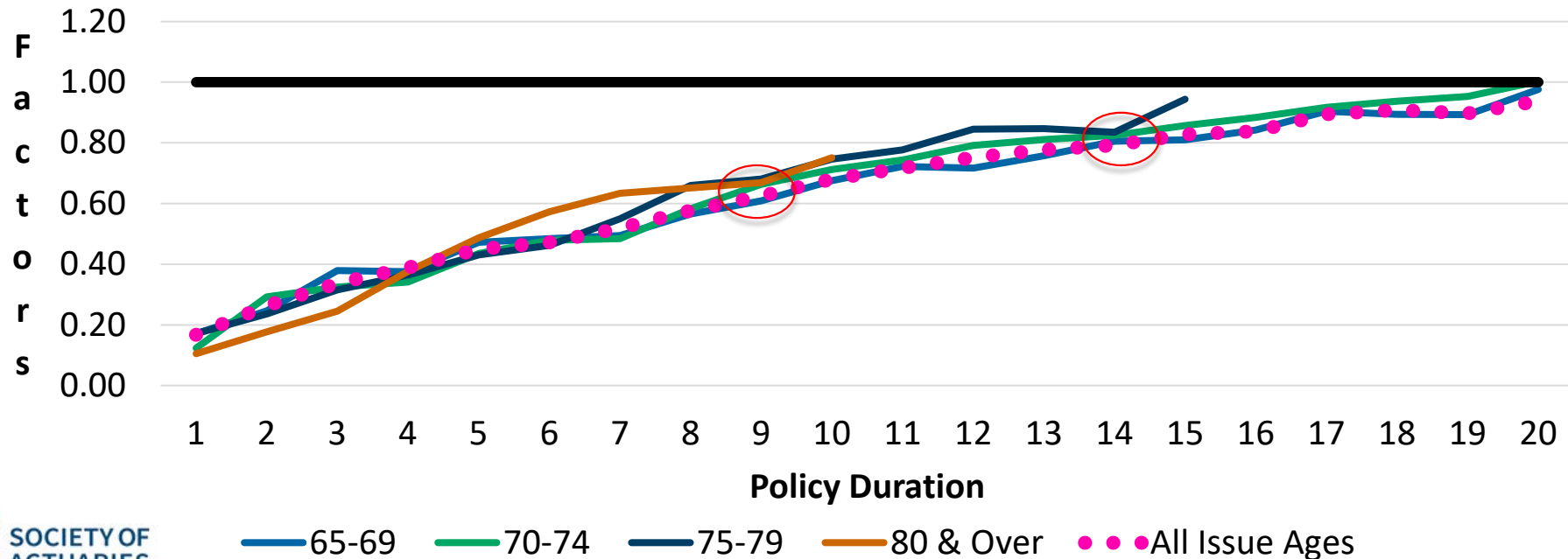
- Durational selection effects extend beyond 20 years.
- Greater selection than aggregate for all issue ages.



# Durational Factors—Older Issue Ages

- Durational selection effects shorter than 20 years at issue ages 75 and over.

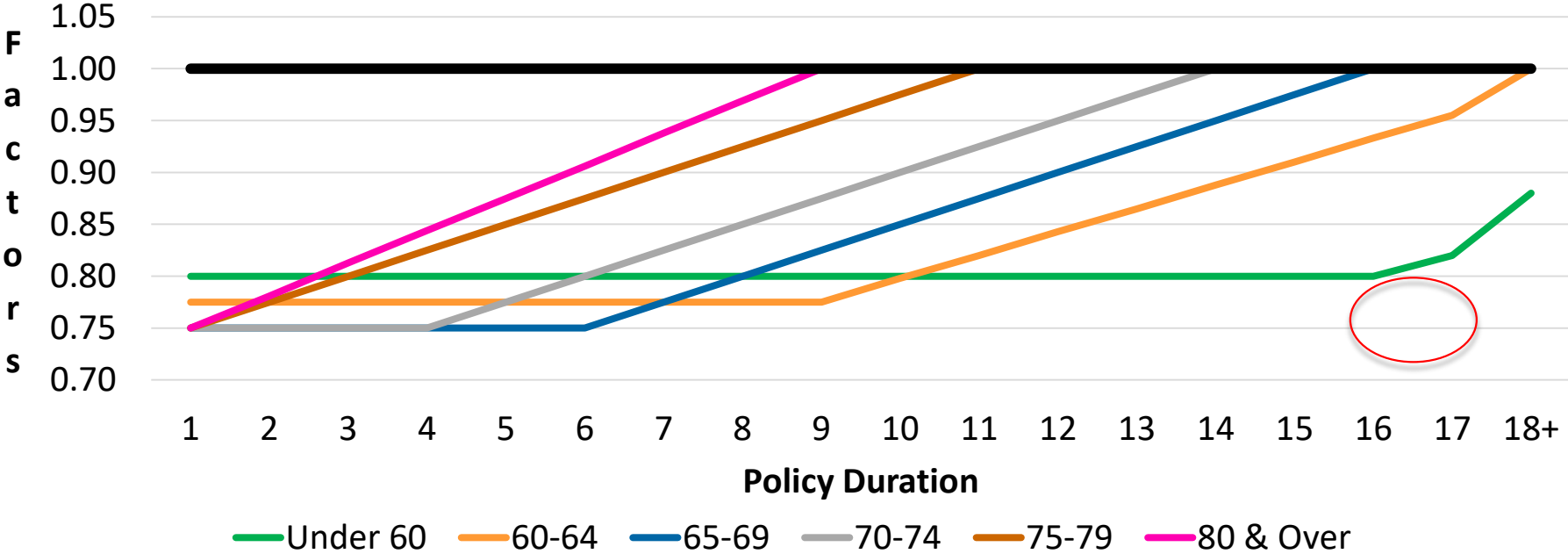
Durational Factors by Issue Age Group



# Risk Class Factors—Preferred

- Permanent selection for issue ages under 60.

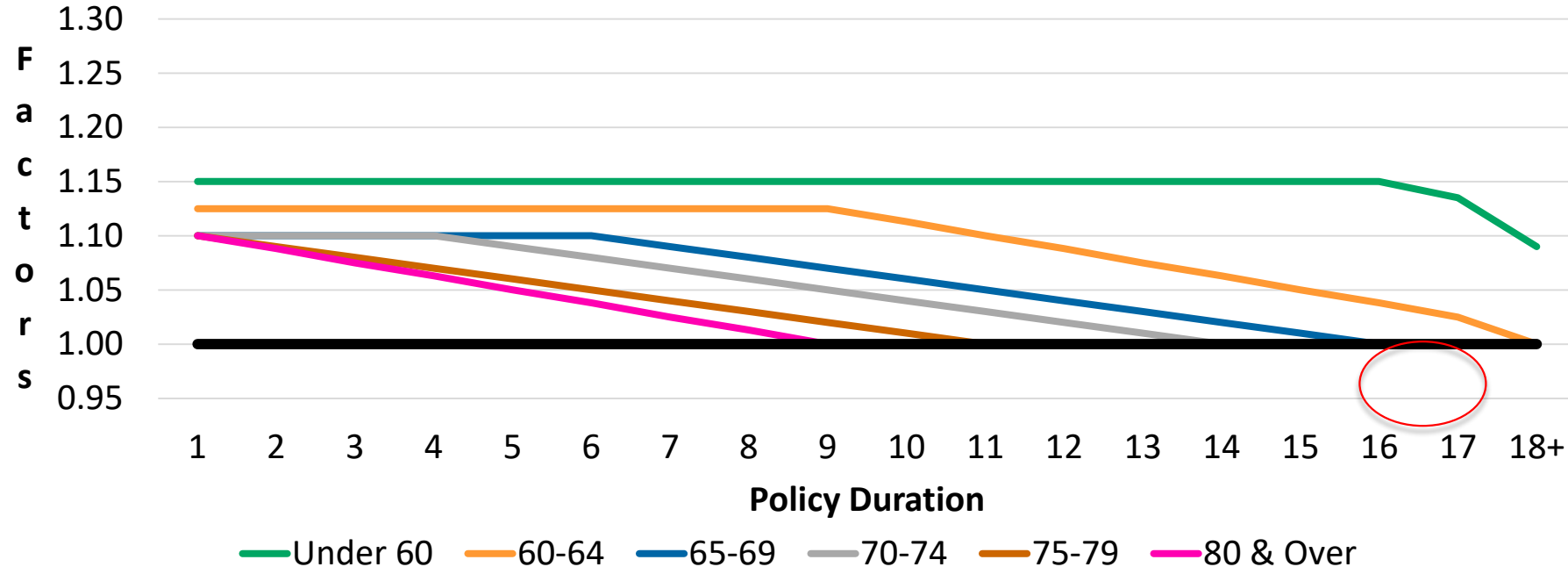
Preferred Risk Class Factors by Issue Age Group



# Risk Class Factors—Standard (including Substandard)

- Permanent selection for issue ages under 60.

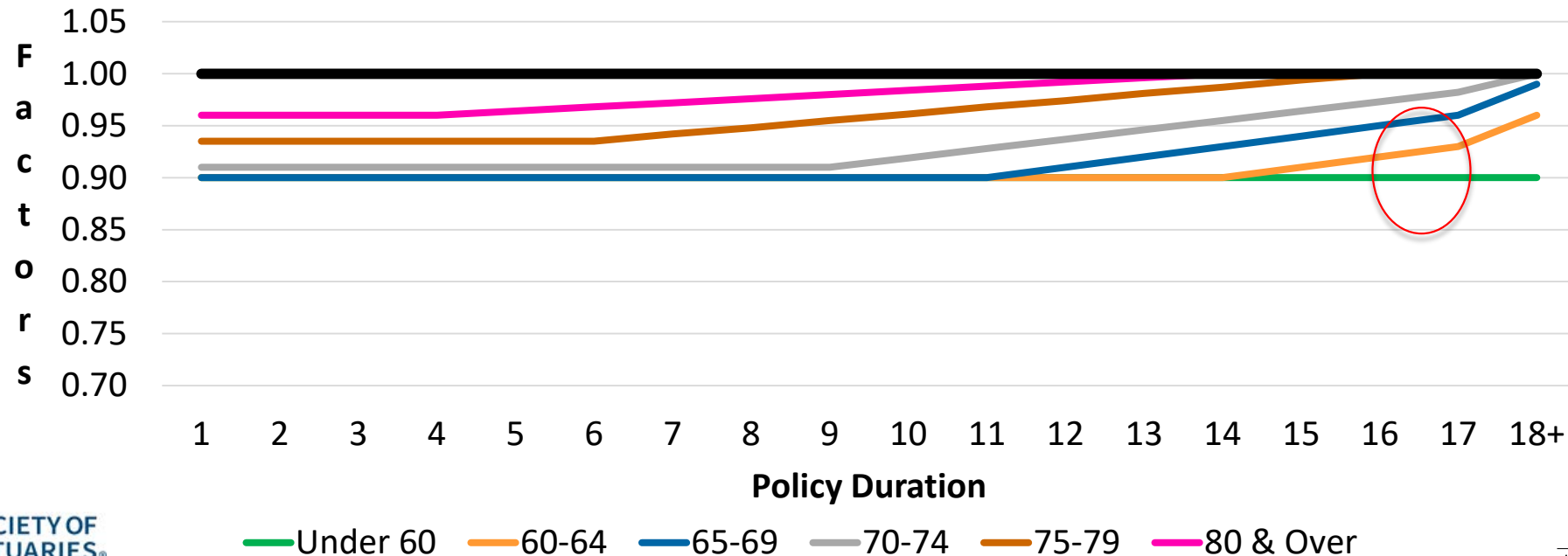
Standard Risk Class Factors by Issue Age Group



# Married Factors

- Permanent selection for issue ages under 70.
- Less selection than corresponding preferred class factors.

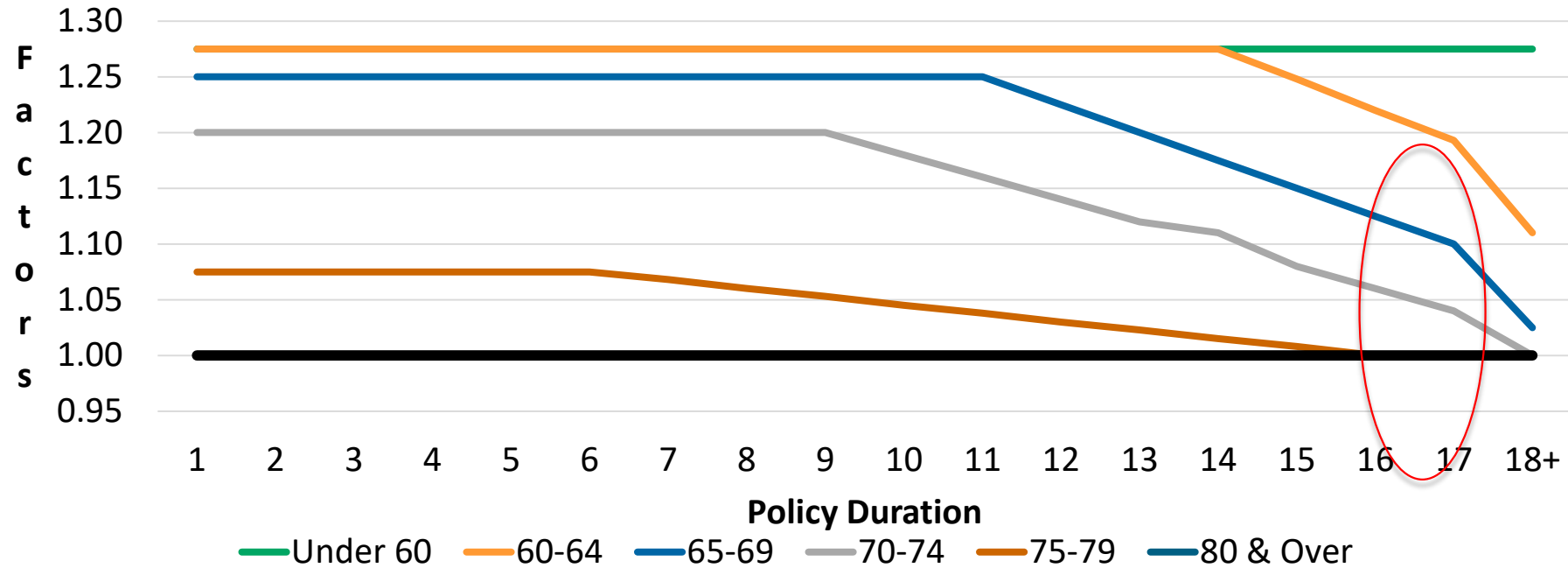
Married Factors by Issue Age Group



# Not Married Factors

- Permanent selection for issue ages under 70.

Not Married Factors by Issue Age Group





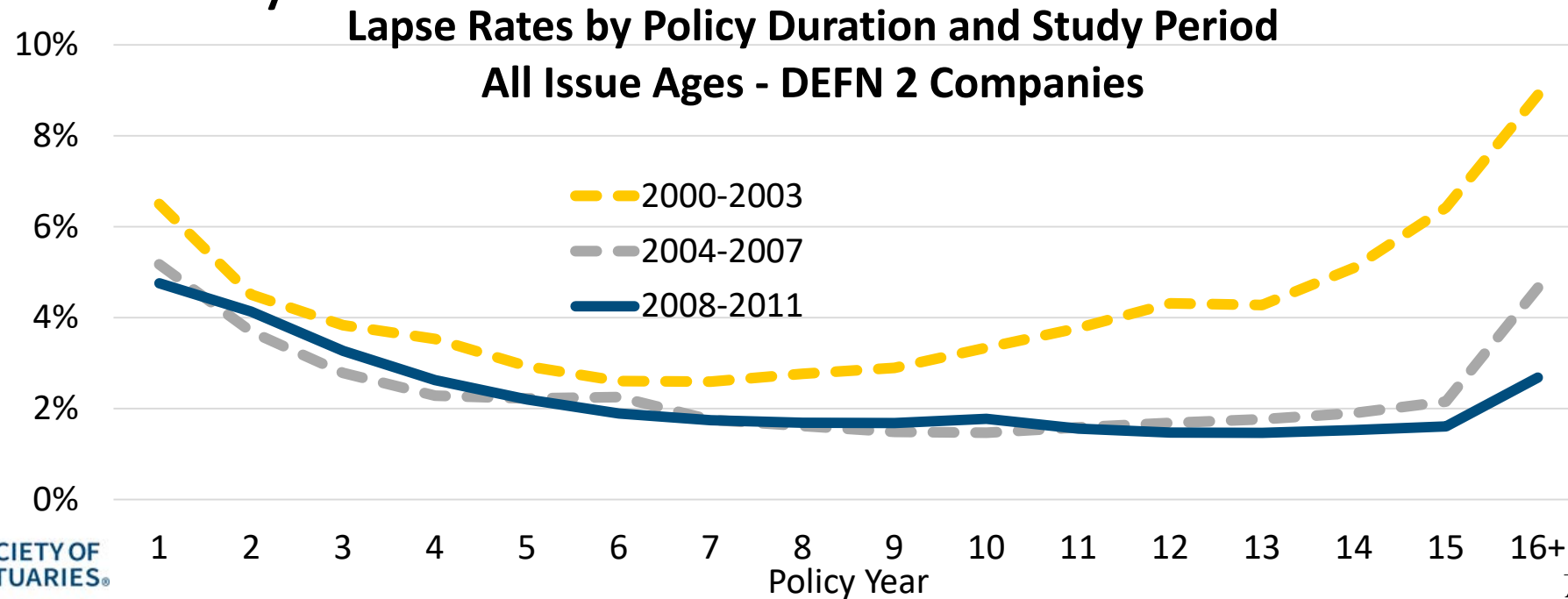
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# Background on Data

- Source of data is the 2000-2011 LTC Intercompany Study.
- Select data for DEFN 2 companies and experience years 2008–2011 only.



# Background on Data

- Based on 2008-2011 experience years and DEFN2 companies (10 of them):

	Exposure Years	Number of Lapses
<b>Individual</b>	9.4 million	197,000
<b>Group</b>	4.9 million	302,000

- Minimum 240 lapses in any rate-cell (minimum 50% partial credibility).



# Select Factors for Lapse

- Key lapse factors were identified using a logistic regression method.

Factors for Lapse in Order of Significance
Policy Duration
Premium Paying Status
Issue Age
Underwriting Class
Periodic Premium Level
Marital Status
Premium Mode
Rate Increase Indicator



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# Select Factors for Lapse

- To be consistent with the factors selected for Mortality Table, Work Group selected the following factors for lapse:

Factors for Lapse in Order of Significance	
Policy Duration	✓
Premium Paying Status	
Issue Age	✓
Underwriting Class	✓
Periodic Premium Level	
Marital Status	✓
Premium Mode	
Rate Increase Indicator	



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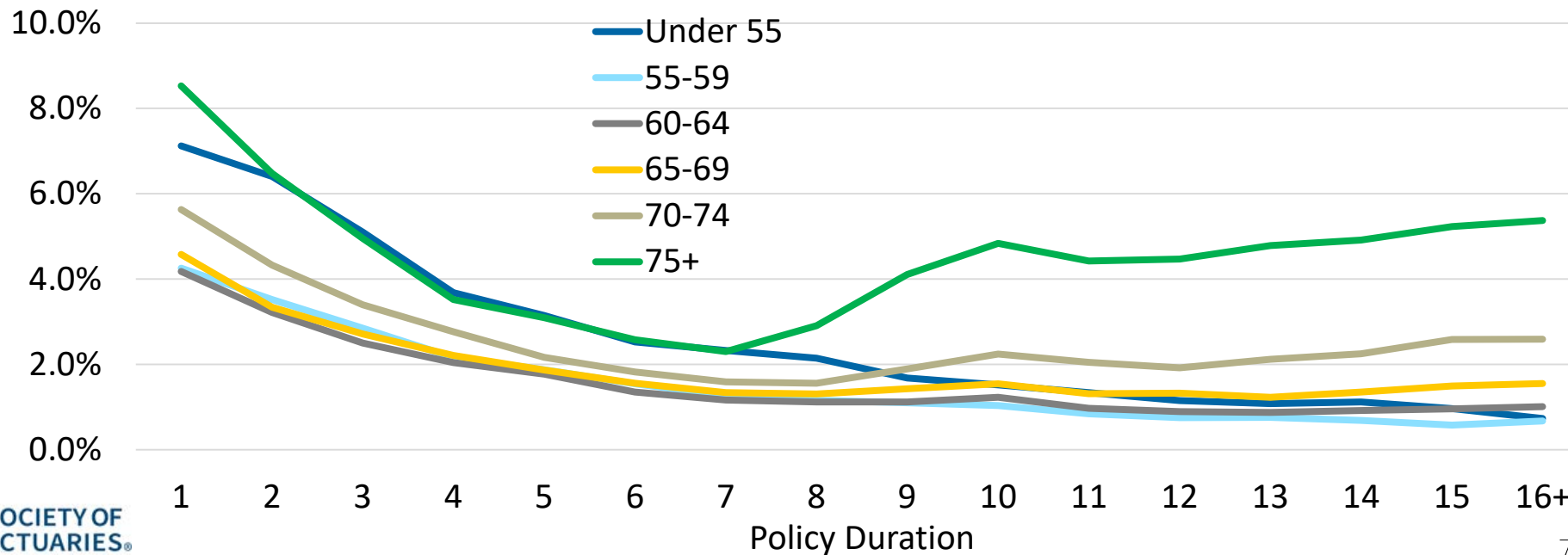
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# Raw Lapse Rates—Individual

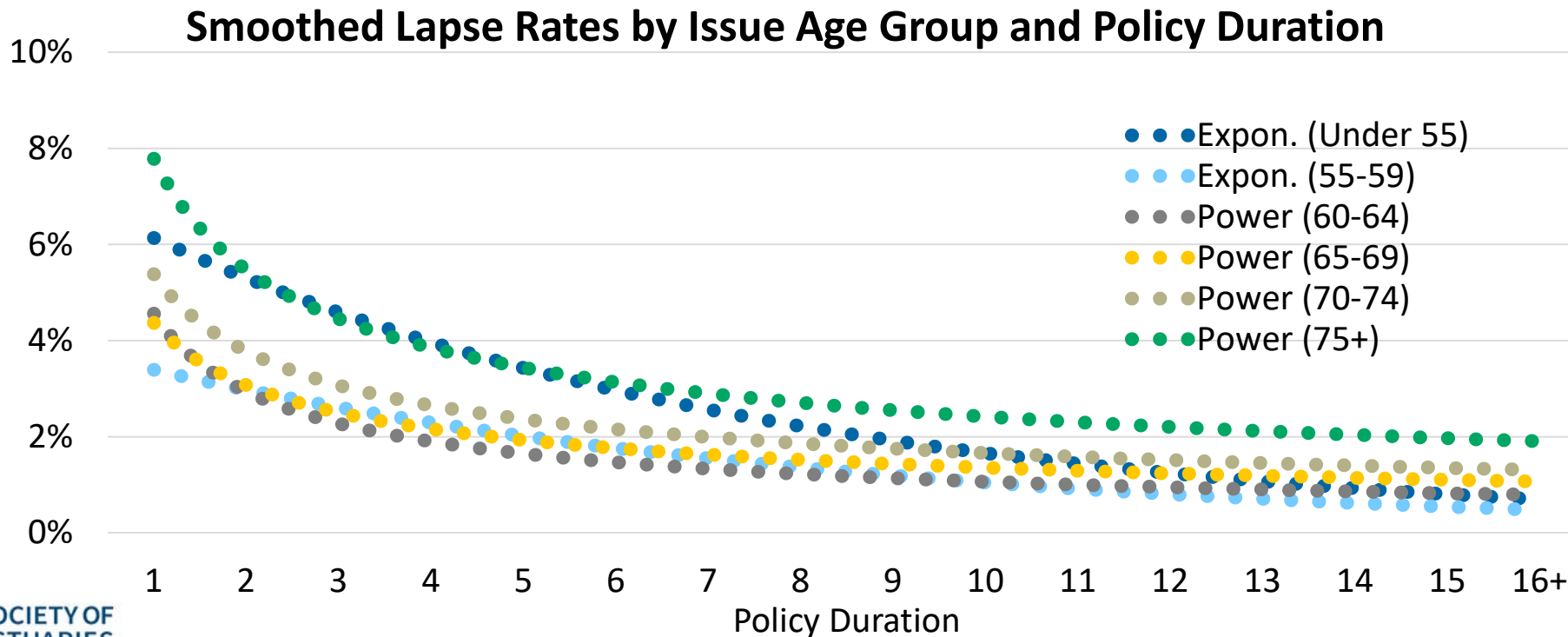
- Raw rates were capped by prior year's rates to remove increasing patterns.

Raw Lapse Rates by Issue Age Group and Policy Duration



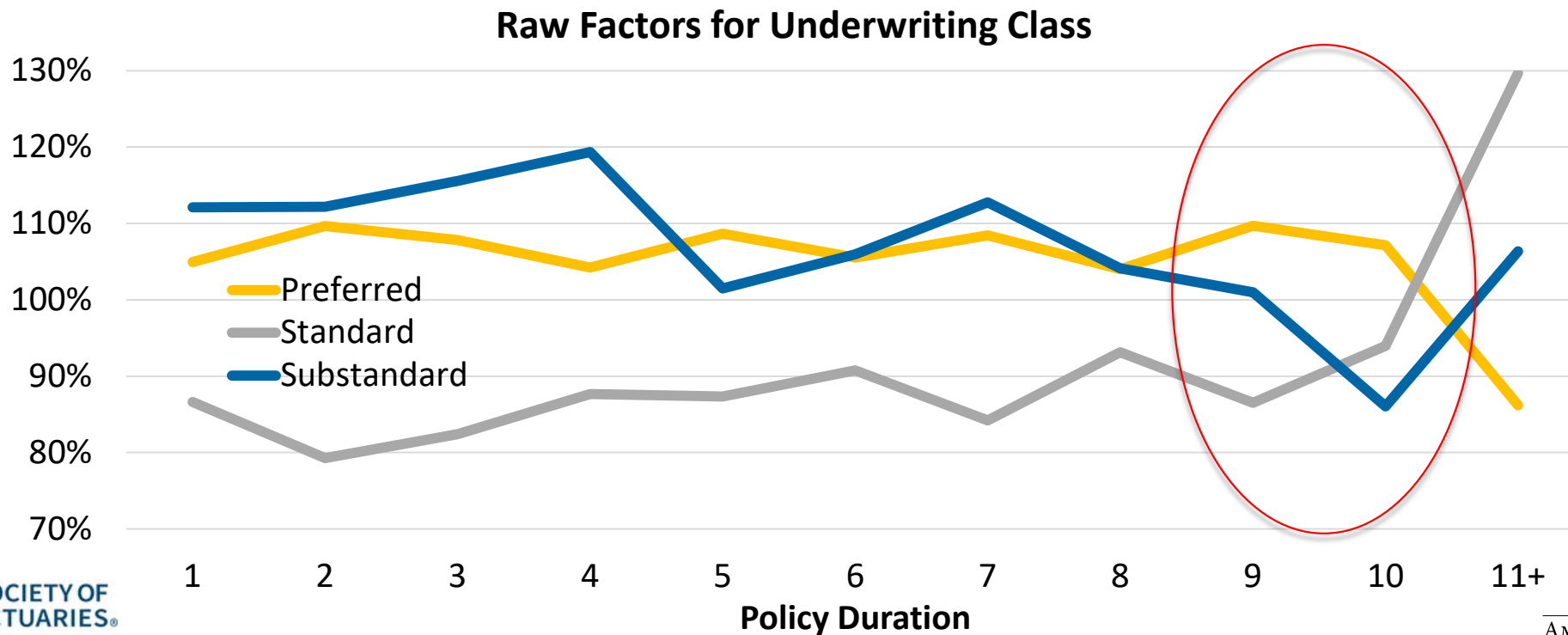
# Smoothed Lapse Rates—Individual

- Capped raw rates for each issue age group were fitted by either an exponential (Expon.) or a power trend line.



# Preliminary Proposed Risk Class Factors— Individual

- Unsmoothed adjustment factors were used due to unevenness at the tails.

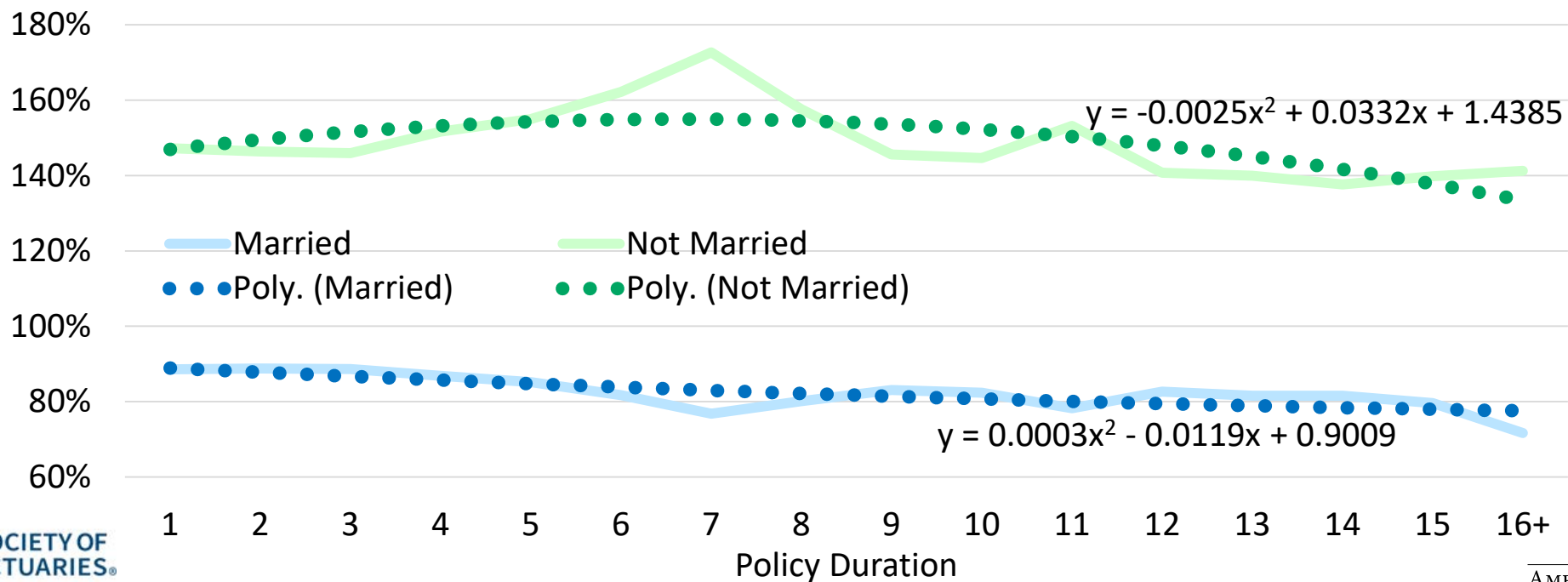




# Preliminary Proposed Marital Factors— Individual

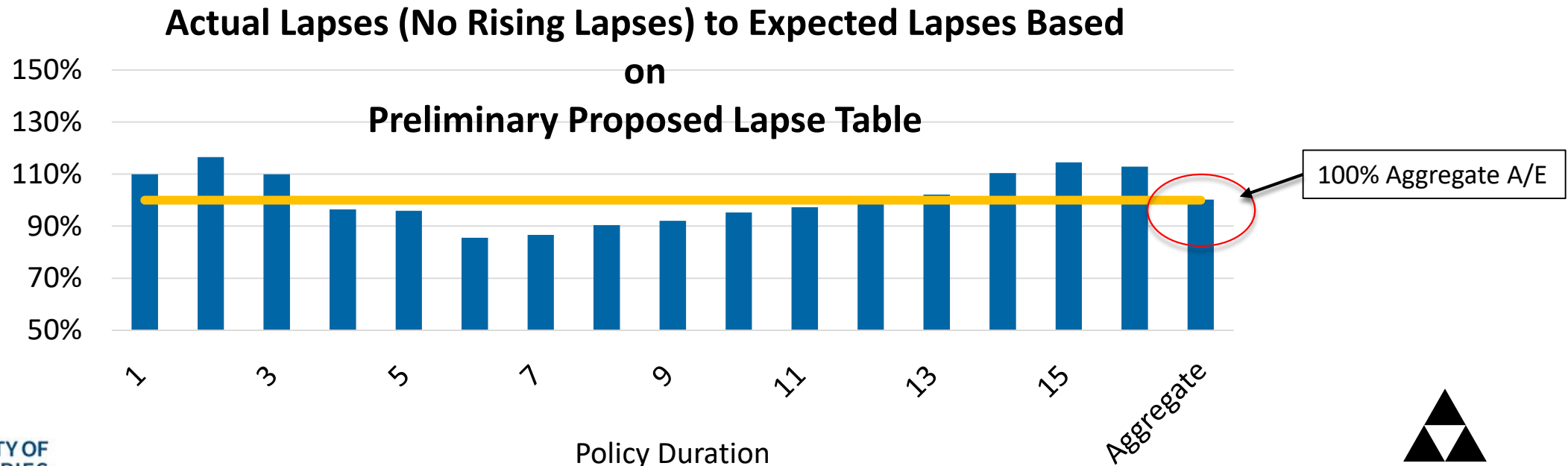
- Raw adjustment factors converted to smoothed factors using 2<sup>nd</sup> polynomial (Poly.) trend lines.

Raw and Smoothed Factors for Marital Status



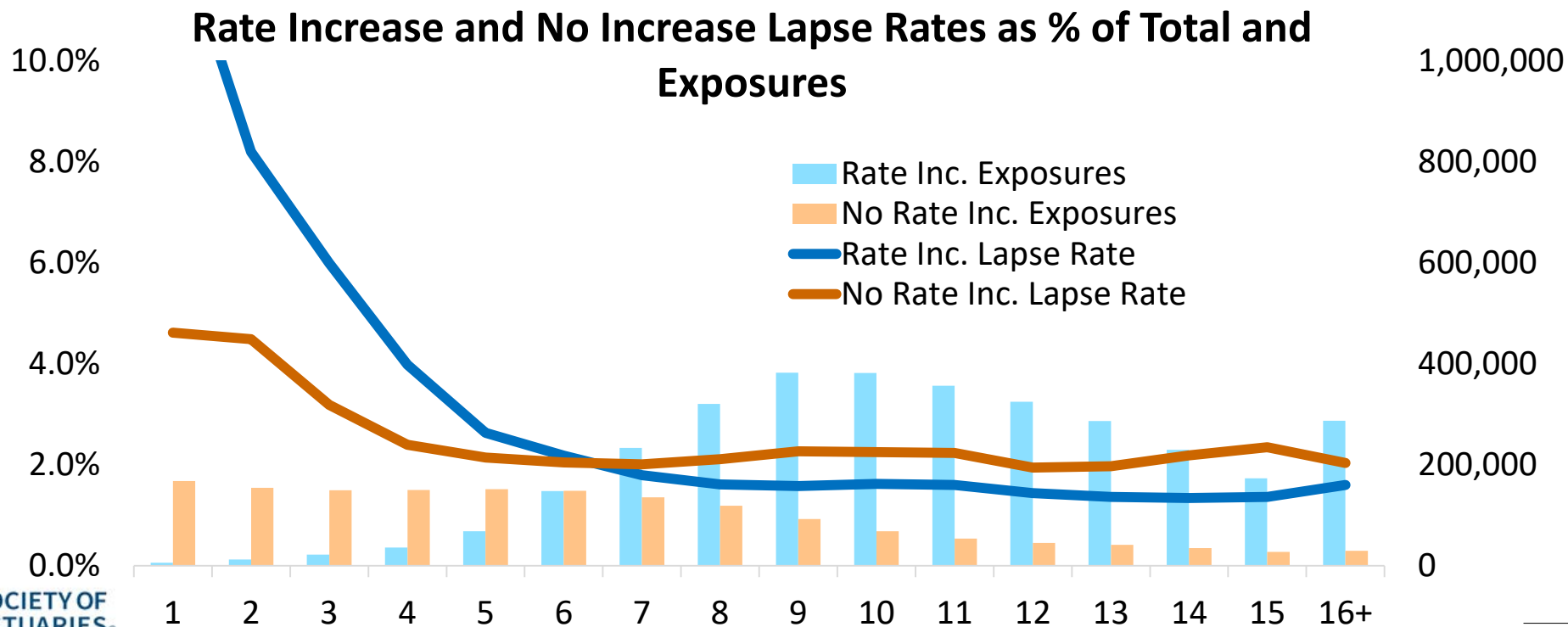
# Actual Lapse to Expected—Individual

- As A/E varies by within 20% by policy duration, a decision has not yet been made to make further adjustments.



# Rate Increase Status Ignored

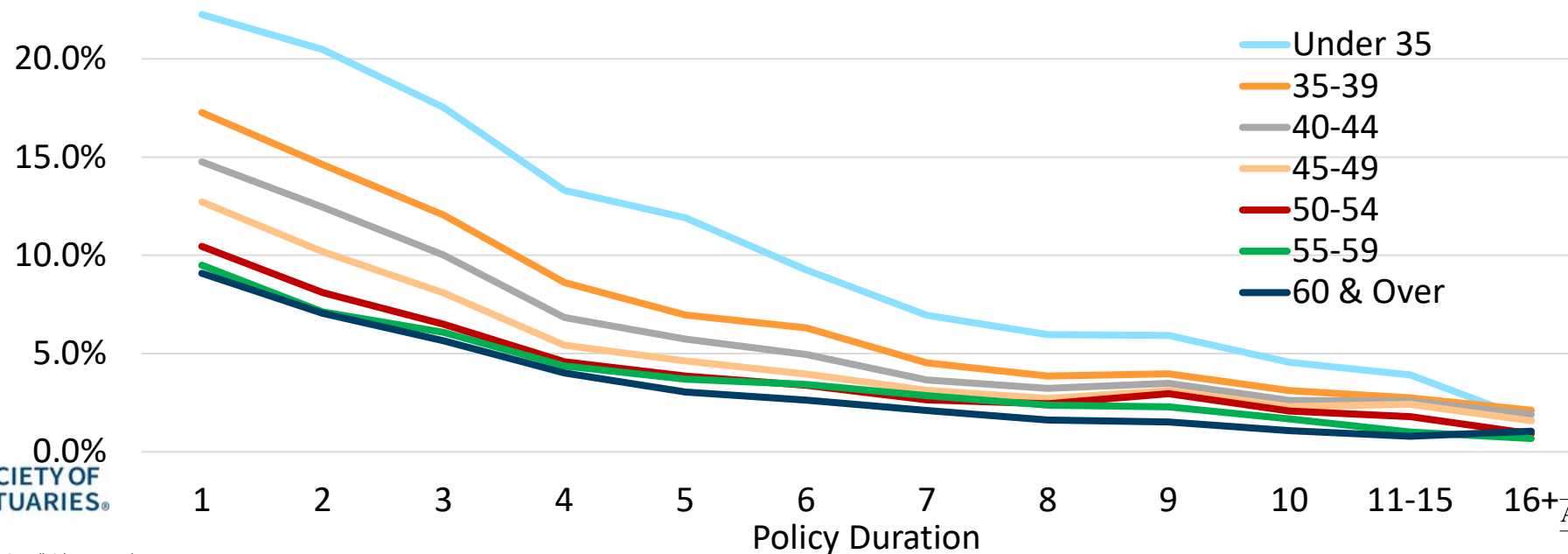
- 48% of total exposures have unknown rate increase status.



# Raw Lapse Rates—Group

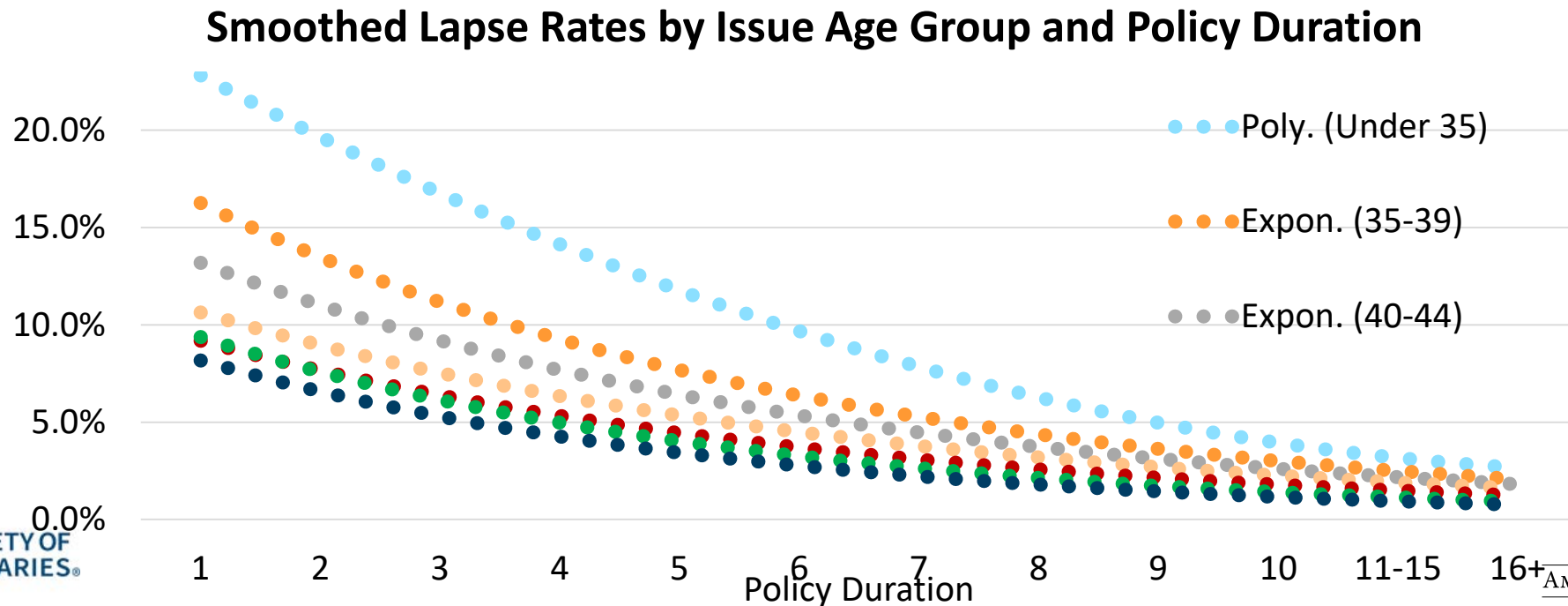
- Raw rates were not capped since there are only a few instances where the rates are higher than the prior year's rates.

Raw Lapse Rates by Issue Age Group and Policy Duration



# Smoothed Lapse Rates—Group

- Raw rates for each issue age group were fitted by either an exponential (Expon.) or a 2<sup>nd</sup> degree polynomial (Poly.) trend line.
- A/E adjustments by policy year needed for proposed rates.



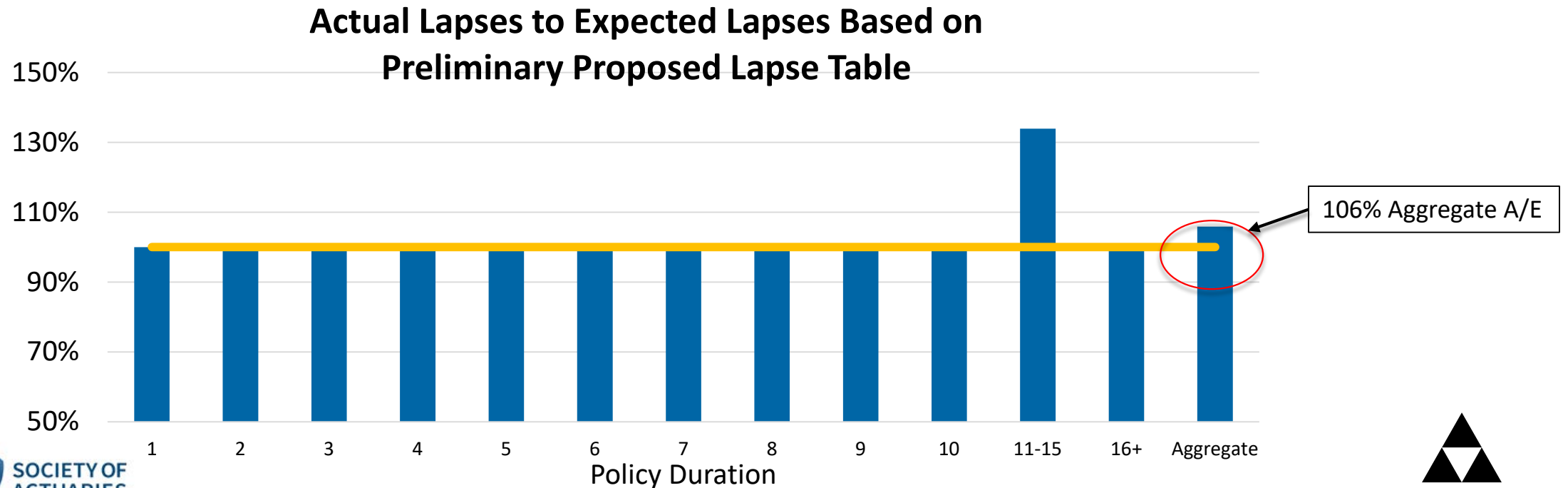
# No Other Factors for Preliminary Proposed Group Lapse Table

- Marital status data for Group was minimal.
- Underwriting risk class was deemed to be unreliable (under further review).
- Covered person (employee, spouse, family members, etc.) is not a significant lapse factor.
- Occupational class data is not available.



# Actual Lapse to Expected—Group

- The high A/E at policy durations 11–15 was the result of keeping the proposed rates non-increasing.



# Next Steps

- Develop proposed active lives tables
- Review reasonableness of total terminations
- Recommend margins
- Update NAIC LTC Actuarial Working Group on any new issues
- Produce report





# Preliminary Proposed Lapse Table— Individual

Issue Age							Marital Status Adjustment Factors			Underwriting Class Adjustment Factors			
Policy Year	Under 55	55-59	60-64	65-69	70-74	75 & Over	Policy Year	Married	Not Married	Policy Year	Preferred	Standard	Sub-standard
1	6.1%	3.4%	4.6%	4.4%	5.4%	7.8%	1	89%	147%	1	105%	87%	112%
2	5.3%	3.0%	2.9%	3.1%	3.8%	5.5%	2	88%	149%	2	110%	79%	112%
3	4.6%	2.6%	2.3%	2.5%	3.1%	4.5%	3	87%	152%	3	108%	82%	116%
4	4.0%	2.3%	1.9%	2.2%	2.6%	3.8%	4	86%	153%	4	104%	88%	119%
5	3.4%	2.0%	1.6%	1.9%	2.4%	3.4%	5	85%	154%	5	109%	87%	102%
6	3.0%	1.8%	1.5%	1.8%	2.2%	3.1%	6	84%	155%	6	106%	91%	106%
7	2.6%	1.5%	1.3%	1.6%	2.0%	2.9%	7	83%	155%	7	108%	84%	113%
8	2.2%	1.4%	1.2%	1.5%	1.9%	2.7%	8	82%	154%	8	104%	93%	104%
9	1.9%	1.2%	1.1%	1.4%	1.8%	2.5%	9	82%	153%	9	110%	87%	101%
10	1.7%	1.0%	1.1%	1.4%	1.7%	2.4%	10	81%	152%	10	107%	94%	86%
11	1.4%	0.9%	1.0%	1.3%	1.6%	2.3%	11	81%	150%	11	86%	130%	106%
12	1.2%	0.8%	0.9%	1.2%	1.5%	2.2%	12	80%	148%	12	86%	130%	106%
13	1.1%	0.7%	0.9%	1.2%	1.5%	2.1%	13	80%	145%	13	86%	130%	106%
14	0.9%	0.6%	0.9%	1.1%	1.4%	2.0%	14	79%	141%	14	86%	130%	106%
15	0.8%	0.5%	0.8%	1.1%	1.3%	2.0%	15	79%	137%	15	86%	130%	106%
16 & Over	0.7%	0.5%	0.8%	1.1%	1.3%	1.9%	16 & Over	79%	133%	16 & Over	86%	130%	106%



# Preliminary Proposed Lapse Table—Group

Policy Year	Issue Age						
	Under 35	35-39	40-44	45-49	50-54	55-59	60 & Over
1	25.4%	18.1%	14.7%	11.9%	10.2%	10.5%	9.1%
2	18.4%	12.6%	10.3%	8.4%	7.2%	7.1%	6.1%
3	15.3%	10.2%	8.4%	6.9%	5.8%	5.6%	4.8%
4	11.8%	7.7%	6.4%	5.3%	4.4%	4.2%	3.6%
5	8.0%	5.2%	4.4%	3.7%	3.0%	2.8%	2.3%
6	7.7%	5.1%	4.3%	3.6%	3.0%	2.6%	2.2%
7	6.7%	4.6%	3.9%	3.3%	2.7%	2.3%	1.9%
8	5.1%	3.6%	3.1%	2.7%	2.1%	1.8%	1.5%
9	4.8%	3.6%	3.1%	2.7%	2.1%	1.8%	1.5%
10	3.3%	2.7%	2.3%	2.0%	1.6%	1.3%	1.0%
11	3.3%	2.7%	2.3%	2.0%	1.6%	1.3%	1.0%
12	3.3%	2.7%	2.3%	2.0%	1.6%	1.3%	1.0%
13	3.3%	2.7%	2.3%	2.0%	1.6%	1.3%	1.0%
14	3.3%	2.7%	2.3%	2.0%	1.6%	1.3%	1.0%
15	3.3%	2.7%	2.3%	2.0%	1.6%	1.3%	1.0%
16 & Over	2.1%	2.0%	1.7%	1.5%	1.2%	0.9%	0.7%



# Questions?



# Additional Information

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