



**Montana Teachers' Retirement System
Experience Study Results
July 9, 2026**

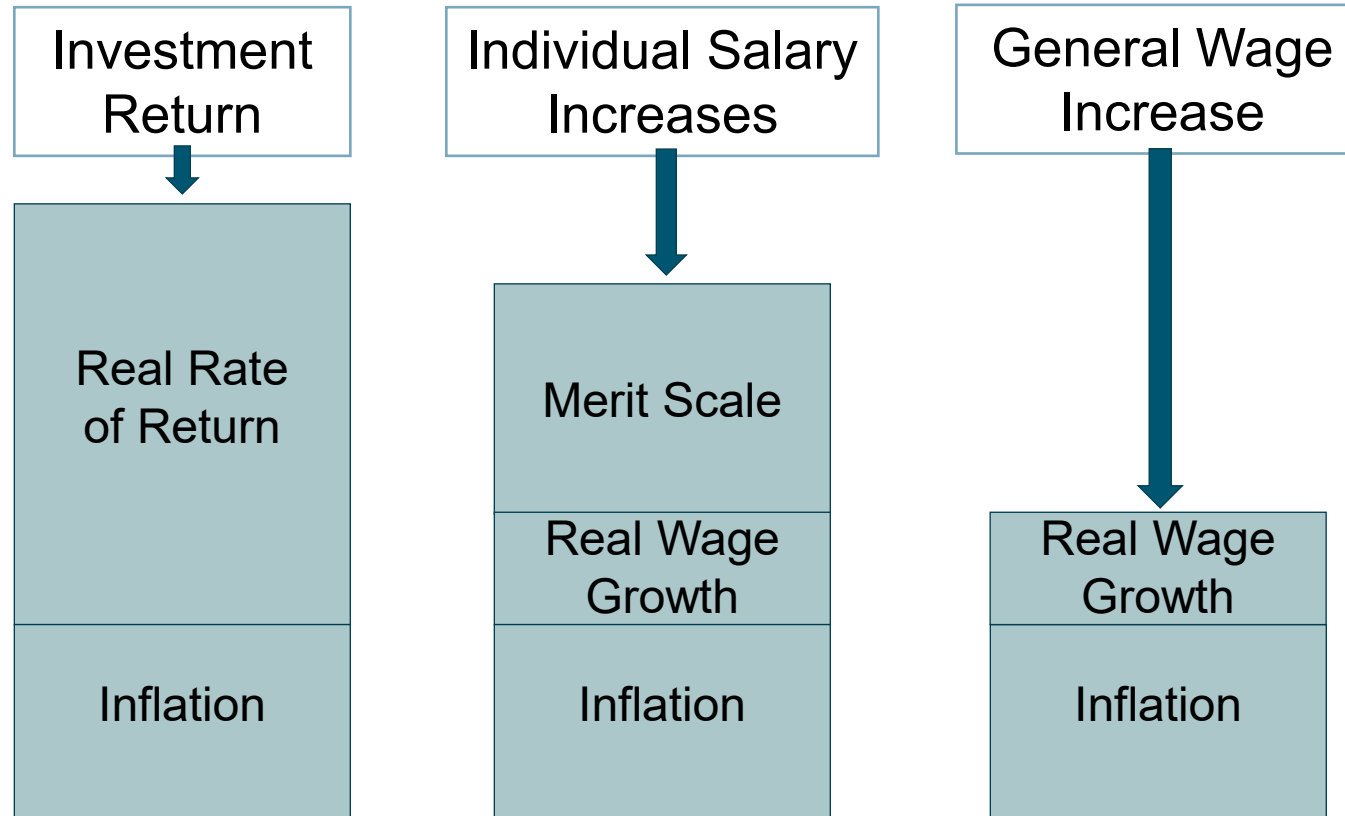
Shawn Graham, Executive Director

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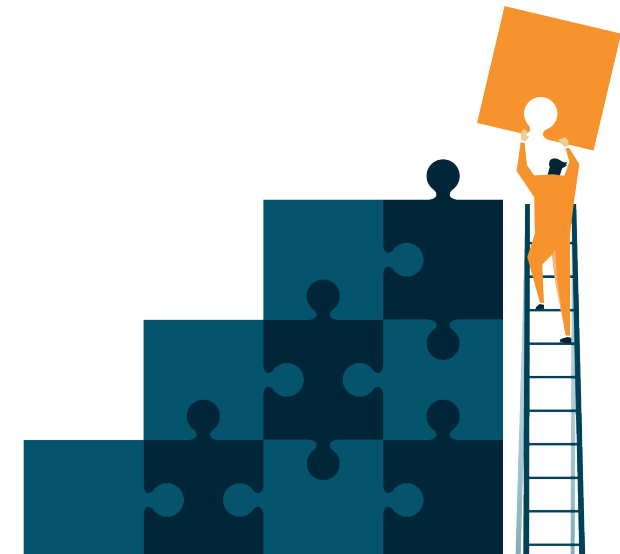
- Compare actual experience during study period (Fiscal years 2021 through 2025) with expected results based on current assumptions
 - Key measurement tool: Actual/Expected Ratio or A/E Ratio
- Past experience provides strong guidance for some assumptions (like mortality) and weak guidance for others (like investment return)
- Assumption setting involves both science and art
 - Objective (science): number crunching of actual and expected numbers of members and rates of occurrence
 - Subjective (art): interpreting the information and deciding on appropriate changes
 - Professional judgement is involved
- The Covid pandemic likely had an impact during this study period and was considered in making recommended changes



Actuarial Method	Current	Recommended
Actuarial Cost Method	Entry age normal	No change
Asset Valuation Method	4-year smoothing of the difference between actual and expected return on market value not less than 80% of market value or more than 120%	No change
Amortization of Unfunded Actuarial Accrued Liability	Level percent of payroll over the amortization period as a single base	No change



Note: inflation assumption and real wage growth should be consistent in all assumptions. Some margin for adverse deviation in the assumption is acceptable. Administrative expenses are also reflected in the Investment Return assumption.



Bond Market expectations:

Years to Maturity	Bond Nominal Yield	TIPS Nominal Yield	Breakeven Rate of Inflation
10	4.24%	1.95%	2.29%
20	4.79%	2.32%	2.47%
30	4.78%	2.51%	2.27%

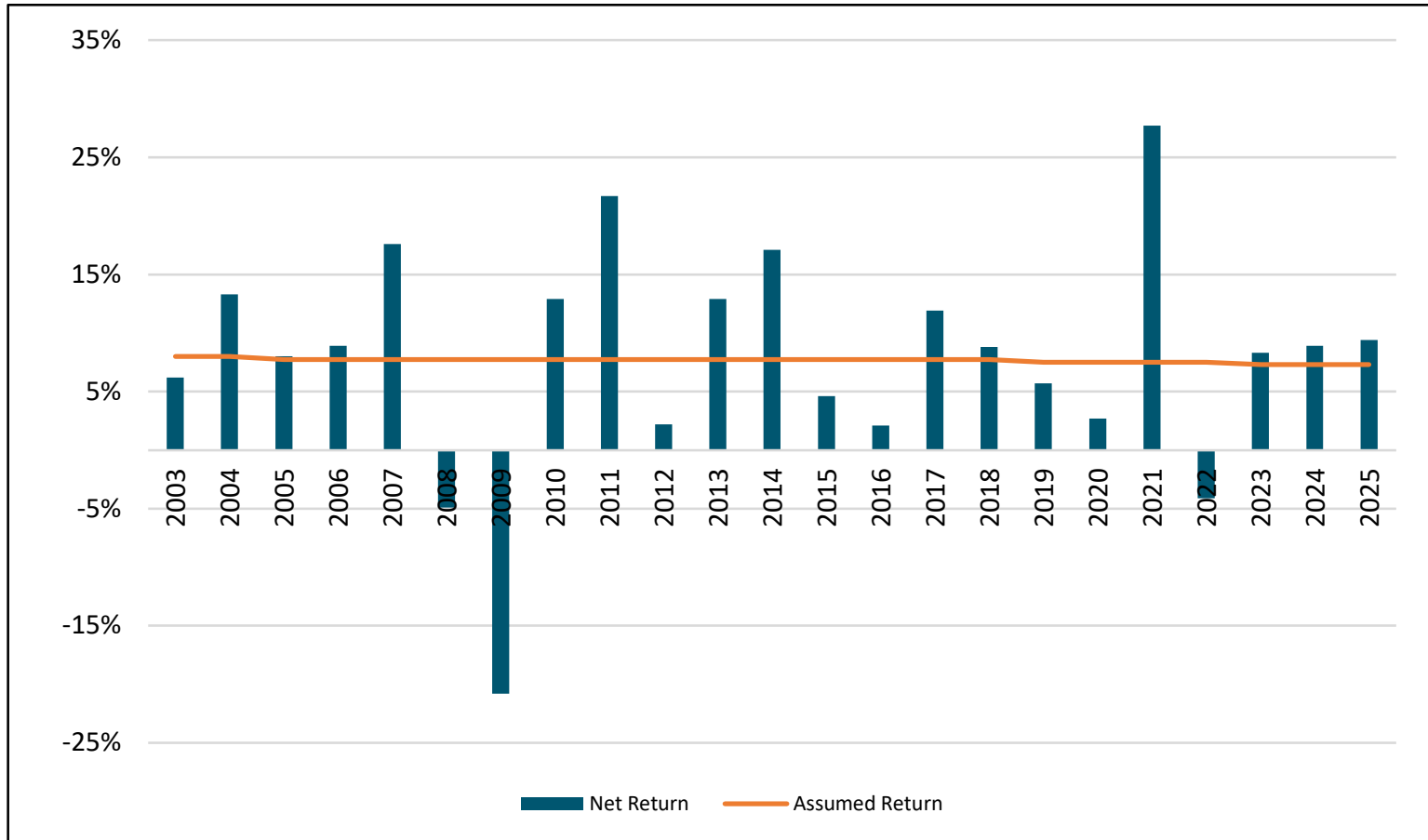
Social Security expectations: 1.8% - 3.0%

Horizon Survey: 2.2% - 2.7%

- **Recommend retaining 2.75% assumption**

- Using the “building block” approach, the investment return assumption is composed of two components
 - Rate of price inflation (previously discussed)
 - Real rate of return
- The investment return assumption is net of investment and administrative expenses
- Current assumption is 7.30%
 - 2.75% inflation + 4.55% real return
- Asset allocation is the key factor in setting this assumption
 - Portfolios that take risk are generally expected to be rewarded with higher returns, along with potentially greater volatility
- Most powerful assumption in the valuation
 - Small changes can have large impact on liabilities and contribution rates

Historical Investment Returns



Current assumption is 7.30%, net of investment and administrative expenses

Period	Average Return
20-year	7.2%
15-year	9.0%
10-year	7.9%
5-year	9.6%

Time Span In Years	Mean Return	Standard Deviation	Real Returns by Percentile				
			5 th	25 th	50 th	75 th	95 th
1	5.76%	12.13%	-12.93%	-2.72%	5.08%	13.50%	26.80%
5	5.21	5.38	-3.40	1.52	5.08	8.76	14.24
10	5.15	3.80	-0.99	2.55	5.08	7.67	11.51
20	5.11	2.69	0.75	3.28	5.08	6.90	9.59
30	5.10	2.19	1.53	3.61	5.08	6.57	8.74
50	5.09	1.70	2.32	3.94	5.08	6.23	7.91

50% probability that the long-term real rate of return will be between 3.94% and 6.23%.

Based on 2025 Horizon Survey

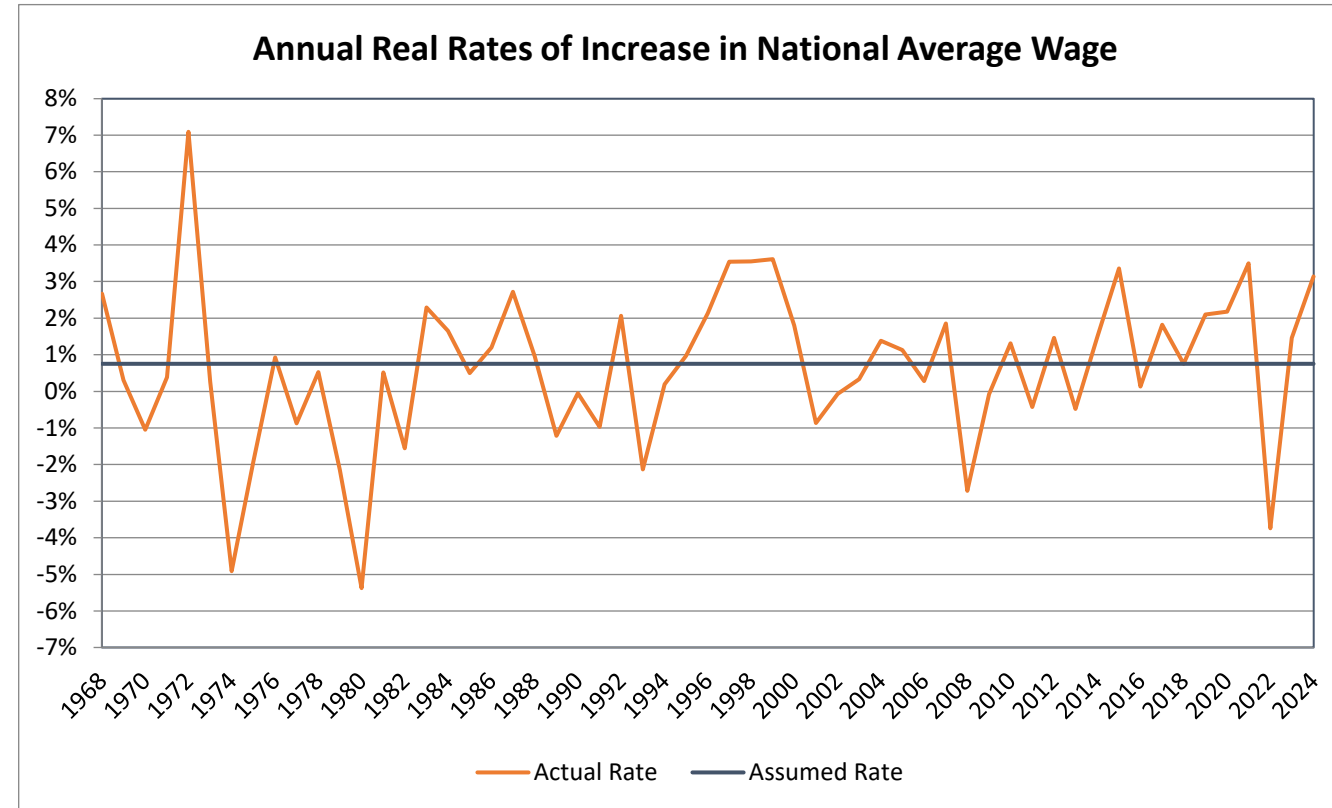
	25 th Percentile	50 th Percentile	75 th Percentile
Real Rate of Return	3.94%	5.08%	6.23%
Inflation	2.75%	2.75%	2.75%
Administrative Expenses	<u>(0.08)%</u>	<u>(0.08)%</u>	<u>(0.08)%</u>
Net Investment Return	6.61%	7.75%	8.90%

Current assumption of 7.30% provides a 60% chance of meeting or exceeding the assumed rate of return.

- **Recommend retaining 7.30% assumption**

General Wage Growth Assumption

- Typically consists of price inflation and real wage growth (standard of living increase)
- Current assumption is 3.50% (2.75% inflation + 0.75% real wage growth)
- National Average Wage actual experience
 - Last 10 years, general wage inflation 1.31% (4.16% wage inflation – 2.85% price inflation)
 - Last 30 years, general wage inflation 1.13% (3.66% wage inflation – 2.53% price inflation)
- **Recommendation: Increase from 3.50% to 3.75% (2.75% inflation + 1.00% real wage growth)**



- Payroll growth assumption
 - Does not impact the Actuarial Accrued Liability or Funded Ratio
 - Used only to determine the amortization payment on the Unfunded Actuarial Accrued Liability (UAAL)
- Current assumption is 3.25%
- Impacted by three factors
 1. The size of the group (number of active members)
 2. The general wage increase assumption
 3. Historical growth in total payroll
- Annual increase over the past 10 years was 3.03%
- Recommend decreasing the payroll growth assumption from 3.25% to 3.00%

Recommended Economic Assumption Changes

	Current Assumptions	Proposed Assumptions
Price Inflation	2.75%	2.75%
Investment Return	7.30%	7.30%
Real Wage Growth	0.75%	1.00%
General Wage Growth	3.50%	3.75%
Payroll Growth	3.25%	3.00%



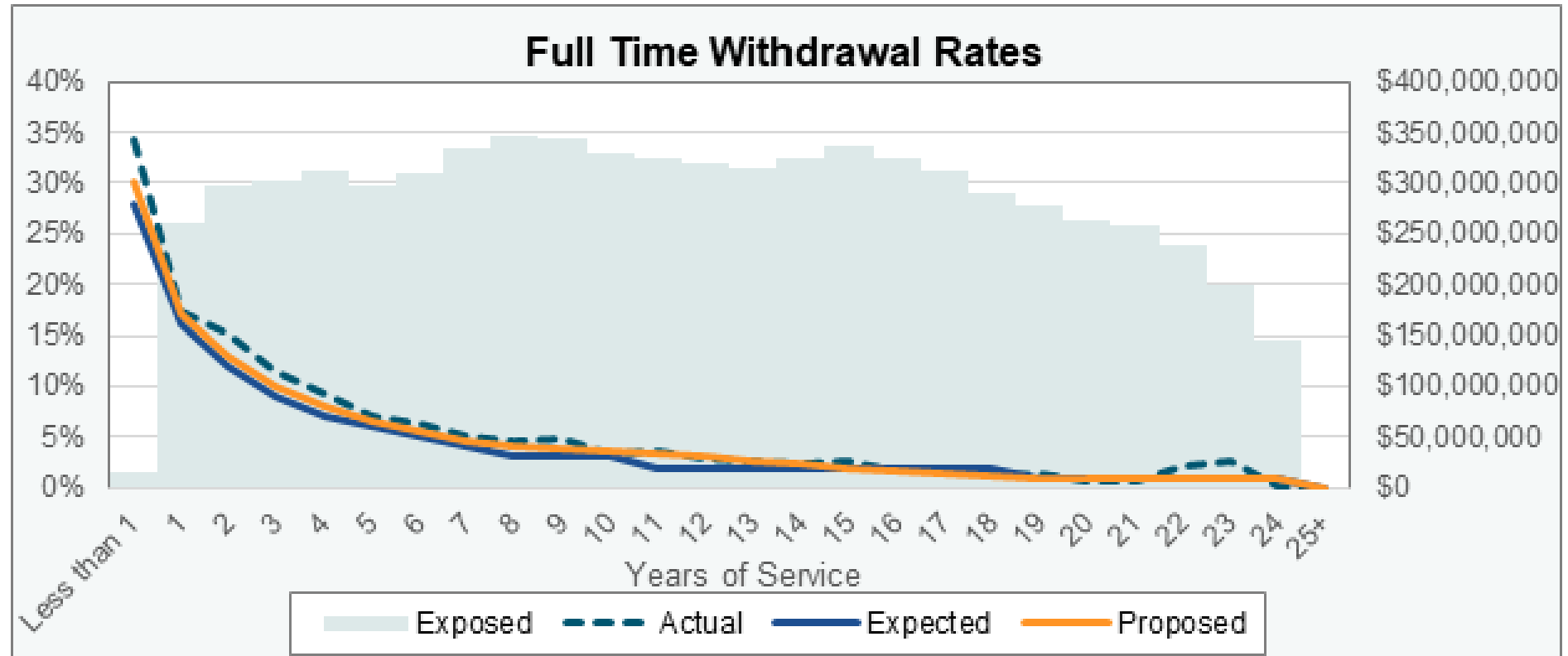
- Compare what actually happened to individual members with what was expected to happen based on the actuarial assumptions
- Key evaluation tool is actual decrements/expected decrements (called A/E ratio)
 - Decrement is a change in a member's status during the study period (e.g., retirement, termination, death)
- Professional judgment is needed when setting assumptions

- Anticipates a member terminating directly from active status prior to becoming eligible for a retirement benefit
- Studied separately for full-time/part-time members without regard to gender and based on years of service
- Liability weighted analysis was performed
 - Members who have a higher liability have a larger impact on the gains and losses that occur in the annual valuation



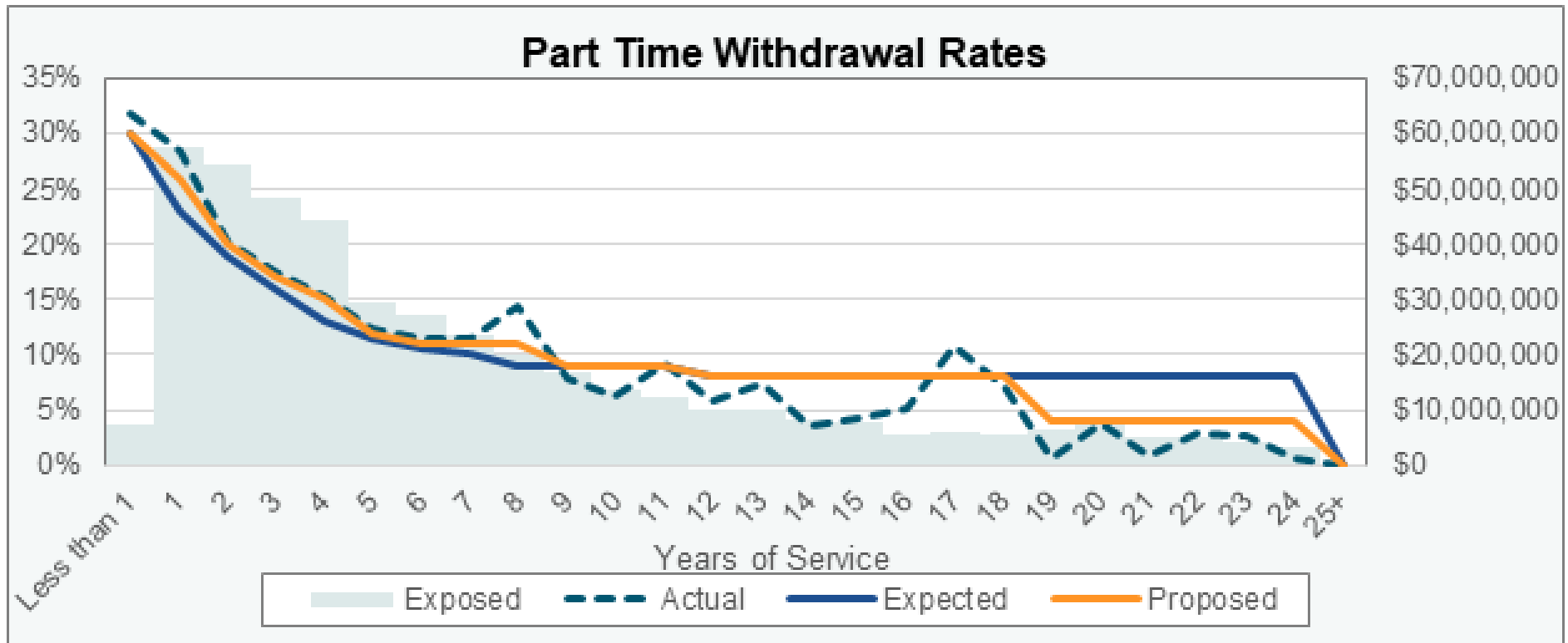
Withdrawal (Full Time)

- **Recommend adjusting rates to better fit experience (orange line)**



Current Assumption A/E Ratio: 124%
Proposed Assumption A/E Ratio: 112%

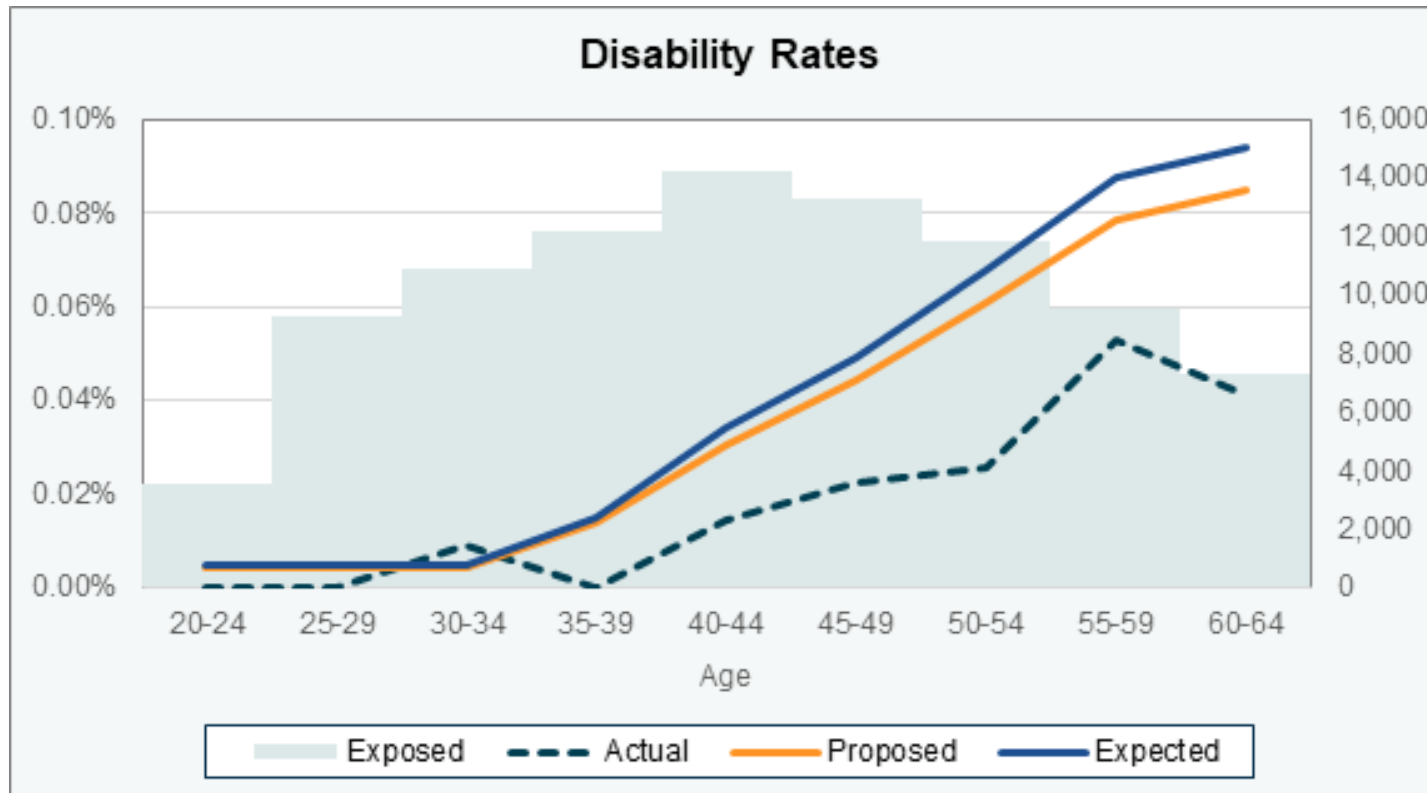
- **Recommend adjusting rates to better fit experience (orange line)**



Current Assumption A/E Ratio: 107%
Proposed Assumption A/E Ratio: 101%

- Vested members who terminate active employment have the option to
 - Take a distribution of their member contributions
 - Leave their contributions with the system and draw a benefit in the future
- Assumption is needed because the choice impacts the system
- Current assumption: All members elect a deferred benefit
- **Recommended assumption: All members will elect the most valuable option (refund or deferred benefit)**

- **Recommend adjusting rates** to move part way to observed experience (orange line)



Only 83 disability retirements during study period (expected 127).

Recommend reducing rates by 10%.

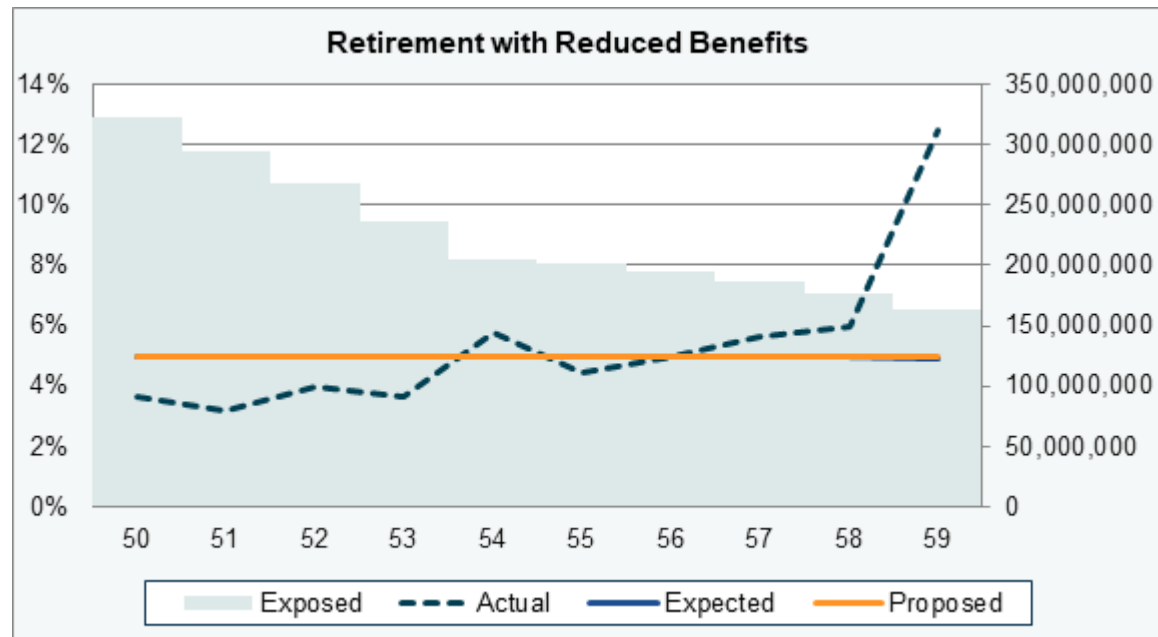
Current Assumption A/E Ratio: 43%
Proposed Assumption A/E Ratio: 48%

- Current Assumption based on age and by
 - Early Retirement (reduced benefit)
 - Unreduced Retirement (first eligible for unreduced benefit)
 - Unreduced Retirement (beyond first eligibility for unreduced benefit)
- Data shows limited value in separating First/Beyond First assumption
- Recommend:
 - Eliminating First Eligible assumption
 - No change to Early Retirement rates
 - Minor adjustments to Normal Retirement rates

Early Retirement

Current Assumption A/E Ratio: 100%

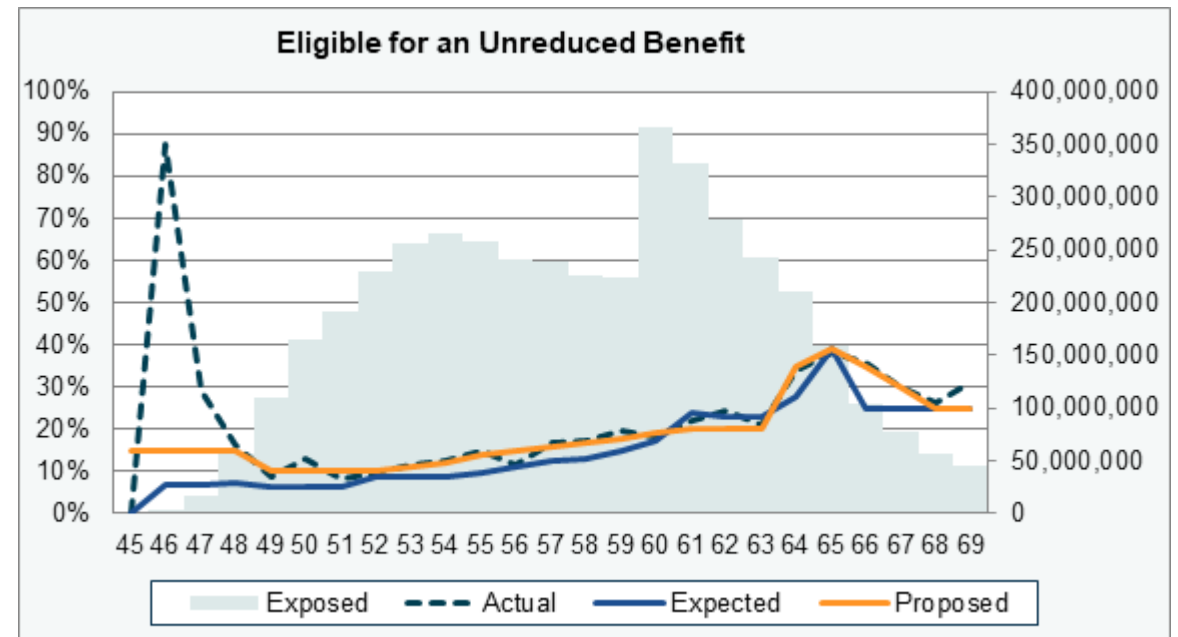
Proposed Assumption A/E Ratio: 100%



Unreduced Retirement

Current Assumption A/E Ratio: 118%

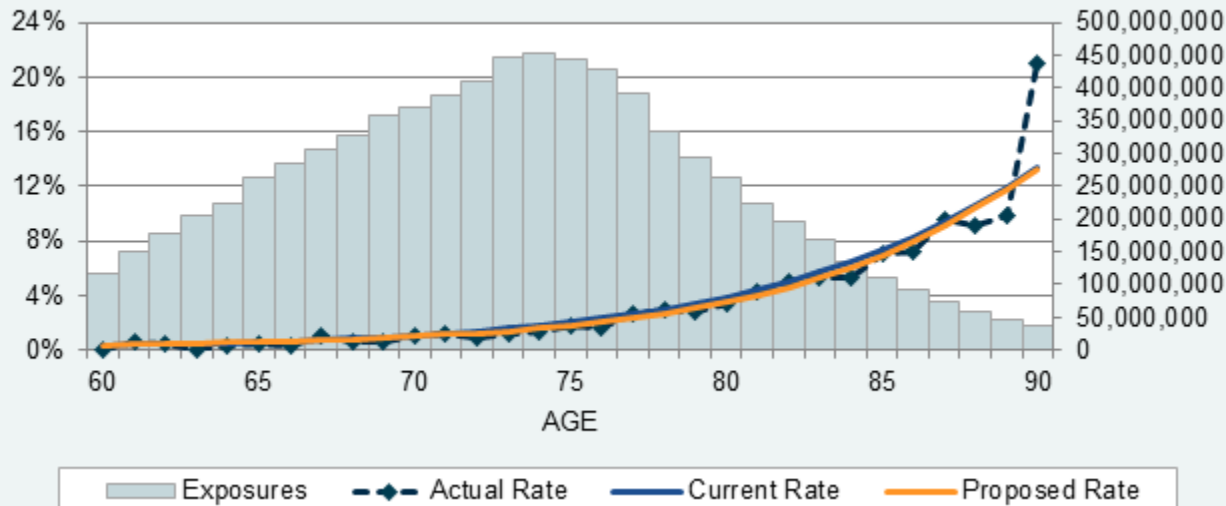
Proposed Assumption A/E Ratio: 104%



- New set of public plan mortality tables published in 2025 (Pub-2016 tables)
- Our recommendation is to move to the newest family of mortality tables
- Recommendation for Retiree Mortality Tables
 - Pub-2016 Teacher Amount Weighted Retiree Mortality Table, without adjustments
- Future mortality improvements projected generationally using Scale MP-2021 (most recent)

Retiree Mortality

Service Retirees Mortality - Males



Males

Current Assumption A/E Ratio: 90.6%

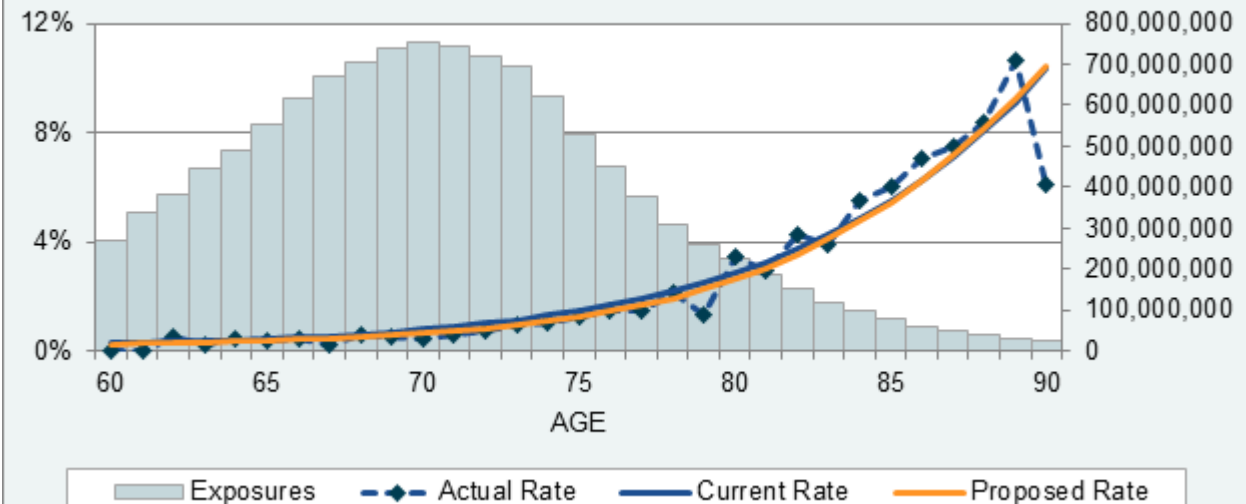
Proposed Assumption A/E Ratio: 96.8%

Females

Current Assumption A/E Ratio: 87.5%

Proposed Assumption A/E Ratio : 96.7%

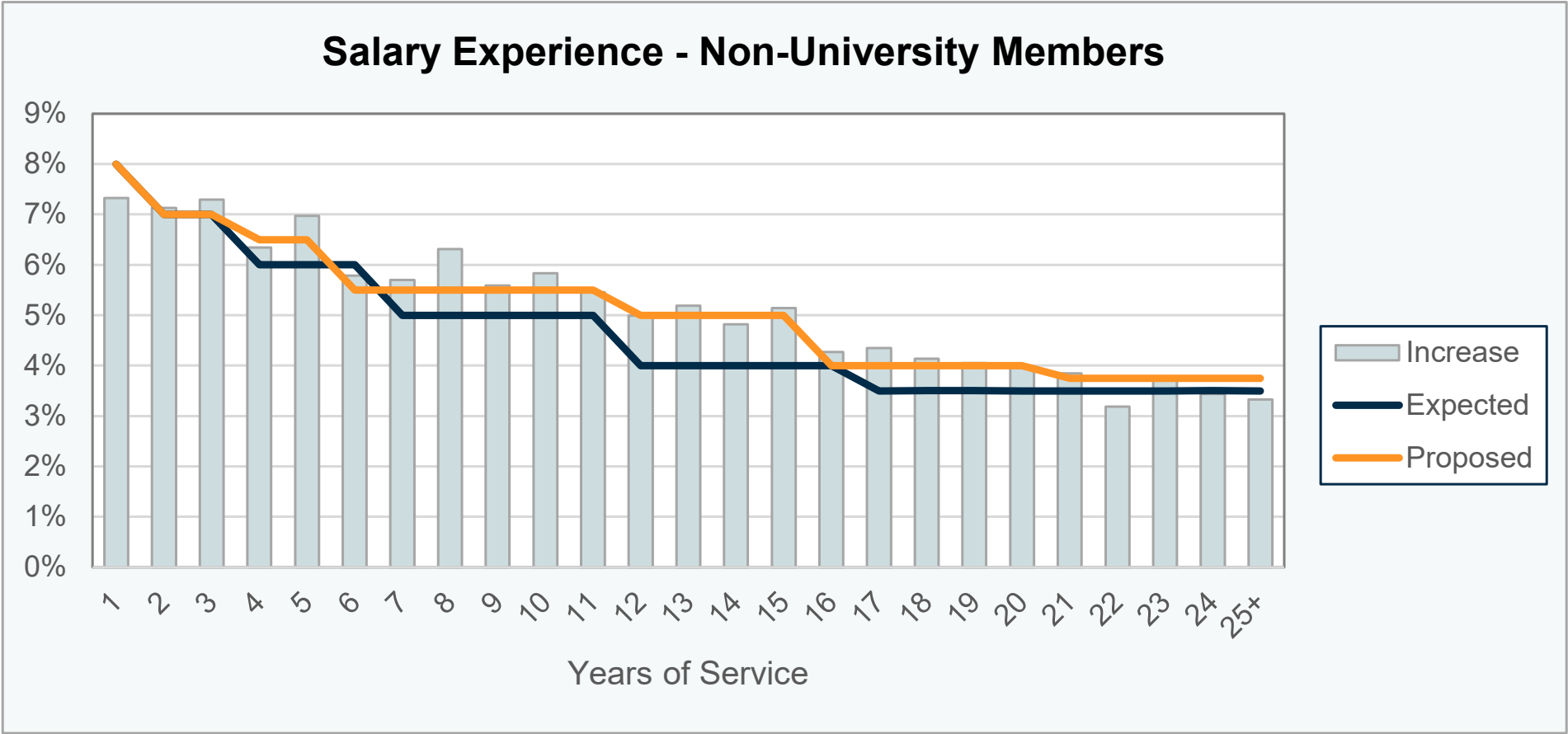
Service Retirees Mortality - Females



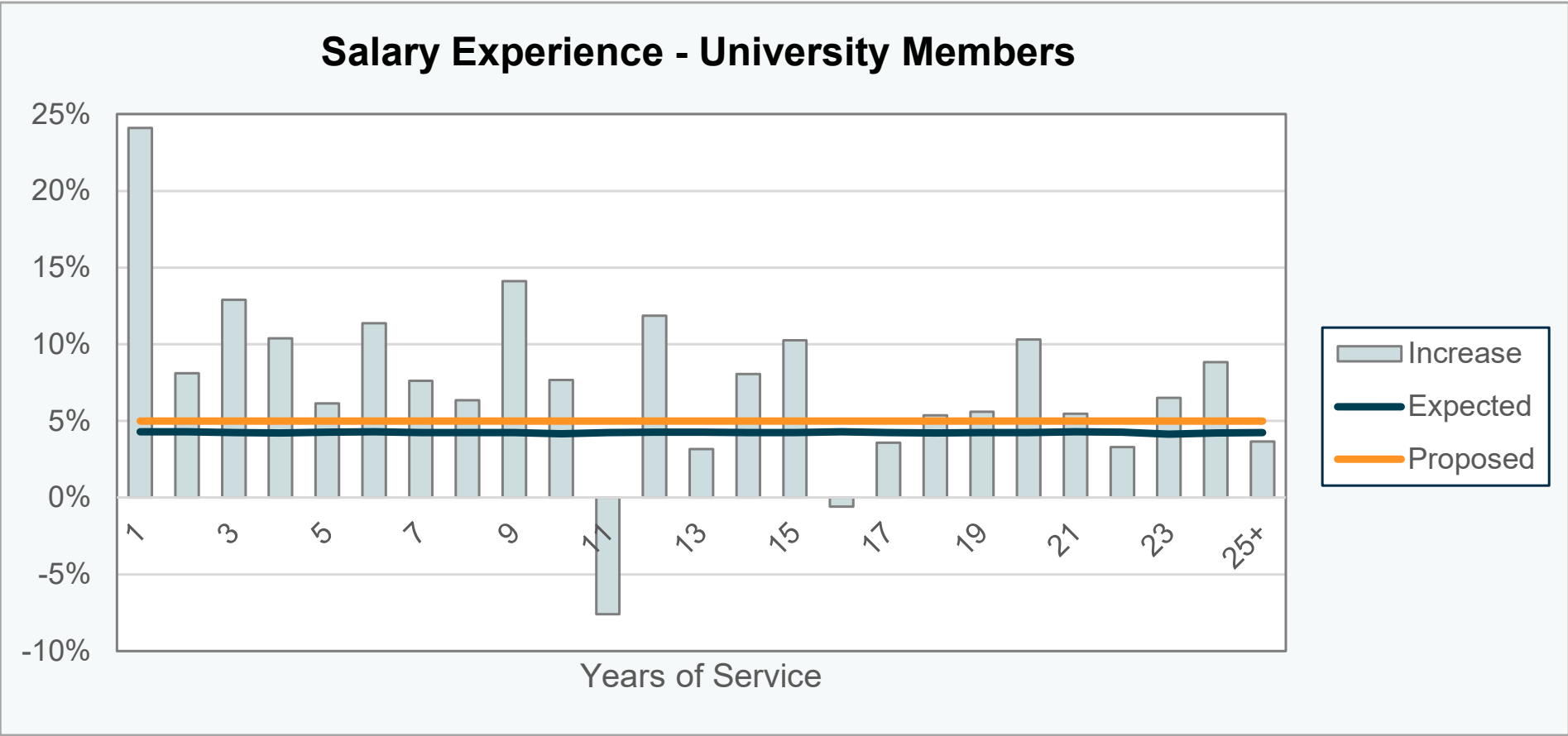
- Our recommendation is to use the same Amount Weighted Pub-2016 family of mortality tables for Actives, Disabled and Beneficiaries
- **Recommendation for Active Base Table**
 - Teacher Employee Mortality Table, projected generationally using scale MP-2021
- **Recommendation for Disabled Base Table**
 - Non-Safety Disabled Retiree Mortality Table, without mortality improvement
- **Recommendation for Beneficiary Base Table**
 - Contingent Survivor Mortality Table, projected generationally using scale MP-2021

- Consists of two pieces
 - General wage inflation assumption (previously recommended to increase to 3.75%)
 - Merit scale: varies by age or, more commonly, service and reflects individual performance (longevity and promotion)
- Analysis is performed separately for University and Non-University





Recommend the total salary increase assumption be increased at most years of service (general wage increase by 0.25% and merit increase varies by years of service).



Recommend the total salary increase assumption be increased from 4.25% to 5.00%.

- Marriage Assumption
 - No change to age difference assumption (spouse assumed to be same age as the eligible member)
- Interest on Member Contributions
 - No change to current assumption of 2.00%

Recommended Demographic Assumption Changes

	Current Assumptions	Proposed Assumptions
Mortality		
- Base Tables	Pub-2010 Teacher Members	Pub-2016 Teacher Members
- Mortality Improvement	MP-2021; none for disabled	MP-2021; none for disabled
- Adjustments	102% scaling for male retirees and 103% for female retirees	None
Retirement		
- Early	5.0%	No change
- First Eligible	Vary by age	Eliminate Assumption
- Unreduced	Vary by age	Increase rates at most ages
Termination	Service-based tables	Minor adjustments for both full time and part time
Disability	Vary by age	10% reduction in rates
Salary	Vary by service	Increase rates at most ages

Summary of Results

	0 Current Valuation July 1, 2025	1 Demographic Changes Plan Definition	2 Demographic Changes PD,Mort	3 Demographic Changes PD,Mort,Ret	4 Demographic Changes PD,Mort,Ret,Term	5 Demographic Changes PD,Mort,Ret,Term,Dis	6 Demographic Changes PD,Mort,Ret,Term,Dis,Sal	7 All Changes
Employer Contribution Rate:								
Normal Rate	2.65%	2.65%	2.73%	2.86%	2.68%	2.68%	3.27%	3.27%
UAAL	<u>9.31%</u>	<u>9.31%</u>	<u>9.23%</u>	<u>9.10%</u>	<u>9.28%</u>	<u>9.28%</u>	<u>8.69%</u>	<u>8.69%</u>
Total Statutory Employer Rate	11.96%	11.96%	11.96%	11.96%	11.96%	11.96%	11.96%	11.96%
Actuarial Accrued Liability	7,201,718,346	7,202,075,685	7,240,699,483	7,278,020,270	7,288,900,192	7,288,934,527	7,326,161,216	7,326,161,216
Actuarial Value of Assets	<u>5,288,715,976</u>	<u>5,288,715,976</u>	<u>5,288,715,976</u>	<u>5,288,715,976</u>	<u>5,288,715,976</u>	<u>5,288,715,976</u>	<u>5,288,715,976</u>	<u>5,288,715,976</u>
UAAL	1,913,002,370	1,913,359,709	1,951,983,507	1,989,304,294	2,000,184,216	2,000,218,551	2,037,445,240	2,037,445,240
Amortization Period	21	21	21	22	22	22	24	25

	Greater of Refund/Annuity	Mortality	Retirement	Termination	Disability	Salary	Payroll Growth
Change in Normal Rate	0.00%	0.08%	0.13%	-0.18%	0.00%	0.59%	0.00%
Change in AAL	357,339	38,623,798	37,320,787	10,879,922	34,335	37,226,689	0
Change in Amortization Period	0	0	1	0	0	2	1
Funded Status	73.44%	73.43%	73.04%	72.67%	72.56%	72.19%	72.19%
Change in UAAL							124,442,870
Change in Funded Status							-1.25%

Comparison of Valuation Results and Costs			
	6/30/25 Valuation		
	Baseline	All Changes	Difference
Actuarial Accrued Liability (\$M)	7,202	7,326	124
Actuarial Value of Assets (\$M)	<u>5,289</u>	<u>5,289</u>	<u>0</u>
Unfunded Actuarial Accrued Liability (UAAL) (\$M)	1,913	2,037	124
Funded Ratio	73.4%	72.2%	(1.2%)
Normal Cost Rate	2.65%	3.27%	0.62%
UAAL Amortization Rate	<u>9.31%</u>	<u>8.69%</u>	<u>(0.62%)</u>
Total Contribution Rate	11.96%	11.96%	0.00%
Amortization Period	21	25	4

Note: the impact of the assumption changes, as measured in the July 1, 2026 valuation, will be different than that shown here.