CHEIRON Classic Values, Innovative Advice

State Teachers Retirement System of Ohio

Quinquennial Experience Study

Produced by Cheiron

March 2022

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Via Electronic Mail

March 11, 2022

Board of Trustees
State Teachers Retirement System of Ohio
275 East Broad Street
Columbus, Ohio 43215

Dear Members of the Board:

The State Teachers Retirement System of Ohio ("STRS Ohio") engaged Cheiron to perform an actuarial experience study covering the period from July 1, 2015 through June 30, 2021. This report presents the results of the experience study and has been prepared in accordance with Ohio Revised Code Section 3307.51 (B), which requires the board's actuary to prepare an actuarial investigation of the mortality, service and other experience of the members, retirees and beneficiaries of the system at least once in each five-year period.

The previous experience study was completed in 2017 for the period from July 1, 2011 through June 30, 2016. The reason the period July 1, 2015 through June 30, 2016 was included in both this most recent experience study, as well as the prior study, was due to wanting an additional non-COVID year be a part of this study. Starting in 2020 economic studies are now performed annually and conducted in the months surrounding each year's June 30 valuation date. For the upcoming June 30, 2022 actuarial valuation the economic assumptions will be reviewed during late Spring and Summer of 2022.

In the report that follows we summarize in Section I the results of our demographic experience study followed by Section II, which contains the PowerPoint that was presented to the Board at its February 17, 2022 meeting, where all of Cheiron's recommendations were accepted by the Board. Finally, in Section III, we present Cheiron's analysis of five possible plan benefit changes requested by the Board which is commonly referred to as the "Levers Study". Cheiron's specific task in the Levers Study was to determine whether any of the proposed adjustments materially impaired the fiscal integrity of the system or were necessary to preserve the fiscal integrity of the system, as set forth in Ohio law.

This transmittal letter, along with the sections that replicate the PowerPoint presentations including appendices, constitute the final quinquennial experience study report for STRS Ohio for the period July 1, 2015 through June 30, 2021.

This report has been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations.

Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This letter and the attachments do not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

Finally, this report has been prepared exclusively for the STRS Ohio for the purposes described herein. This analysis is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

If you have any questions, please let us know.

Sincerely,
Cheiron

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SECTION I - SUMMARY OF DEMOGRAPHIC EXPERIENCE STUDY RESULTS

Actuarial assumptions are intended to be long-term in nature and should be both individually reasonable and consistent and reasonable in the aggregate. The purpose of this experience study is to evaluate whether or not the current demographic assumptions adequately reflect the current, long-term expectations for STRS Ohio, and if not, to recommend any adjustments to the assumptions that might be needed. It is important to note that frequent and significant changes in the actuarial assumptions are not typically desirable, unless there are known fundamental changes in expectations with respect to STRS Ohio's membership or assets that would warrant such frequent or significant changes.

The results of the experience study were presented to the Board on February 17, 2022. The purpose of this letter is to formally summarize our recommendations and analysis.

Based upon our analysis, we are recommending changes in assumptions as summarized below:

Pension Assumptions

- **Mortality:** Adopt the PubT-2020 mortality tables
- **Mortality improvement:** Use the MP-2020 projection scale
- **Retirement:** Adopt updated tables split on eligibility for unreduced retirement
- **Turnover:** Adopt slightly modified tables based on experience
- **Disability:** Lower disability rates
- **Salary scale:** Use slightly lower overall rates based on service
- **Deferral election:** Higher rates for those electing to take a deferred annuity
- **Marriage assumption:** Continue current assumptions

Health Assumptions

- **OPEB participation:** Lower participation rate to 65% for healthy annuitants

The remainder of this letter will summarize our analysis of each of these assumptions. Section II is a replication of the February 17 quinquennial experience study presentation to the Board as well as a summary of the current and proposed actuarial assumptions.

Demographic Actuarial Assumptions

In analyzing the experience of demographic assumptions, we determined the ratio of the actual number of decrements for each assumption compared to the expected number of decrements (A/E ratio or actual-to-expected ratio). If an assumption were perfect, this ratio would be 100%, and any recommended assumption change should move from the current A/E ratio towards an A/E ratio closer to 100%, unless future experience is expected to be different from the experience during the period of study.

SECTION I - SUMMARY OF DEMOGRAPHIC EXPERIENCE STUDY RESULTS

We also calculated an r-squared statistic for each assumption. r-squared values measure how well an assumption fits the actual data and can be thought of as the percentage of the variation in the actual data that is explained by the assumption. Ideally, r-squared values would equal 100%, but this is never the case in reality. A recommended assumption will generally increase the r-squared value compared to the r-squared value of the current assumption, moving it closer to 100%, unless the pattern of future decrements is expected to be different from the pattern experienced during the period of study. Note, however, that the proposed assumptions will typically only move the r-squared value closer to 100% rather than all the way, reflecting the desire to adjust assumptions gradually.

In addition, we calculated 90% confidence intervals for each demographic rate assumption, which represent the range within which the true decrement rate during the experience study period fell, within 90% confidence. If there is insufficient data to calculate a confidence interval for a given group and assumption, the confidence interval is shown as the entire range of the graph. We generally propose assumption changes when the current assumption is outside the 90% confidence interval of the observed experience. However, adjustments are made to account for differences between future expectations and historical experience, to account for the past experience represented by the current assumption, and to maintain a neutral to slightly conservative bias in the selection of the proposed assumption.

Mortality Tables

Current mortality assumptions are sex-distinct and there are separate tables for healthy annuitants, disabled annuitants, and non-annuitants. The current tables are based upon the RP-2014 mortality tables adjusted as follows:

- Healthy annuitant tables are adjusted from 50% to 90% for ages up to age 85
- Disabled annuitant tables are adjusted by 90% for males

The mortality experience is discussed and shown graphically on pages II-28 through II-37 and is summarized below:

- Healthy annuitants: Female mortality was very close to the assumed rates with an A/E ratio of 99%. Male mortality was higher than assumed with an A/E ratio of 114%.
- Disabled annuitants: Female disabled mortality was higher than assumed with an A/E ratio of 112%. Male disabled mortality was close to assumed with an A/E of 101%.
- Non-annuitants: Both female and male non-annuitant mortality was lower than assumed with A/E ratios of 63% for females and 59% for males.

At the time the current mortality tables were adopted, the RP-2014 tables were the most recent mortality tables available. However, these tables were constructed by the Society of Actuaries (SOA) by using experience only from private sector retirement plans. In 2019 the SOA published the Pub-2010 mortality tables. These new tables were constructed using only public sector retirement plan experience. In addition, separate tables were published for general employees,

public safety employees, and teachers. We recommend that STRS Ohio adopt the Pub-2010 Teacher mortality tables with adjustments as follows:

- For male healthy annuitants, adjust to 110% of the published rates
- For female non-annuitants, adjust to 95% of the published rates

For mortality improvement the current mortality rates use the MP-2016 mortality improvement tables published by the SOA. The SOA updates this table every year and we recommend using the MP-2020 table.

The impact of adopting the new mortality assumptions will be to reduce the overall pension liability by just under 1% and reduce the overall OPEB liability by about 1.2%.

Retirement Rates

The retirement rates vary by gender and service. Also, there are separate rates for the combined plan and the defined benefit plan, and within the defined benefit plan there are separate rates for grandfathered members.

The retirement rate experience is shown in the charts and tables on pages II-38 through II-47. The results are summarized as follows:

- Combined plan
  - The observed rates for females are higher than expectations for all ages after age 60
  - The observed rates for males are generally higher than expectations, with exceptions for ages 66-68
- Defined benefit plan
  - For females eligible for unreduced retirement, the observed rates are generally lower at ages 60-64 but higher later
  - For males eligible for unreduced retirement, the observed rates have been lower before age 65 and higher after age 65
  - The rates for members who retire prior to being eligible for an unreduced benefit are relatively low and close to the current assumptions.

We recommend adopting revised assumptions which more closely match the experience. Also, the Grandfathered group has dwindled and the impact of having separate assumptions has worn away, so we recommend eliminating separate assumptions for this group going forward. The impact of the recommended assumptions will be a marginal decrease in the pension liability and a 4.3% decrease in the OPEB liability.

Turnover Rates

The current assumption for turnover uses service-based rates for the first five years and age-based rates after five years. We reviewed the methodology of applying a service-based select period and

age based ultimate rates to the data and believe that the data continues to support this methodology at the current time.

The results of our analysis are shown in the tables and charts on pages II-48 though II-53. The results are summarized below:

- Select period (first 5 years)
  - For both males and females, except for year one, the experience has generally been lower than assumed.
- Ultimate period (after 5 years of service)
  - For both males and females, the experience has generally been lower than assumed at younger ages and higher after age 51.

We recommend slightly modified tables to better fit the experience. The impact of this change will be immaterial for pension and results in a 0.5% decrease in the OPEB liability.

Disability Rates

The current disability rates vary by age. The same rates are used for males and females.

The results of our analysis in on pages II-54 through II-56. Disability experience was lower than assumed with an overall A/E ratio of 70%.

We recommend adjusting the current rates by 70%, which results in an immaterial change in both pension and OPEB liabilities.

Salary Scale

The current assumption is based upon age. Our analysis of the experience is shown on pages II-57 through II-58 and in Appendix A page A-10 through A-11.

The experience shows that salary increases are highly correlated with service. Therefore, we are recommending adoption of a service-based table to replace the current age-based table. The impact will be a reduction in the pension liability of 0.8% and a 1% increase in the OPEB liability.

Payment Form Assumption

Currently it is assumed that 50% of active vested (at termination) and current terminated vested (at the valuation date) participants will cash out and 50% will elect a deferred annuity.

Our review of the experience suggests that this assumption be modified as follows:

- 20% of active vested participants will cash out and 80% will elect a deferred annuity.

- 5% of current terminated vested participants will cash out and 95% will elect a deferred annuity.

The impact will be just over a 0.5% reduction in pension liability and no impact on the OPEB liability.

Marriage Assumption

The current assumptions are as follows:

- 80% of male participants and 60% of female participants are married at death or retirement.
- Male members are assumed to be three years older than their spouses and female members are assumed to be one year younger than their spouses.

Our review of the experience supports these assumptions, and we recommend no changes.

OPEB Participation Assumptions

The current assumptions for OPEB participation are as follows:

- Healthy retirees: 75% of eligible retirees elect retiree health coverage
- Disabled retirees: 65% of eligible disabled retirees elect retiree health coverage
- Spouses: 20% of eligible retirees electing retiree health coverage have an eligible spouse who also opts for retiree health coverage

Healthy new retirees' participation rate averages 60% for the 2016-2020 period, and the overall retiree participation declined to about 70% by 2020. We recommend lowering the healthy retiree election percentage from 75% to 65%.

The Disabled population is very small, representing less than 4% of the entire retiree population. We do not see a reason to set a separate assumption for disabled vs. healthy retirees; hence we propose no changes to the disabled retiree participation assumption.

No changes are proposed for the spouse election percentages.

The impact will be a reduction in OPEB liability of 4.7%

Liability Impact

Pension Plan

For the pension plan, the impact of the assumption changes on the actuarial liability and the normal cost are shown on page II-22.

If the changes had been applied at June 30, 2021, the actuarial liability would have been $2.6 billion lower, which represents 2.47% of the liability. The most significant reductions would come from changes in mortality ($0.94 billion), salary ($0.89 billion) and deferral election percentages ($0.59 billion). The normal cost would have been reduced by $163 million, which represents 12.09% of the normal cost. The most significant reductions come from changes in salary ($92 million) and deferral election percentages ($41 million).

OPEB Plan

For the OPEB plan, the impact of the assumption changes on the actuarial liability and the normal cost are shown on page II-25.

If the changes had been applied at June 30, 2021, the actuarial liability would have been $273 million lower, which represents 9.69% of the liability. The most significant reductions would come from changes in OPEB participation percentages ($133 million) and retirement ($123 million). The normal cost would have been reduced by $9.4 million, which represents 24.55% of the normal cost. The most significant reductions come from changes in OPEB participation percentages ($4.2 million) and retirement ($3.3 million).

Disclosures

All data, assumptions, methods, and provisions are the same as those outlined in the June 30, 2021 Actuarial Valuation Pension Report and the June 30, 2021 OPEB Actuarial Valuation except as indicated where the recommended assumptions were used.

Future actuarial measurements may differ significantly from the current measurements due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and changes in plan provisions or applicable law.

The results of this letter rely on future plan experience conforming to the underlying assumptions and methods outlined in the June 30, 2021 Actuarial Valuation Reports. To the extent that the actual plan experience deviates from the underlying assumptions and methods, or there are any changes in plan provisions or applicable laws, the results would vary accordingly. In preparing our letter, we relied on information (some oral and some written) supplied by STRS Ohio. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

SECTION I - SUMMARY OF DEMOGRAPHIC EXPERIENCE STUDY RESULTS

Cheiron utilizes ProVal, an actuarial valuation software leased from Winklevoss Technologies (WinTech) to calculate the liabilities, normal costs and projected benefit payments. We have relied on WinTech as the developer of ProVal. We have reviewed ProVal and have a basic understanding of it and have used ProVal in accordance with its original intended purpose. We are not aware of any material inconsistencies, unreasonable output resulting from the aggregation of assumptions, material limitations or known weaknesses that would affect this report.

Cheiron also uses the Getzen Model (the Society of Actuaries (SOA) Long-Run Medical Cost Trend Model version 2020_b) to develop Medical Trend assumptions. We have relied on the Society of Actuaries as the developer of the Model. We have reviewed the Model and have a basic understanding of the Model and have used the Model in accordance with its original intended purpose. We have not identified any material inconsistencies in assumptions or output of the Model that would affect this report.

State Teachers Retirement System of Ohio

CHEIRON
Classic Values, Innovative Advice

Quinquennial Experience Study

February 17, 2022

Presented by
Gene Kalwarski, FSA, EA MAAA
Michael Noble, FSA, EA, MAAA
Gaelle Gravot, FSA, MAAA

CHEIRON
Celebrating 20 years

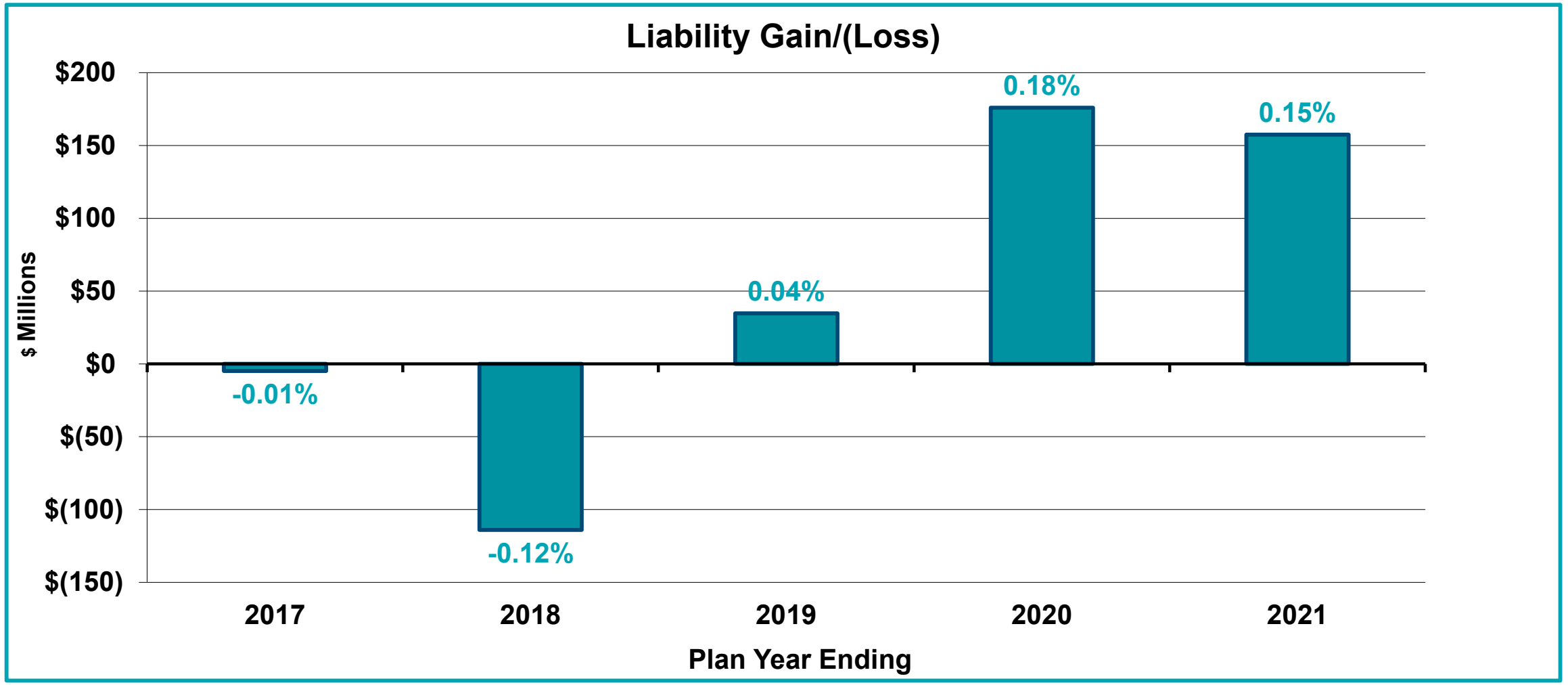
Discussion Topics

- Background
- Assumption Review Process
- Demographic Assumption Review
  - Mortality
  - Retirement
  - Turnover
  - Disability
  - Salary Scale
- Cost Impact
- Health Assumption Review
- Appendix

Experience Study – Background

- Actuarial Assumptions – used to estimate cost of benefits
- Ultimate Cost of Benefits - depend upon actual experience
- Experience Study – compares assumptions to actual experience
- Assumptions must be reasonable individually AND in aggregate
- Ohio Revised Code requires an experience study at least every 5 years
  - Experience period: July 1, 2015 – June 30, 2021
  - Prior study July 1, 2011 – June 30, 2016

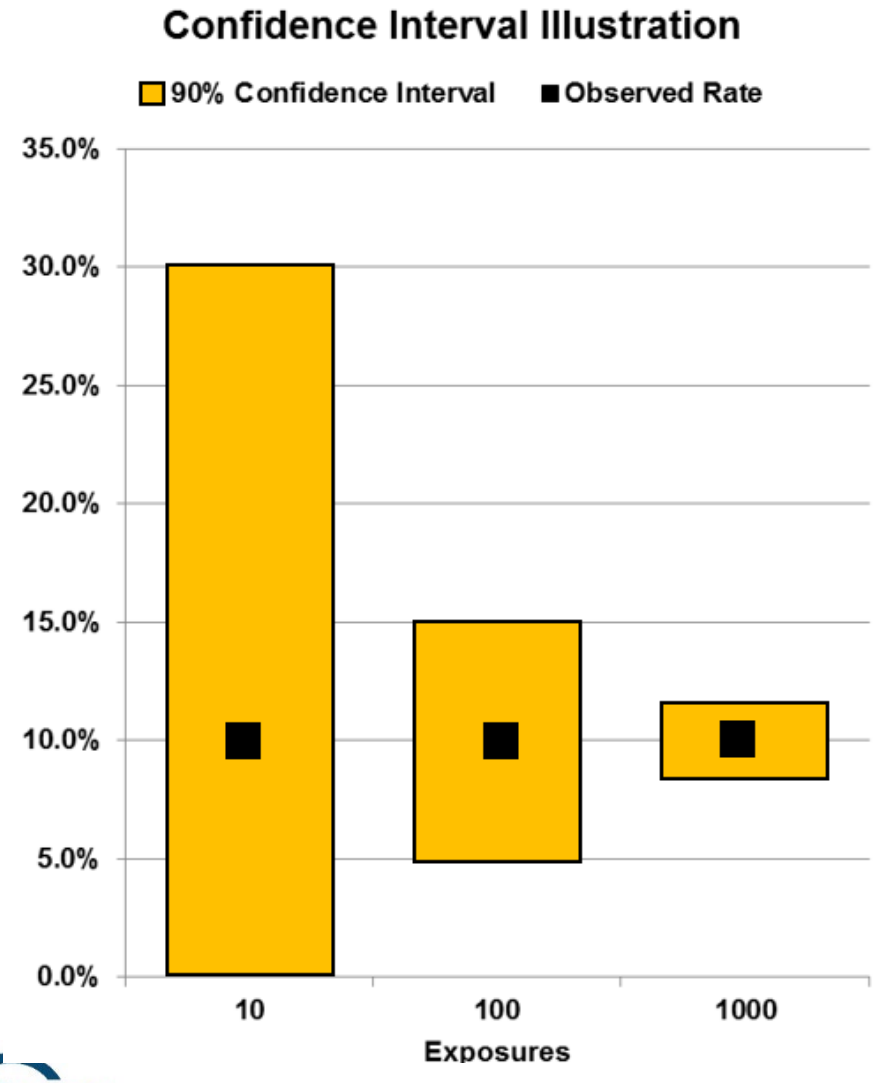
Review of Recent Actuarial Gains and Losses



Assumption Review Process Example

- Step One: Review Plan Experience
  - The number of participants that actually retired is compared to the number of participants that could have retired
  - This determines the actual retirement rates at each age
- Step Two: Compare actual rates to expected rates based on the current assumptions (This is the A/E ratio)
  - Ratios closer to 100% indicate a better match
  - A/E ratio > 100% implies rates too low, and <100% implies too high
- Step Three: Determine Credibility
  - Is there sufficient data to be relied upon
  - The more data, the greater the credibility of the results

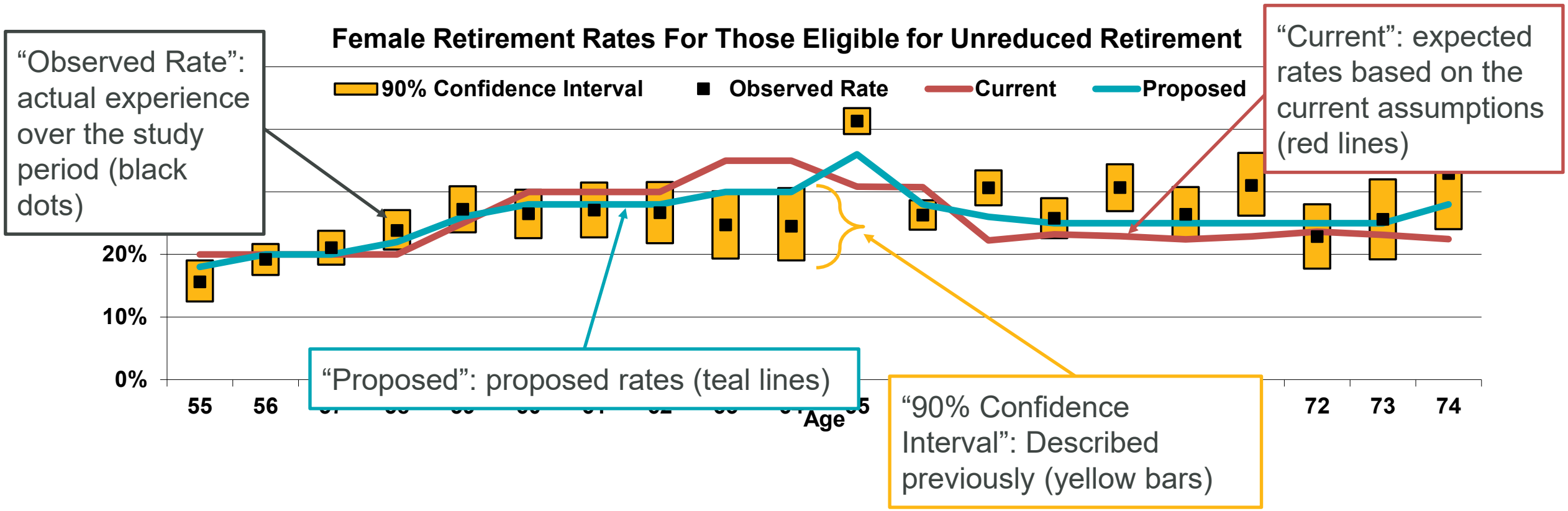
Confidence Intervals



- The amount of data is critical in determining how much credibility to assign to the experience:
  - Observed Rate = 10%
  - 1 retirement with 10 exposures, “true” rate between 0% - 30%
  - 10 retirements with 100 exposures, “true” rate between 5% -15%
  - 100 retirements with 1000 exposures, “true” rate between 8% -12%

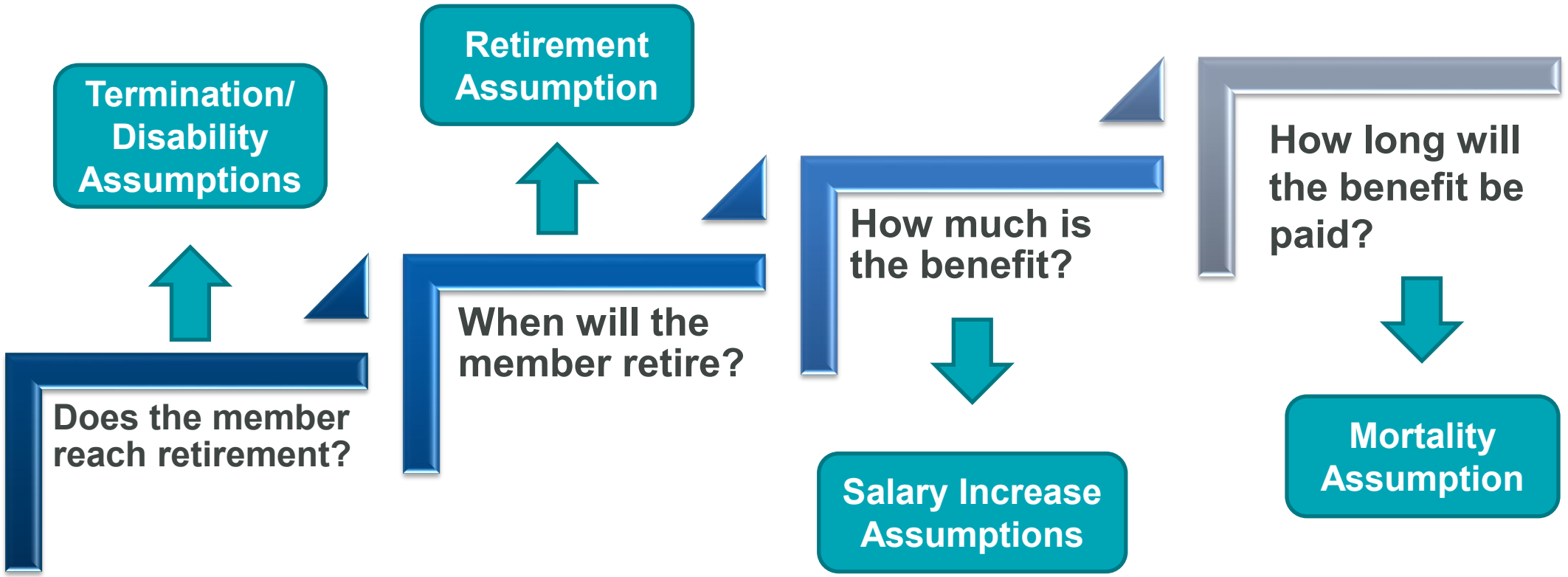
Review Process – Demographic Assumptions

- Graphs summarizing the plan experience review will be provided



Demographic Assumptions Review

Actuarial Assumptions – Key Demographic

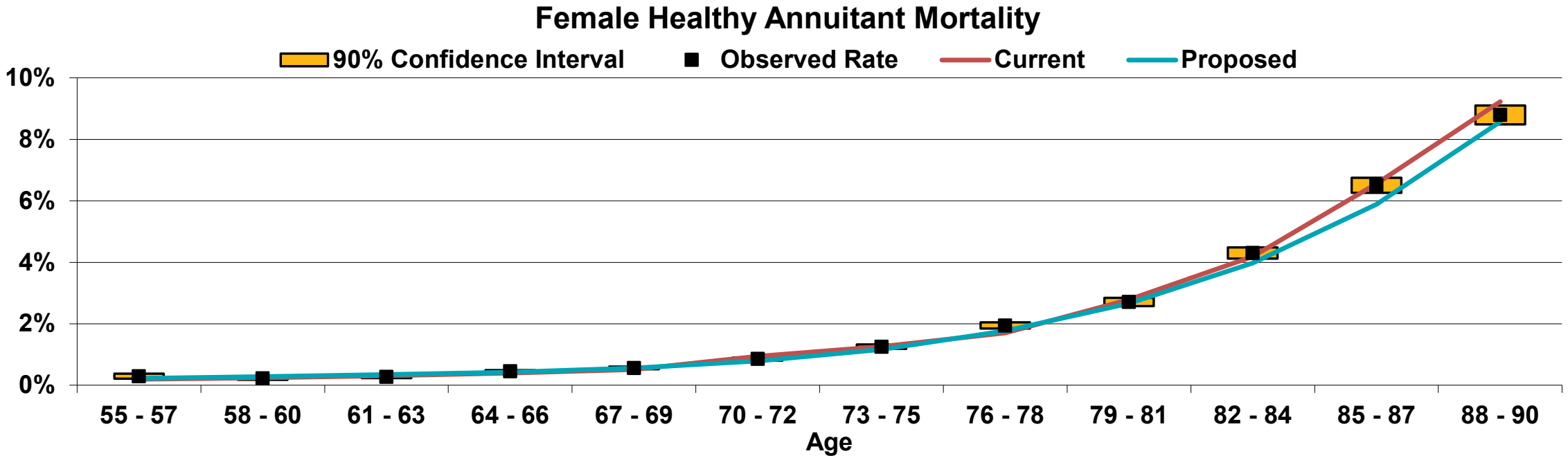


Mortality – Overview

- The mortality assumptions are sex-distinct for various groups:
  - Rates for healthy annuitants
  - Rates for disabled annuitants
  - Rates for non-annuitants (i.e. active or vested terminated participants)
- Current assumption is based on RP2014 tables with mortality improvements projected generationally using Scale MP-2016
  - Healthy annuitant tables are adjusted 50%-90% for ages up to 85
  - Disability annuitant table has a 90% adjustment for males
- Recommended assumption
  - Adopt Pub-2010 Teacher Tables with appropriate adjustments
  - Adopt MP-2020 mortality improvement scale
  - Impact will be to reduce liability by just under 1%

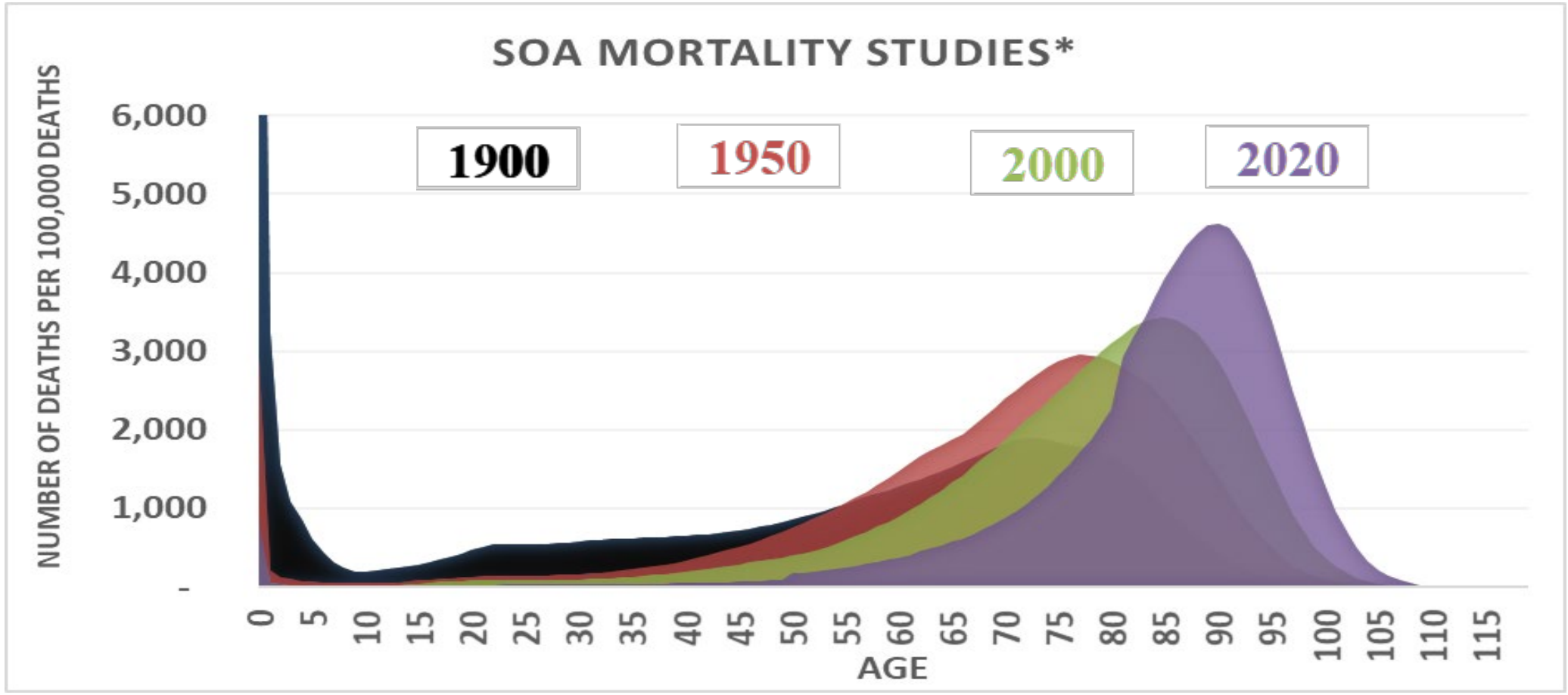
Mortality Base – Healthy Annuitants Females

- Proposed Table Shown is the PUB-2010 Teachers Healthy Annuitant Female Table



Assumption	A/E Ratio	R-Squared
Current	99%	98%
Proposed	102%	98%

Mortality Improvement 1900 – 2020



1900, 1950, 2000 from Social Security tables on the general US population, 2020 is estimated from latest Society of Actuaries tables on the pension participant population

Mortality Improvement Scale

- Mortality improvement scales build into our valuation the expectation that mortality will continue to improve in the future
  - First introduced by the SOA in 2014 and updated each year to adjust for observed improvement
  - Generally, improvements have been scaled back each year
- Updating improvement scale to MP2020 from MP2016 lowered liabilities by 1.3%
  - We still are projecting improvement, just not as fast as MP2016

Mortality – Changes in Life Expectancy

- Current assumption:

Life Expectancies (Current Assumptions)

Age	Healthy Retirees Male	Healthy Retirees Female	Non-Retirees Male	Non-Retirees Female	Disabled Retirees Male	Disabled Retirees Female
25	N/A	N/A	88.8	92.4	N/A	N/A
40	N/A	N/A	87.8	91.4	N/A	N/A
55	88.2	90.3	87.1	90.8	78.7	81.4
60	88.2	90.2	87.2	90.7	80.5	82.7
65	88.4	90.3	N/A	N/A	82.4	84.2
75	89.5	91.0	N/A	N/A	86.6	87.5

- Proposed assumption:

Life Expectancies (Proposed Assumptions)

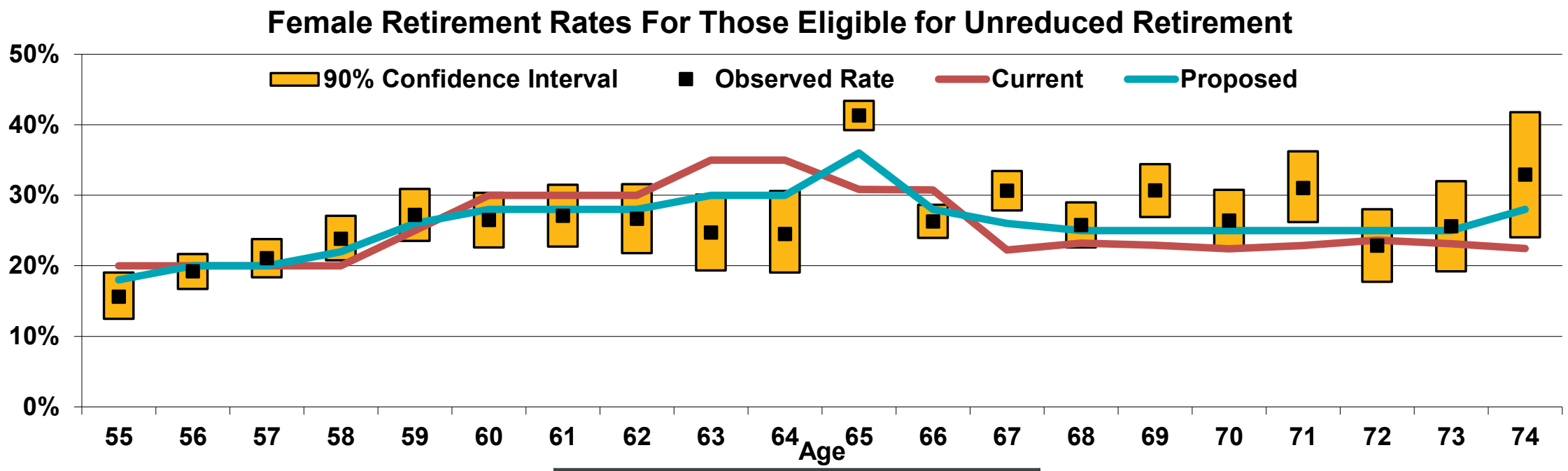
Age	Healthy Retirees Male	Healthy Retirees Female	Non-Retirees Male	Non-Retirees Female	Disabled Retirees Male	Disabled Retirees Female
25	N/A	N/A	90.1	92.5	N/A	N/A
40	N/A	N/A	89.4	91.9	N/A	N/A
55	86.8	89.7	89.0	91.4	77.5	80.3
60	86.9	89.8	89.0	91.3	79.4	82.0
65	87.1	90.0	N/A	N/A	81.5	83.8
75	88.5	90.9	N/A	N/A	86.0	87.2

Retirement Rates - Overview

- The valuation assumption for retirement rates vary by
  - Combined Plan vs Defined Benefit Plan
  - DB Participants – Grandfathered Status
  - Gender
  - Service
- Overall, retirement rates were slightly less compared to both the prior assumption and the prior study
- Recommendation is to slightly modify table to fit experience
  - Impact will be to slightly reduce liability

Retirement Rates – DB Plan – Eligible for Unreduced

- The observed rates for females ages 60-64 have been generally lower than expectations but generally higher later



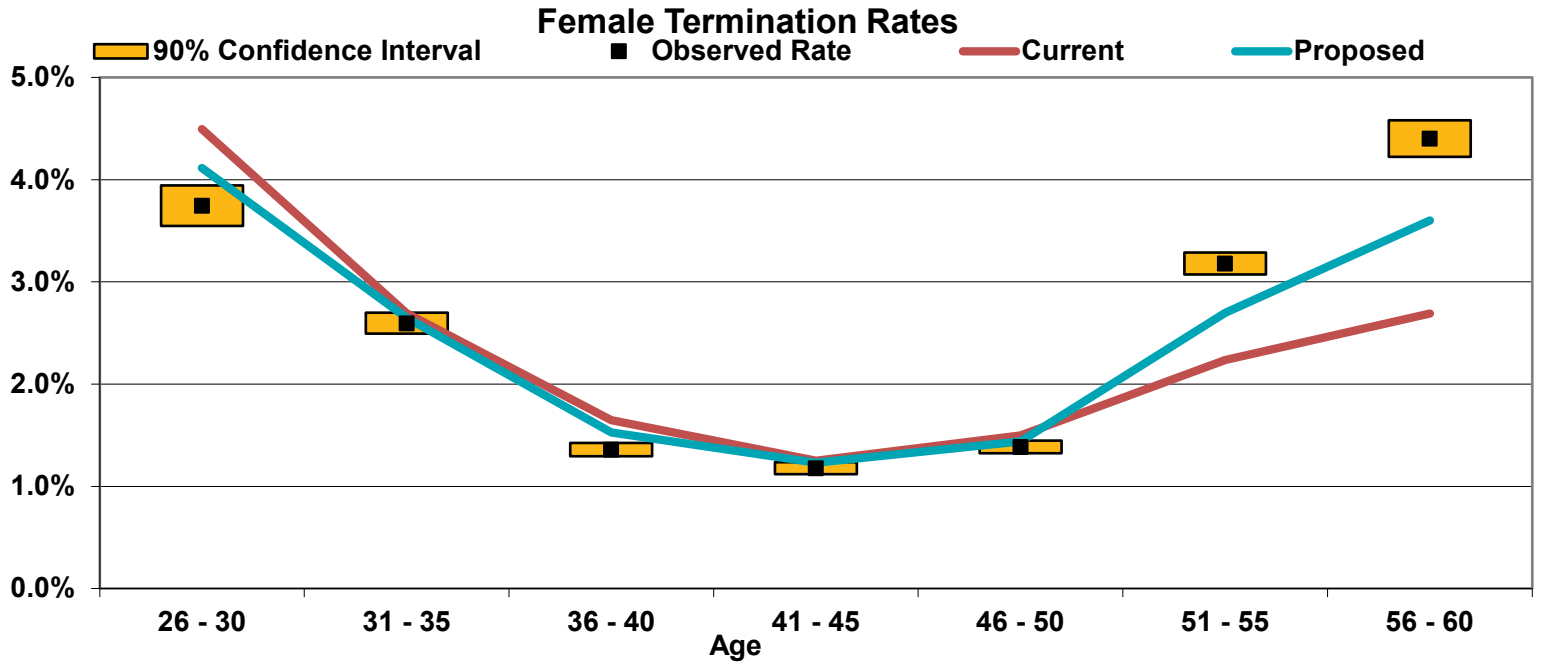
Assumption	A/E Ratio	R-Squared
Current	110%	95%
Proposed	105%	99%

Turnover – Overview

- The current assumption for turnover is split by:
  - Service based rates for first 5 years
  - Age based rates for after 5 years
- We reviewed the experience and determined that the age/service blend with a 5-year select period is supported by the data
- Recommendation is to slightly modify table to better fit experience
  - Impact will be immaterial

Turnover – Ultimate Period – 5+ Years of Service

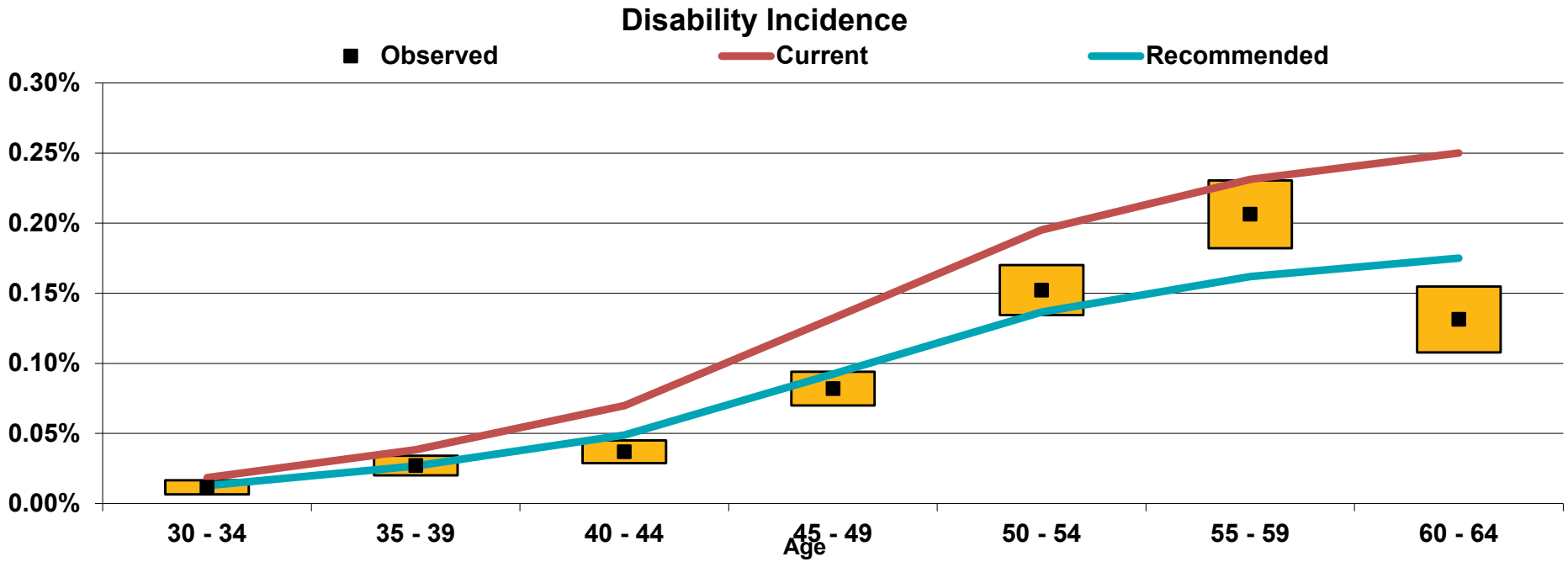
- For females – experience has generally been lower than the prior assumption for younger ages and higher for older ages



Assumption	A/E Ratio	R-Squared
Current	106%	34%
Proposed	103%	79%

Disability – Experience vs Assumption

- Proposed Table is the current table multiplied by 70%
  - Impact will be to slightly reduce liability



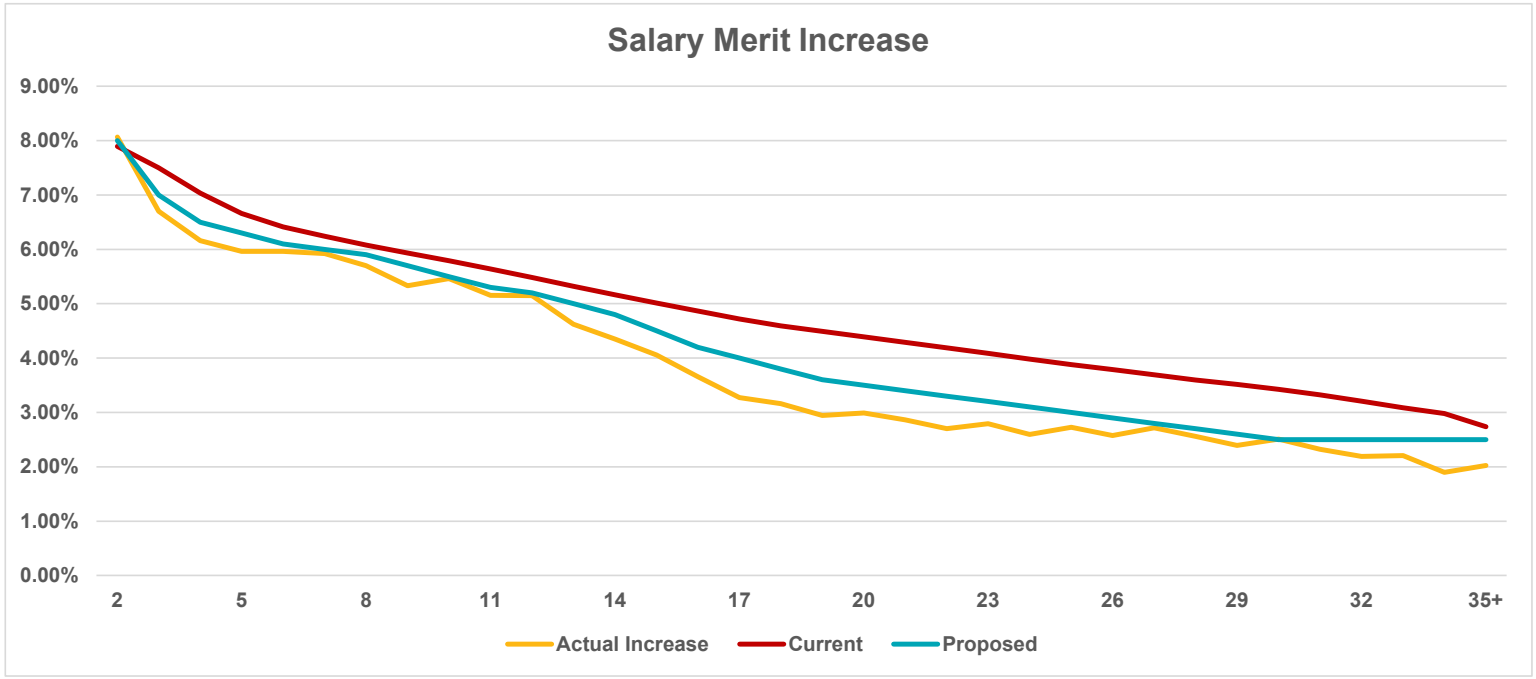
Assumption	A/E Ratio	R-Squared
Current	70%	88%
Proposed	100%	88%

Salary Scale

- Current assumption based on age
  - Highly correlated with service
- We are recommending a service-based table and slightly lower expected increases
  - Impact will be to reduce liability

Salary Scale Assumptions

- Current assumption varies by age



- Experience supports the use of a service-based tables, with lower assumed increases across the board

Payment Form Assumption

- Current assumption
  - 50% of active vested and current terminated vested participants cash out and 50% elect a deferred annuity
- Recommendation is to move to rates matching experience study results
  - 20% of active vested participants cash out and 80% elect a deferred annuity
  - 5% of current terminated vested participants cash out and 95% elect a deferred annuity
  - Impact will be to reduce liability

Experience Study – Liability Impact

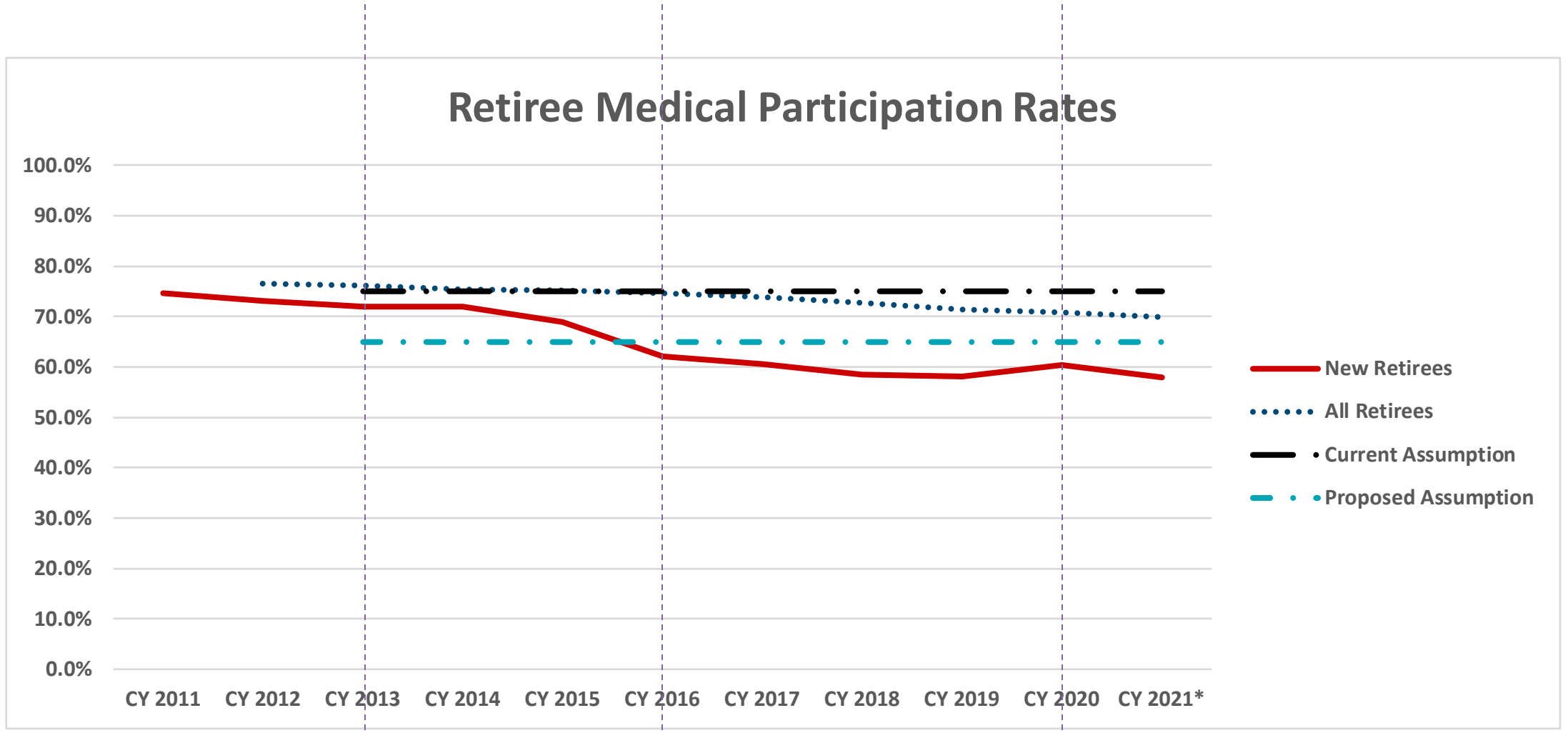
Impact of Assumption Changes	Actuarial Liability			Normal Cost		
	Liability	$ Impact	% Impact	Normal Cost	$ Impact	% Impact
Baseline	**104,591,406**			**1,344,767**		
Assumption Change						
Mortality	$ 103,649,588	$ (941,819)	-0.90%	$ 1,336,340	$ (8,427)	-0.63%
Retirement	103,503,035	(146,553)	-0.14%	1,333,382	(2,958)	-0.22%
Termination	103,522,920	19,885	0.02%	1,320,892	(12,489)	-0.93%
Disability	103,482,256	(40,663)	-0.04%	1,315,593	(5,299)	-0.39%
Salary	102,594,036	(888,220)	-0.85%	1,223,314	(92,279)	-6.86%
% Electing Deferred	102,007,096	(586,940)	-0.56%	1,182,179	(41,135)	-3.06%
Total Demographic Change	**102,007,096**	**$ (2,584,310)**	**-2.47%**	**1,182,179**	**$ (162,588)**	**-12.09%**

Impacts are estimated compared to June 30, 2021 valuation results. Actual impacts on the June 30, 2022 valuation will differ.

OPEB Participation Assumptions

OPEB Participation Assumptions		
	Current	Proposed
Healthy Retiree Participation	75%	65%
Disabled Retiree Participation	65%	65%
Spouse Election	20%	20%

OPEB Retiree Participation Experience



* 2021 Participation rates do not reflect a full year of data

Experience Study – OPEB Liability Impact

OPEB - Impact of Assumption Changes ($In Thousands)						
	Actuarial Liability			Normal Cost		
	Liability	$ Impact	% Impact	Normal Cost	$ Impact	% Impact
Baseline	**2,821,322**			**38,323**		
Assumption Change						
Mortality	$ 2,786,395	$ (34,926)	-1.24%	$ 38,232	$ (91)	-0.24%
Retirement	2,663,889	(122,506)	-4.34%	34,884	(3,348)	-8.74%
Termination	2,650,812	(13,078)	-0.46%	34,698	(186)	-0.49%
Disability	2,649,309	(1,502)	-0.05%	34,610	(88)	-0.23%
Salary	2,681,160	31,851	1.13%	33,105	(1,505)	-3.93%
OPEB Participation %	2,547,850	(133,311)	-4.73%	28,917	(4,189)	-10.93%
Total Demographic Change	**$ 2,547,850**	**$ (273,472)**	**-9.69%**	**28,917**	**$ (9,407)**	**-24.55%**

Impacts are estimated compared to June 30, 2021 valuation results. Actual impacts on the June 30, 2022 valuation will differ.

Summary of Recommendations

Assumption	Recommended Assumption
• Pension	
– Mortality	PubT-2010 Tables with MP2020 projection
– Retirement	Updated tables split on eligibility for unreduced
– Turnover	Slightly modified tables
– Disability	Lowered expected disability rates
– Salary Scale	Slightly lower overall rates based on service
– Deferral election	80% initially and 95% ongoing will defer benefit
• OPEB	
– Participation election	Lowered to 65% for healthy annuitants

Appendix

Mortality – Overview

- When setting the mortality assumption, the first step is to determine the base table to fit the actual mortality rates from the past experience
  - Mortality improvements projected to 2018, the mid-point of the experience study
- The second step is to apply mortality improvements to this base table
  - Consider if participants may live longer in the future (based on the Actuarial Standards of Practice)
  - Important to apply this assumption so the number of expected pension payments under the plan in the future are not under-estimated

Mortality – Overview

- There have been many studies of mortality rates published in recent years
- PUB-2010 Tables published Jan 2019
  - Study period from 2008 to 2013
  - Data from public retirement systems
  - Includes separate tables for General Employees, Public Safety Employees and Teachers
  - Includes OHSTRS in dataset

Mortality – Data groups

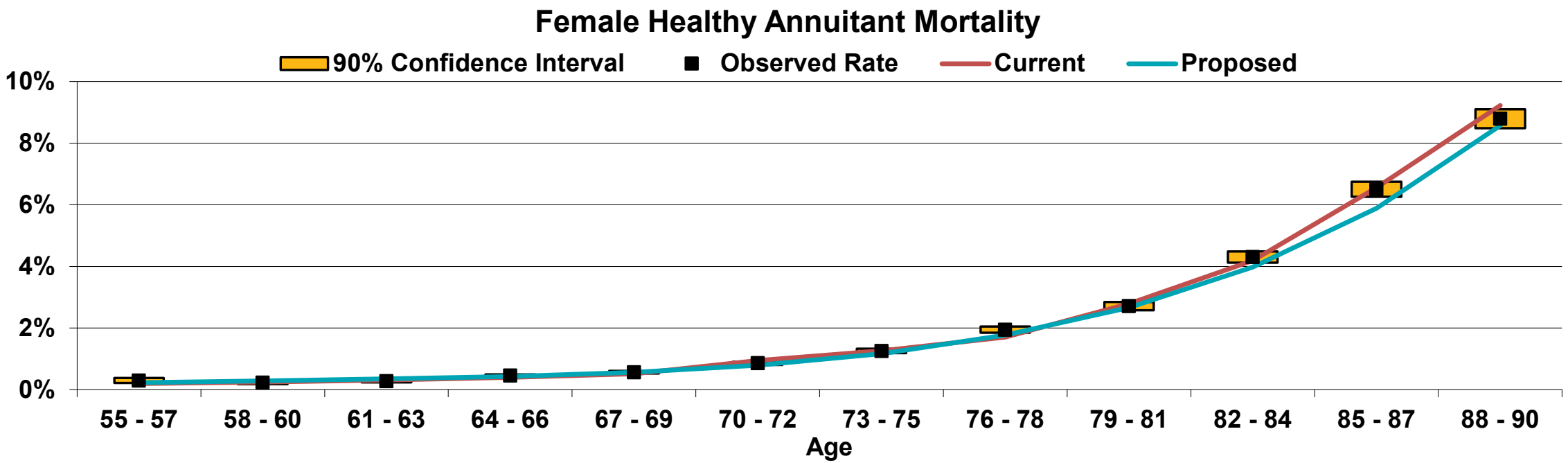
- Healthy Retirees are 100% credible – all other groups have significant credibility

Group	Gender	Exposures	Deaths	Credibility
Healthy Annuitant	Male	300,307	10,077	100%
	Female	618,810	15,329	100%
Non-Annuitant	Male	309,714	368	51%
	Female	810,887	557	67%
Disabled Annuitant	Male	9,926	463	64%
	Female	22,122	824	85%

- 1,082+ deaths is considered fully credible data for adjusting a standard mortality table

Mortality Base – Healthy Annuitants Females

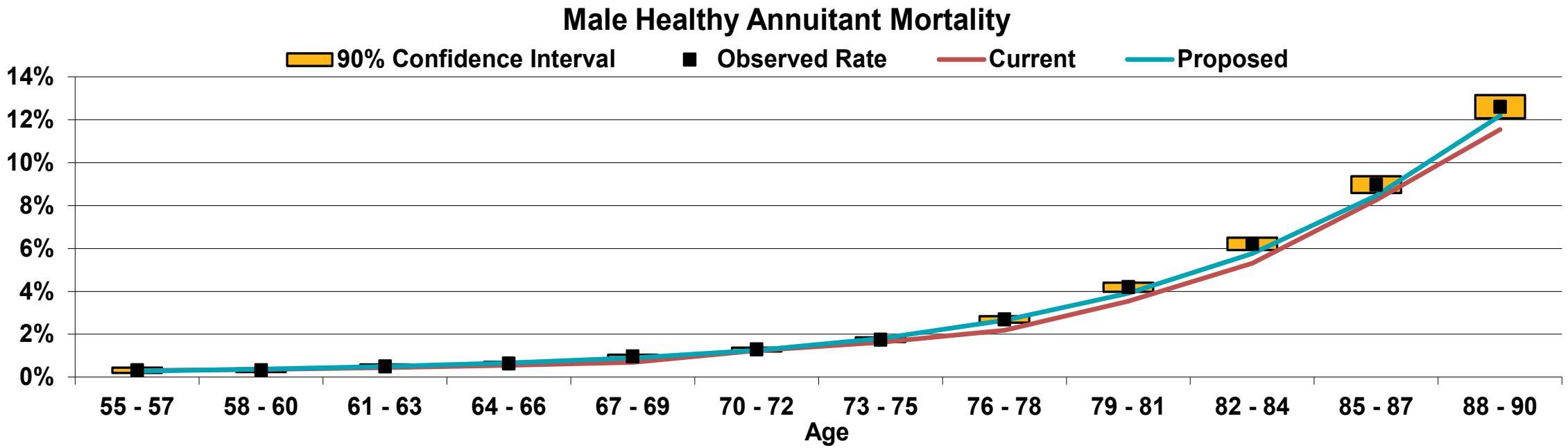
- Proposed Table Shown is the PUB-2010 Teachers Healthy Annuitant Female Table



Assumption	A/E Ratio	R-Squared
Current	99%	98%
Proposed	102%	98%

Mortality Base – Healthy Annuitants Males

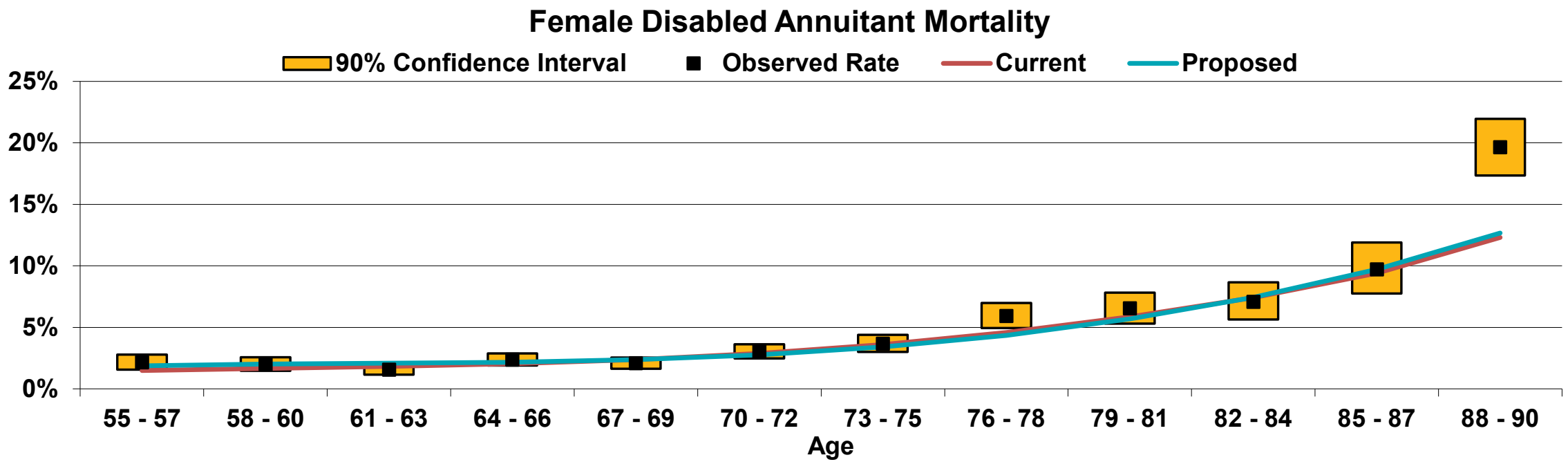
- Proposed Table Shown is 110% of the PUB-2010 Teachers Healthy Annuitant Male Table



Assumption	A/E Ratio	R-Squared
Current	114%	97%
Proposed	104%	98%

Mortality Base – Disabled Annuitants Females

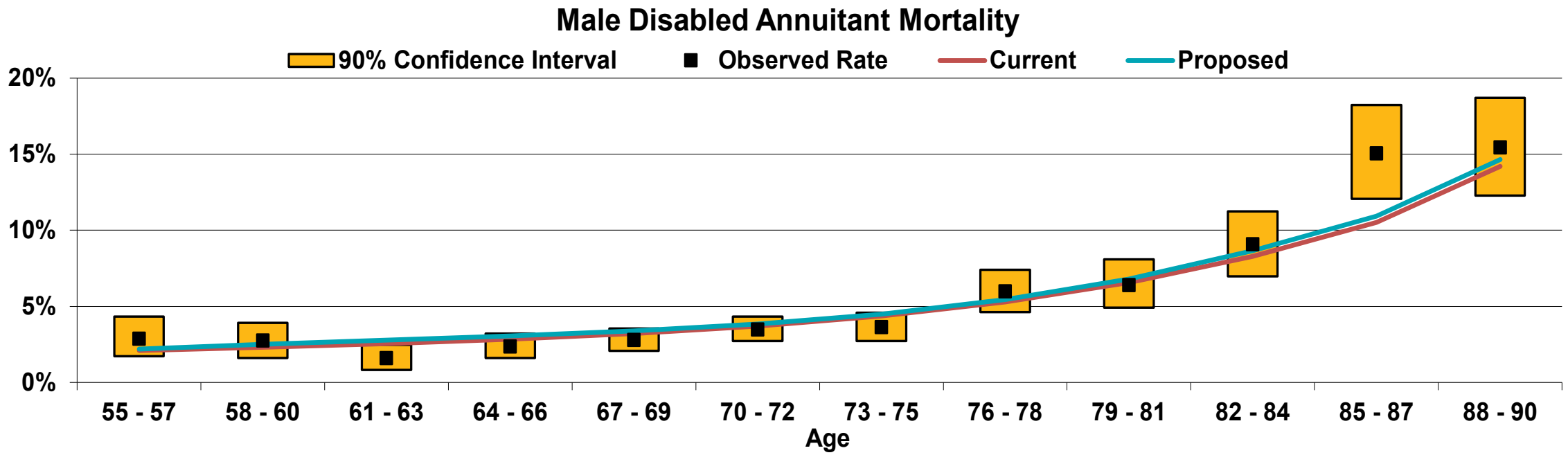
- Proposed Table Shown is the PUB-2010 Teachers Disabled Annuitant Female Table



Assumption	A/E Ratio	R-Squared
Current	112%	86%
Proposed	110%	87%

Mortality Base – Disabled Annuitants Males

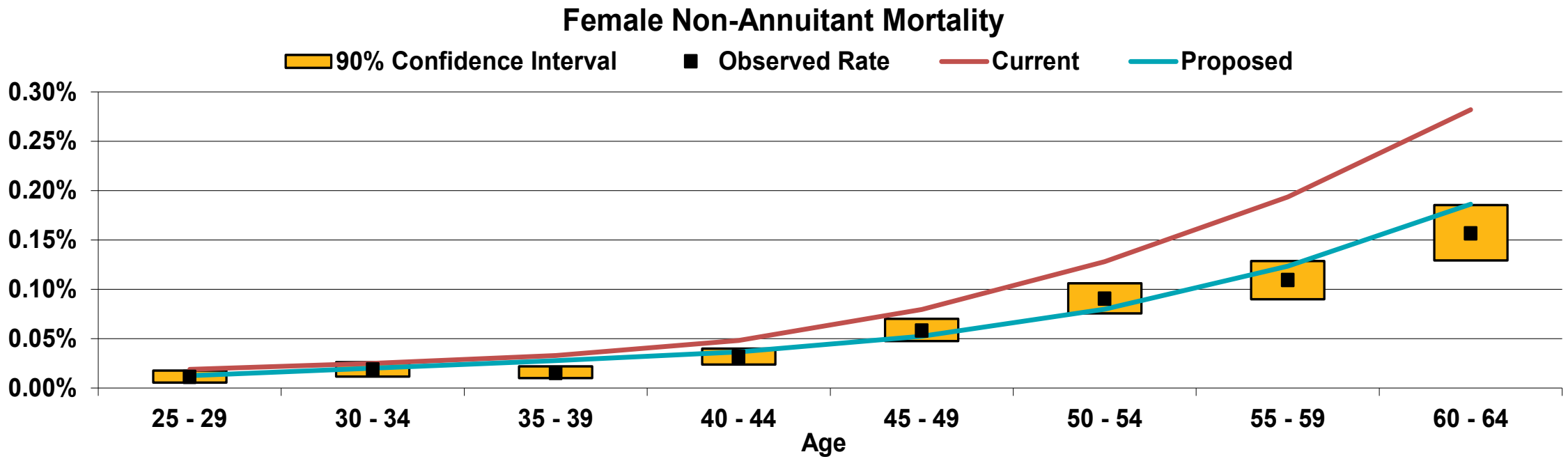
- Proposed Table Shown is the PUB-2010 Teachers Disabled Annuitant Male Table



Assumption	A/E Ratio	R-Squared
Current	101%	84%
Proposed	96%	83%

Mortality Base – Non-Annuitant Females

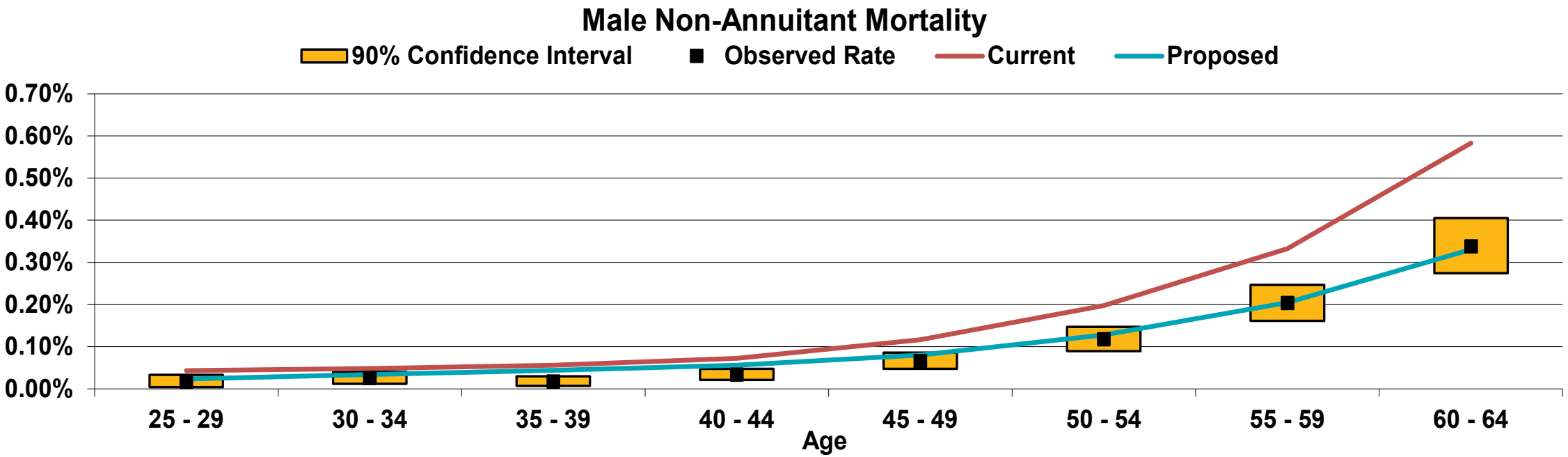
- Proposed Table Shown is 95% of the PUB-2010 Teachers Employee Female Table



Assumption	A/E Ratio	R-Squared
Current	63%	86%
Proposed	95%	85%

Mortality Base – Non-Annuitant Males

- Proposed Table Shown is the PUB-2010 Teachers Employee Male Table



Assumption	A/E Ratio	R-Squared
Current	59%	81%
Proposed	95%	81%

Mortality – Recommendations

- Recommended assumptions
  - Adopt Pub-2010 Teacher Tables – with appropriate adjustments as described
    - Annuitant Males * 1.1
    - Non-annuitant Females *.95
- Apply generational mortality improvements using MP-2020

Retirement Rates – Combined Plan

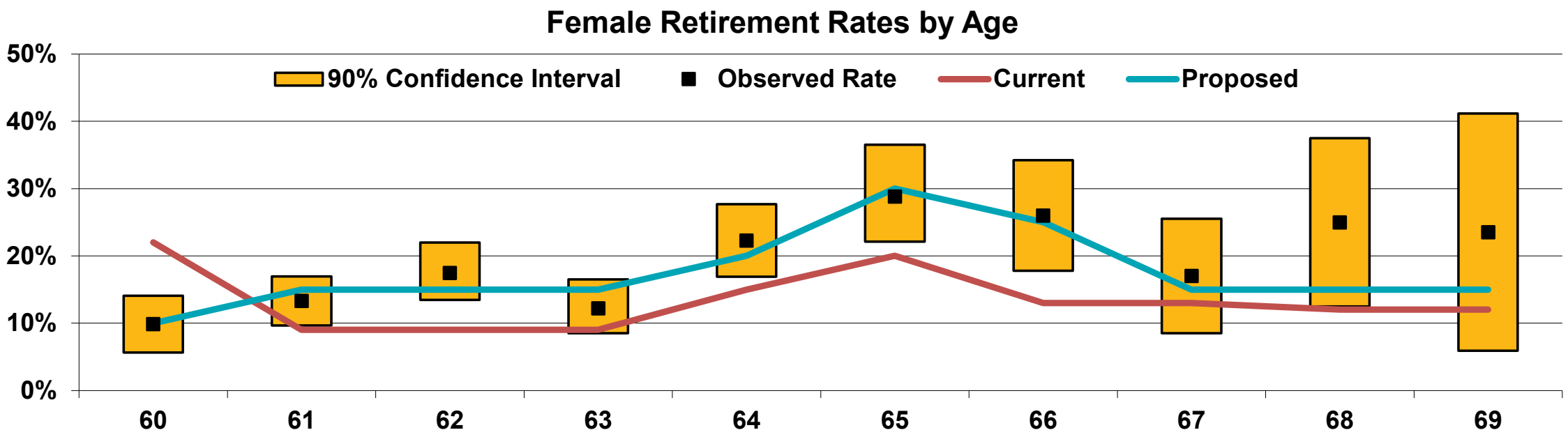
- The current assumption is:

Age	Female	Male
60	22%	13%
61-63	9%	7%
64	15%	9%
65	20%	17%
66	13%	15%
67	13%	12%
68-74	12%	12%
75+	100%	100%

- Experience supports continued use of separate rates for males and females

Retirement Rates – Combined Plan

- The observed rates for females are higher than expectations for all ages after age 60

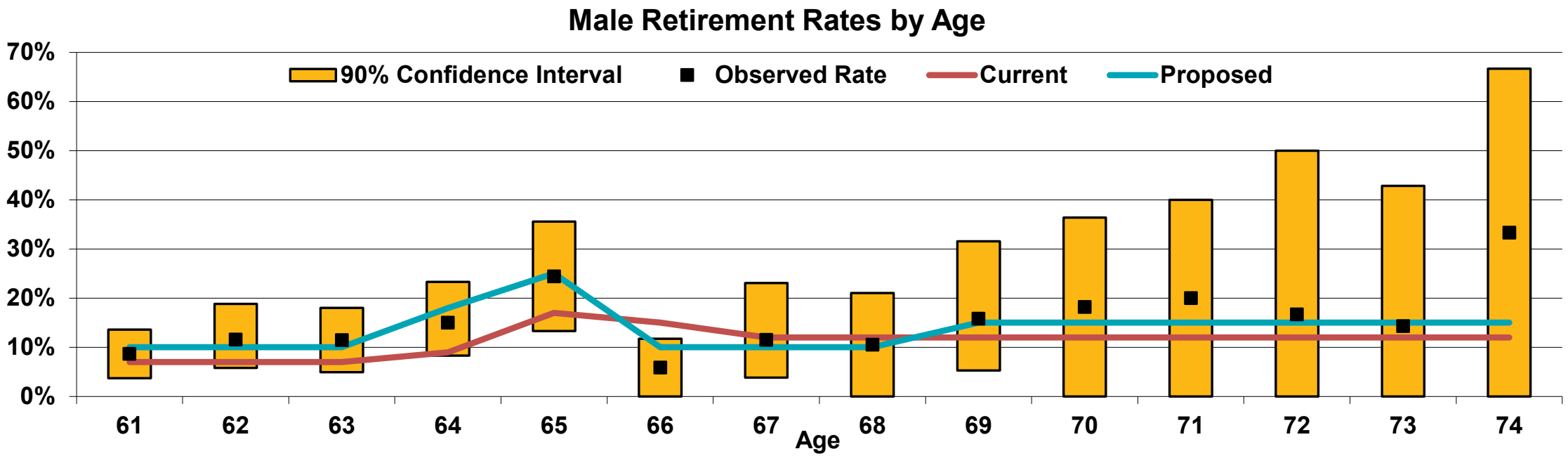


Assumption	A/E Ratio	R-Squared
Current	136%	43%
Proposed	102%	93%

Displayed table range represents 98% of full dataset

Retirement Rates – Combined Plan

- The observed rates for males are generally higher than expectations, with exceptions for ages 66-68



Assumption	A/E Ratio	R-Squared
Current	132%	76%
Proposed	100%	94%

Displayed table range represents 87% of full dataset

Retirement Rates – Combined Plan

- Comparing Proposed to Current:

	Female			Male		
Age	Current		Proposed	Current		Proposed
60	22%	↓	10%	13%	↓	10%
61-63	9%	↑	15%	7%	↑	10%
64	15%	↑	20%	9%	↑	18%
65	20%	↑	30%	17%	↑	25%
66	13%	↑	25%	15%	↓	10%
67	13%	↑	15%	12%	↓	10%
68	12%	↑	15%	12%	↓	10%
69-74	12%	↑	15%	12%	↑	15%
75	100%	=	100%	100%	=	100%
Avg Ret	65.6		64.8	66.9		66.1

- Overall – average retirement ages are proposed to decrease by 0.8 years for both males and females

Retirement Rates – DB Plan

- The current assumption has separate rates for those who are “grandfathered” (retirement eligible by July 1, 2015)
- Grandfathered participants were viewed as having different behaviors because:
  - Unreduced retirement was available at age 65 w/5 Years of Service (YOS), age 55 w/25 YOS or any age w/30 YOS
  - Higher benefit levels may have applied and were protected (but frozen). Higher benefits could create incentive to retire earlier
- Grandfathered group has dwindled and impact of protections have worn away. As such, we do not believe this separation makes sense going forward.

Retirement Rates – DB Plan

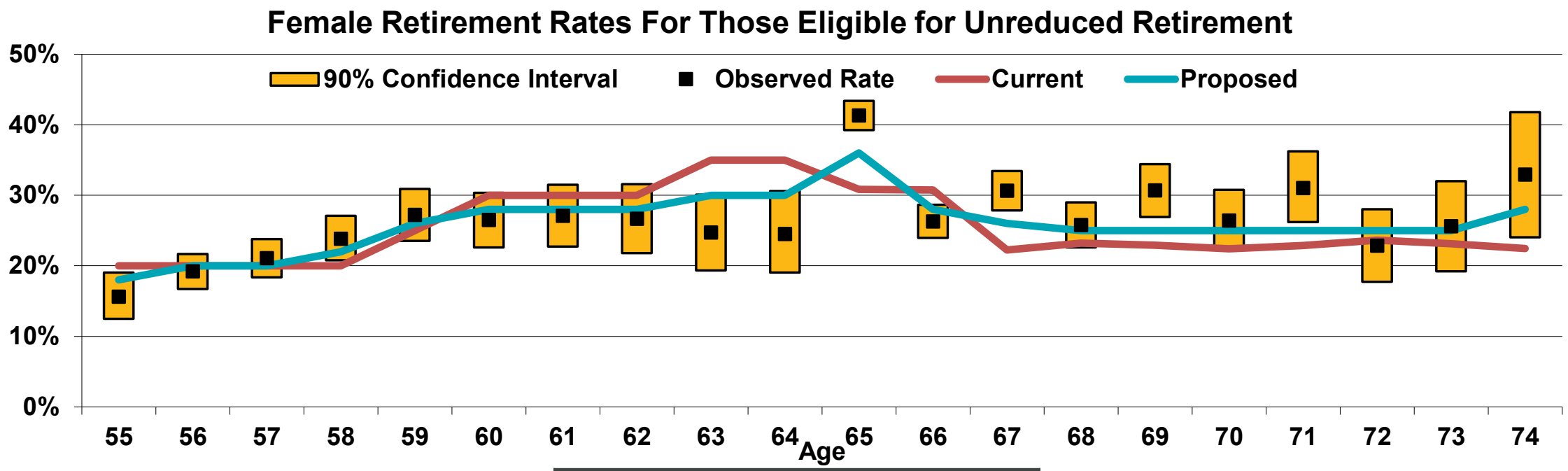
- Retirement Rates for Non-Grandfathered Participants are separated by Gender and Years of Service

Age	Female				Male			
	Under 25 Years of Service	25-29 Years of Service	30-34 Years of Service	35+ Years of Service	Under 25 Years of Service	25-29 Years of Service	30-34 Years of Service	35+ Years of Service
<=58	0%	5%	20%	20%	0%	3%	20%	20%
59	0%	5%	25%	25%	0%	5%	20%	20%
60	10%	10%	30%	30%	5%	5%	20%	25%
61	10%	10%	30%	30%	6%	6%	20%	25%
62	10%	10%	30%	30%	7%	7%	20%	25%
63	10%	10%	35%	35%	8%	8%	25%	25%
64	15%	15%	35%	35%	10%	10%	25%	25%
65-66	30%	30%	35%	35%	20%	20%	25%	25%
67	20%	20%	35%	35%	20%	20%	25%	25%
68-69	20%	20%	35%	35%	20%	20%	25%	20%
70-74	20%	20%	35%	30%	20%	20%	25%	20%
75+	100%	100%	100%	100%	100%	100%	100%	100%

- The prior tables were created prior to the new retirement requirements becoming effective. We have reviewed the experience relative to reduced versus unreduced retirement

Retirement Rates – DB Plan – Eligible for Unreduced

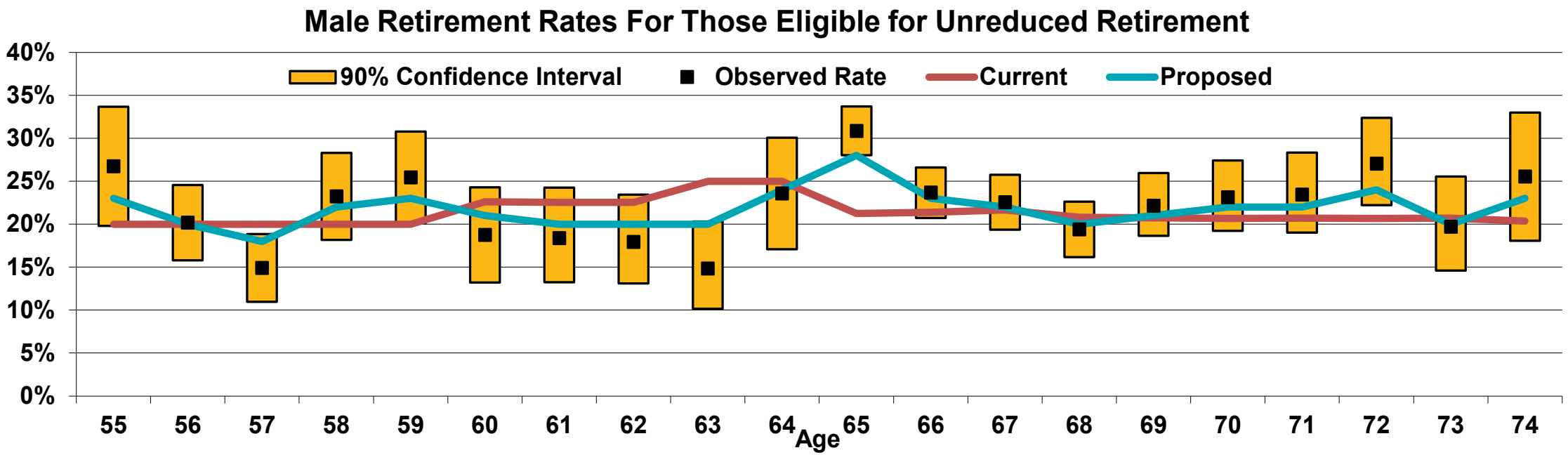
- The observed rates for females ages 60-64 have been generally lower than expectations but generally higher later



Assumption	A/E Ratio	R-Squared
Current	110%	95%
Proposed	105%	99%

Retirement Rates – DB Plan – Eligible for Unreduced

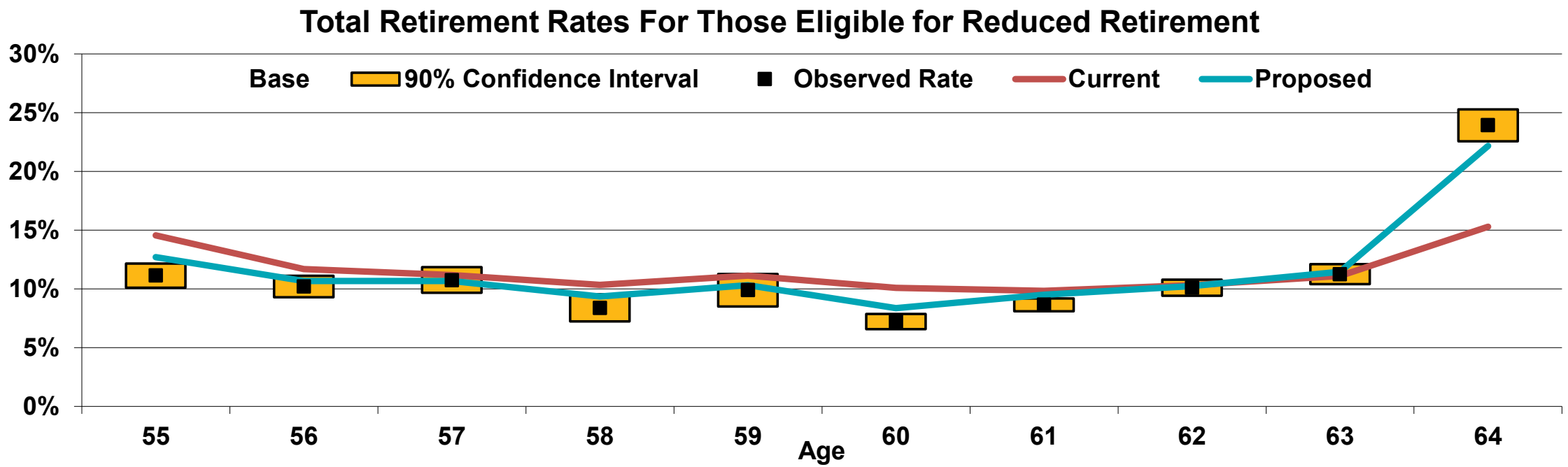
- Similar to females, the observed rates for males before age 65 have been lower but have risen after age 65



Assumption	A/E Ratio	R-Squared
Current	109%	94%
Proposed	103%	99%

Retirement Rates – DB Plan

- Rates prior to being eligible for an unreduced benefit are relatively low – small proposed changes



Assumption	A/E Ratio	R-Squared
Current	95%	84%
Proposed	96%	98%

Retirement Rates – DB Plan

- Two Proposed tables:

Age	Unreduced	
	Female	Male
55	18%	23%
56-58	20%	20%
59	26%	23%
60-62	28%	21%
63	30%	20%
64	30%	24%
65	36%	28%
66	28%	23%
67	26%	22%
68	25%	20%
69-71	25%	21%
72	25%	24%
73	25%	20%
74	28%	23%
75	100%	100%

Age	Reduced	
	Female	Male
55	13%	12%
56	11%	10%
57	11%	10%
58	10%	8%
59	10%	11%
60	9%	7%
61	10%	8%
62	11%	8%
63	12%	10%
64	25%	15%

- Overall – resulting weighted average retirement age is approximately the same for both males and females

Turnover

- The current assumption is:

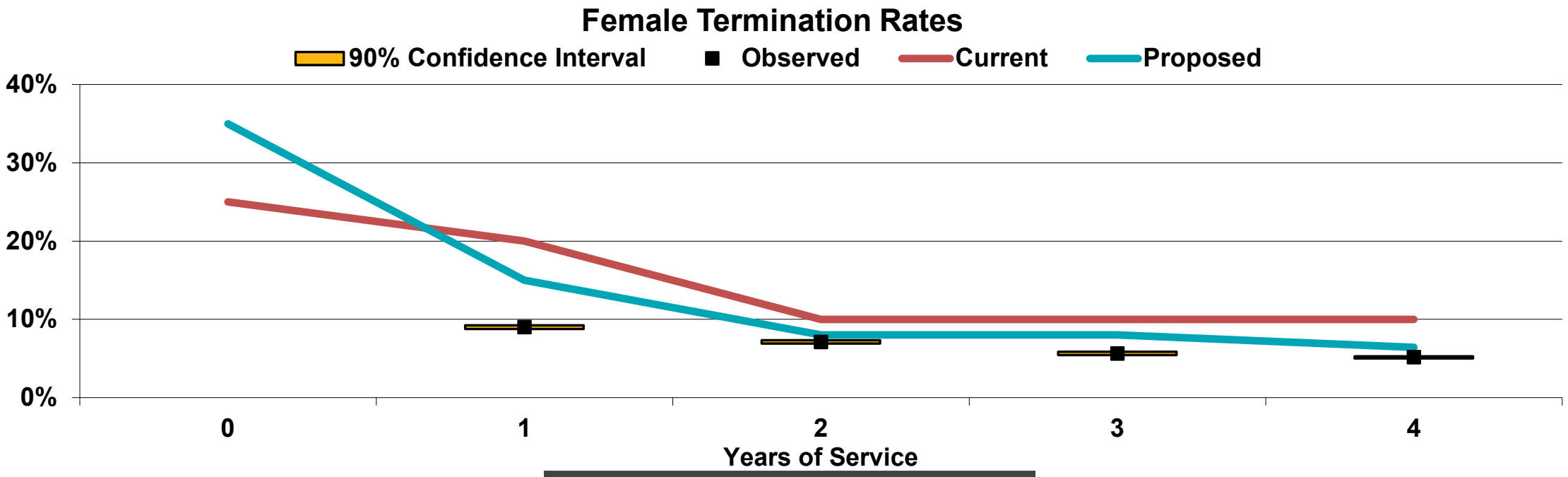
Non-Vested Terminations		
Service	Female	Male
Under 1 Year	25.00%	30.00%
1 to 2 Years	20.00%	20.00%
2 to 3 Years	10.00%	15.00%
3 to 5 Years	10.00%	10.00%

Vested Terminations		
Age	Female	Male
20	13.25%	11.25%
25	12.50%	11.25%
30	3.75%	2.75%
35	2.00%	2.00%
40	1.50%	1.75%
45	1.25%	1.75%
50	1.75%	2.00%
55	3.00%	3.25%
60	0.00%	0.00%

- Experience supports continued use of separate rates for vested and non-vested terminations

Turnover – Select Period – First 5 years

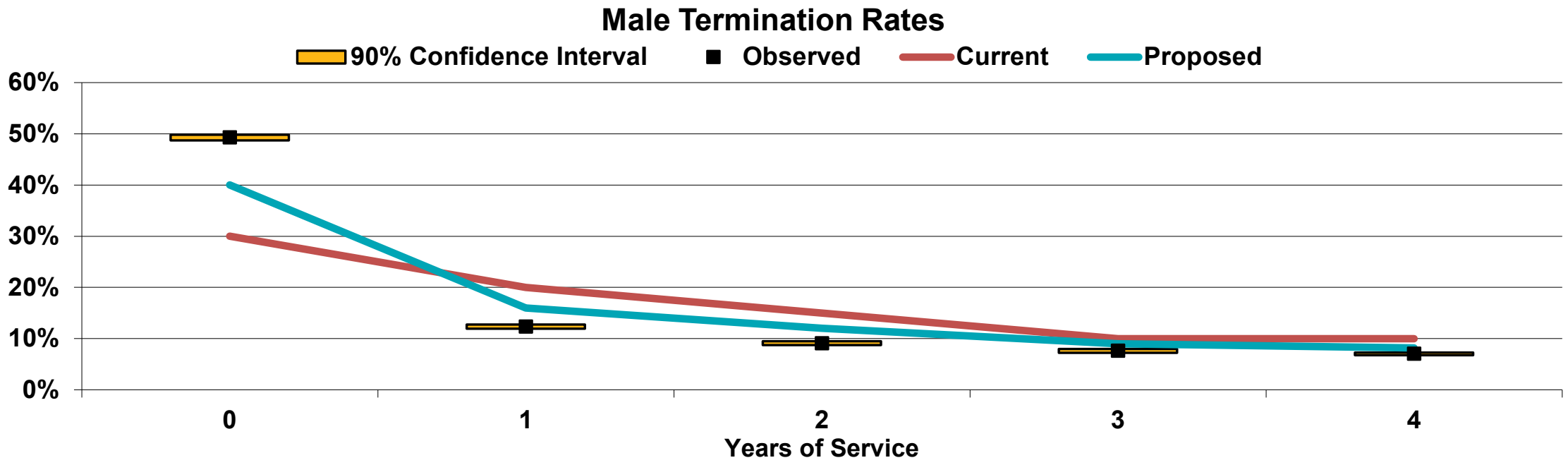
- For females – experience has generally been lower than the prior assumption - Raise 1st year rate, lower other years



Assumption	A/E Ratio	R-Squared
Current	90%	62%
Proposed	96%	94%

Turnover – Select Period – First 5 years

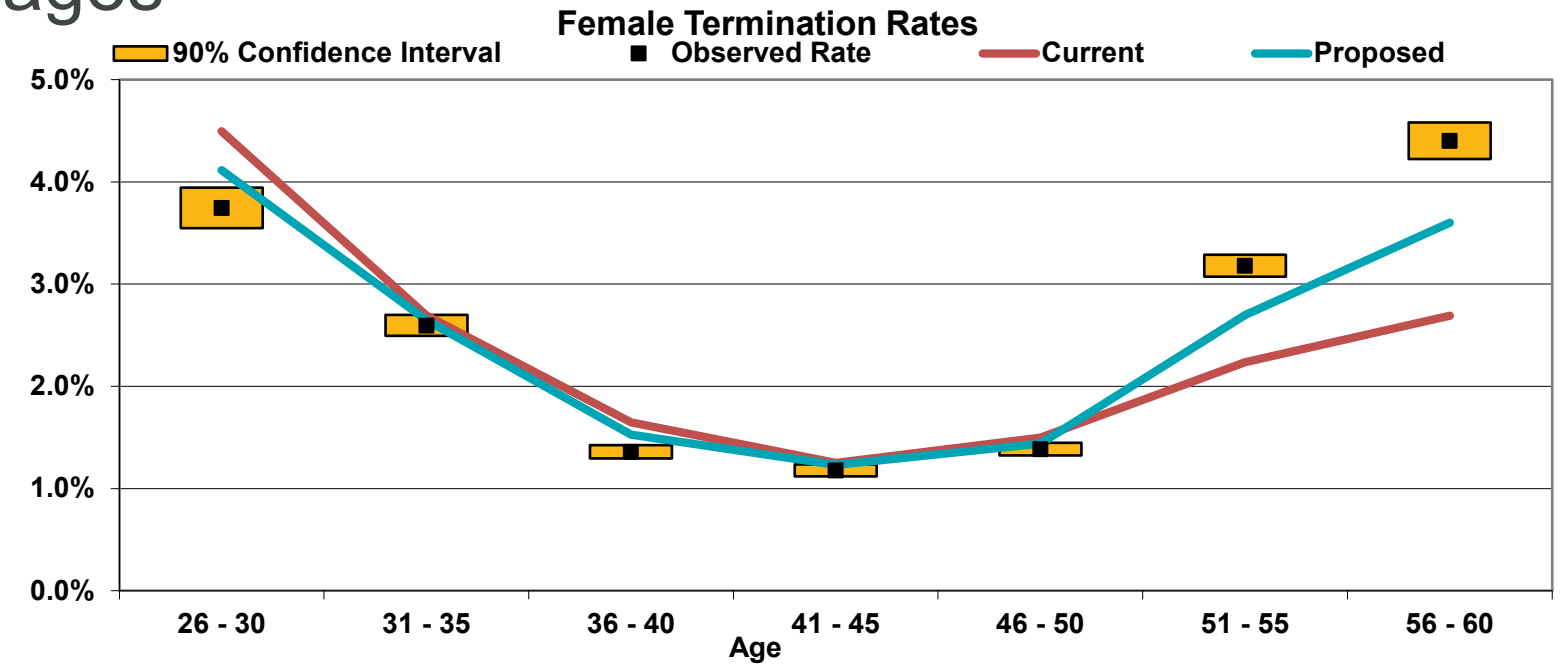
- For males – pattern of experience when compared to prior assumption is similar to females



Assumption	A/E Ratio	R-Squared
Current	106%	88%
Proposed	103%	99%

Turnover – Ultimate Period – 5+ Years of Service

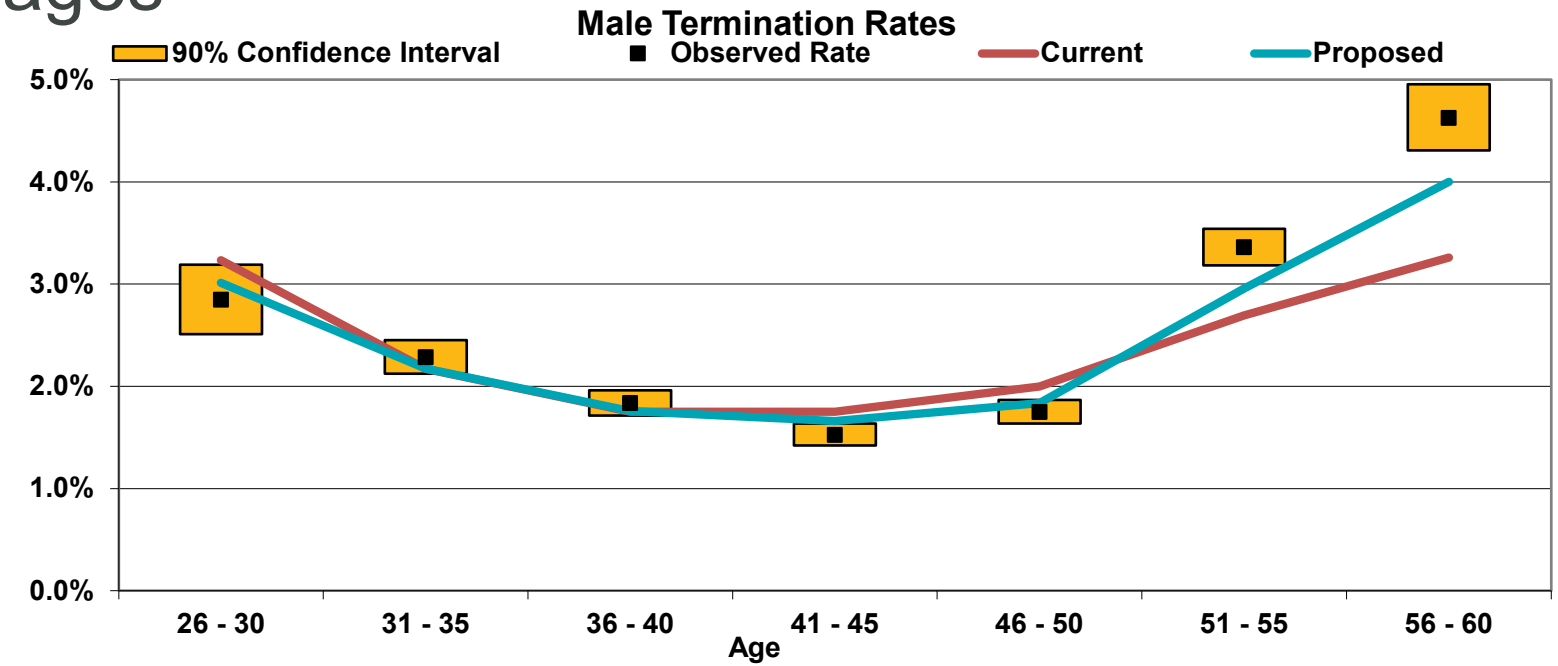
- For females – experience has generally been lower than assumption for younger ages - Lower rates through age 51, raise for older ages



Assumption	A/E Ratio	R-Squared
Current	106%	34%
Proposed	103%	79%

Turnover – Ultimate Period – 5+ Years of Service

- For males – experience has generally been lower than the prior assumption for younger ages. Lower rates through age 51, raise for older ages



Assumption	A/E Ratio	R-Squared
Current	105%	64%
Proposed	104%	86%

Turnover

- The proposed assumption is:

Non-Vested Terminations		
Service	Female	Male
Under 1 Year	35.00%	40.00%
1 to 2 Years	15.00%	16.00%
2 to 3 Years	8.00%	12.00%
3 to 4 Years	8.00%	9.00%
4 to 5 Years	7.00%	8.00%

Vested Terminations		
Age	Female	Male
20	6.00%	6.00%
25	6.00%	6.00%
30	3.55%	2.70%
35	2.00%	2.05%
40	1.40%	1.75%
45	1.25%	1.60%
50	1.60%	1.95%
55	3.60%	4.00%
60	3.60%	4.00%
65	100.00%	100.00%

- Overall – there is higher turnover in earlier years of service prior to vesting

Disability Incidence – Overview

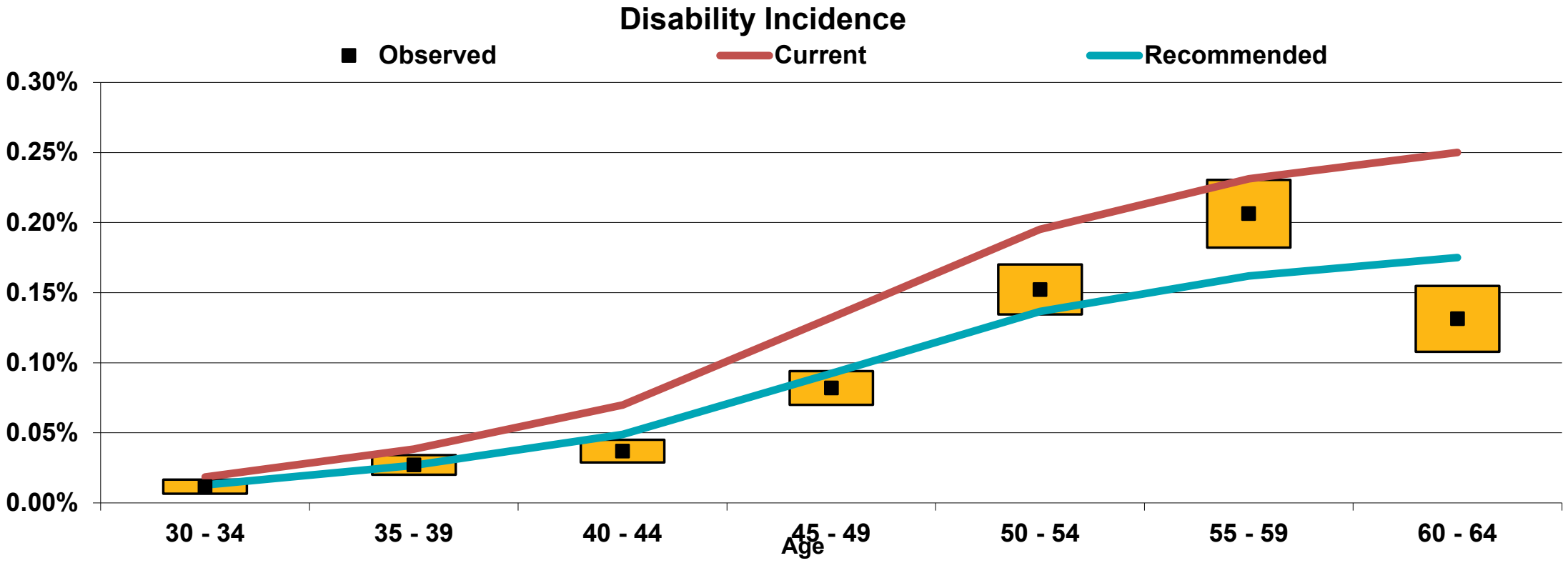
- The current assumption is:

Disability Rates	
Age	Unisex
Under 30	0.01%
30	0.01%
35	0.03%
40	0.05%
45	0.10%
50	0.18%
55	0.22%
60	0.25%
65 and Over	0.25%

- Experience supports continued use of unisex rates for disability incidence

Disability – Experience vs Assumption

- Proposed Table Shown is the Current Disability Assumption with a 70% load



Assumption	A/E Ratio	R-Squared
Current	70%	88%
Proposed	100%	88%

Disability Incidence – Overview

- The proposed assumption is:

Disability Rates	
Age	Unisex
Under 30	0.01%
30	0.01%
35	0.02%
40	0.04%
45	0.07%
50	0.13%
55	0.15%
60	0.18%
65 and Over	0.18%

- Experience supports continued use of base table, with a factor of 70% applied

Salary Scale Assumptions

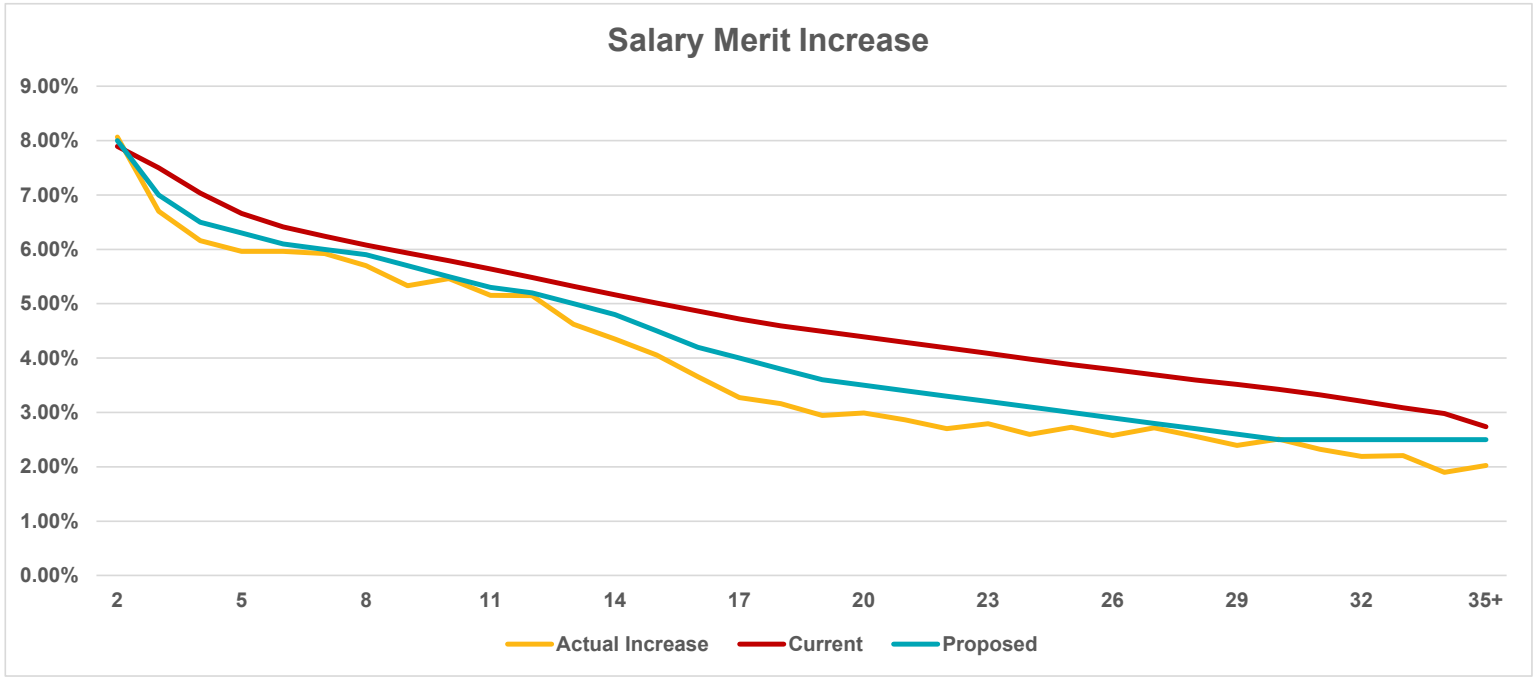
- Current assumption assumes inflation rate of 2.50% plus merit and seniority increases, varying by age:

Age	Rate
20	12.50%
25	11.50%
30	7.75%
35	6.50%
40	5.25%
45	4.75%
50	4.00%
55	3.50%
60	2.75%
65	2.50%

- Experience supports the use of a service-based tables, with lower assumed increases across the board

Salary Scale Assumptions

- Current assumption assumes inflation rate of 2.50% plus merit and seniority increases, varying by age



- Experience supports the use of a service-based tables, with lower assumed increases across the board

Form of Payment Assumptions

- Current assumption assumes that 50% of current and future vested terminated participants cash out and 50% elect a deferred annuity
- Experience suggests 20% of future vested terminations cash out and 80% elect a deferred annuity
- Experience suggests 5% of current vested terminations cash out and 95% elect a deferred annuity

Marriage Assumptions

- Current assumption assumes that 80% of male participants and 60% of female participants are married
- Male members are assumed to be 3 years older than their spouses and female members are assumed to be 1 year younger than their spouses
- Experience continues to support these assumptions, and we propose no changes

OPEB Participation Assumptions

Healthy Retirees — Lower assumption to 65%

- Election percentage has been below 70% since 2015
- New retiree participation rate averages 60% for 2016-2020 period
- New retiree participation rate trails overall retiree participation rate by 12.7 percentage points for the 2016-2020 period
- Changes to methodology for calculation of retiree premium (effective 2022) expected to increase election percentage

Disabled Retirees — Same as for Healthy Retirees: 65%

- Disabled retirees represent less than 4% of all retirees.
- No change from current assumption

Spouse coverage — No change: 20%

- Assumption is for retirees who have enrolled in the medical plan
- Effectively, assumption lowered from 15% to 13% (65% x 20%)

Experience Study – OPEB Liability Impact Detail

Table I-1
Summary of Key Valuation Results
June 30, 2021
7.0% Discount Rate

Scenario	A	B	C	D	E	F	G
Assumption Change	Current	Mortality	Retirement + B	Termination + C	Disability + D	Salary + E	OPEB Part. % + F
Actuarial Liability							
Current retirees, beneficiaries, and dependents	$ 1,680,827,181	$ 1,651,886,218	$ 1,651,886,218	$ 1,651,886,218	$ 1,651,886,218	$ 1,651,886,218	$ 1,651,886,218
Current active members	1,137,504,841	1,131,540,970	1,009,035,035	995,957,430	994,455,270	1,026,306,180	892,995,569
Terminated members entitled but not yet eligible	2,989,499	2,967,937	2,967,937	2,967,937	2,967,937	2,967,937	2,967,937
Total Actuarial Liability	**$ 2,821,321,521**	**$ 2,786,395,125**	**$ 2,663,889,190**	**$ 2,650,811,585**	**$ 2,649,309,425**	**$ 2,681,160,335**	**$ 2,547,849,724**
Health care fund assets	4,929,739,778	4,929,739,778	4,929,739,778	4,929,739,778	4,929,739,778	4,929,739,778	4,929,739,778
Unfunded actuarial liability (UAL)	**$ (2,108,418,257)**	**$ (2,143,344,653)**	**$ (2,265,850,588)**	**$ (2,278,928,193)**	**$ (2,280,430,353)**	**$ (2,248,579,443)**	**$ (2,381,890,054)**
Change Due to Assumption		$ (34,926,396)	$ (122,505,935)	$ (13,077,605)	$ (1,502,160)	$ 31,850,910	$ (133,310,611)
Cumulative Change due to Assumptions		(34,926,396)	(157,432,331)	(170,509,936)	(172,012,096)	(140,161,186)	(273,471,797)
Funded Ratio	174.73%	176.92%	185.06%	185.97%	186.08%	183.87%	193.49%
Normal Cost	$ 38,323,092	$ 38,231,722	$ 34,884,111	$ 34,698,080	$ 34,610,134	$ 33,105,450	$ 28,916,508
Change Due to Assumption		$ (91,370)	$ (3,347,611)	$ (186,031)	$ (87,946)	$ (1,504,684)	$ (4,188,942)
Cumulative Change due to Assumptions		(91,370)	(3,438,981)	(3,625,012)	(3,712,958)	(5,217,642)	(9,406,584)

Required Disclosures

The purpose of this presentation is to present the quinquennial experience study results for the State Teachers Retirement System of Ohio. This presentation is for the use of the Board and System staff.

In preparing our presentation, we relied on information, some oral and some written, supplied by the State Teachers Retirement System of Ohio. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

The actuarial assumptions, data, and methods are those used in the preparation of the Actuarial Valuation Report as of June 30, 2021.

The assumptions reflect our understanding of the likely future experience of the System, and the assumptions as a whole represent our best estimate for the future experience of the System. The results of this presentation are dependent upon future experience conforming to these assumptions. To the extent that future experience deviates from the actuarial assumptions, the true cost of the System could vary from our results.

Cheiron utilizes and relies upon ProVal, an actuarial valuation software leased from Winklevoss Technologies for the intended purpose of calculating liabilities and projected benefit payments. Projected results of future valuations in this presentation were developed using P-scan, our proprietary tool for the intended purpose of developing projections. As part of the review process for this presentation, we have performed a number of tests to verify that the results are reasonable and appropriate. We are not aware of any material inconsistencies, unreasonable output resulting from the aggregation of assumptions, material limitations or known weaknesses that would affect this presentation.

We hereby certify that this presentation and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this presentation. This presentation does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

This presentation was prepared exclusively for the State Teachers Retirement System of Ohio for the purpose described herein. Other users of this presentation are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.

State Teachers Retirement System of Ohio

CHEIRON
Classic Values, Innovative Advice

Lever Analysis Follow Up

March 17, 2022

Presented by
Michael Noble, FSA, EA, MAAA
Gene Kalwarski, FSA, EA MAAA

CHEIRON
Celebrating 20 years

Lever Analysis

- Prior lever analysis
  - In October 16 alternatives were reviewed
  - In December 6 additional alternatives were reviewed
  - In January narrowed to 4 levers and introduced a fiscal integrity framework based on comparison of contribution rate to treadwater rate
  - In February presented impact of assumption changes
- Today we review 5 options requested by board
  - Each option analyzed at 7.0% and 6.5% discount rates since there may be changes to economic assumptions adopted by the Board for the June 30, 2022 valuation

5 Levers Studied

Lever	1st Yr COLA	2nd Yr COLA	Age 60 Ret req.	Member Contrib
Baseline @ 7.0%	-	-	keep	14%
A	2%	-	remove	14%
B	3%	-	remove	14%
C	2%	-	remove	13%
D	3%	-	remove	13%
E	2%	2%	remove	13%

The Board May Adjust the Benefits of the System if

…..the Board actuary determines that the adjustment does not materially impair the fiscal integrity of the system, or is necessary to preserve the fiscal integrity of the system

- Do current contributions exceed treadwater?
- Will contributions exceed treadwater after a shock in a reasonable period of time?
- What is the probability that contributions will exceed treadwater in 10 years?

Lever Analysis Details

Lever	1st Yr COLA	2nd Yr COLA	Age 60 Ret req.	Member Contrib	Liability Impact*	2022 Cont. >TR?	After -19% Yrs >TR	Probability >TR in 10yrs
Baseline @ 7.0%	-	-	keep	14%	$ -	12.24%	2	83.7%
A	2%	-	remove	14%	$ 1,623	11.16%	4	81.1%
B	3%	-	remove	14%	$ 2,119	10.88%	4	80.2%
C	2%	-	remove	13%	$ 2,875	10.16%	6	77.7%
D	3%	-	remove	13%	$ 3,372	9.88%	7	77.4%
E	2%	2%	remove	13%	$ 3,789	9.64%	7	76.9%

** Includes the change in Actuarial Liability and the decrease in present value of future employee contributions ($ in millions)*

Lever Analysis

- Additional considerations
  - Market uncertainties have escalated recently
  - Given Callan's investment outlook, a further lowering of the discount rate is possible
  - The Board's own risk dashboard indicates changes are not advised
- Analysis at 6.5% discount rate produces the same conclusions reached at 7.0% discount rate

Conclusions

- In our professional judgment levers A, B, and C do not materially impair the fiscal integrity of the system
  - Already on record as supporting lever A (2% COLA, unreduced retirement at 35 years of service)
  - Lever B (A with 3% COLA) is only a small increase from A
  - Lever C (A with 1% reduction in member contributions)
    - Meets the Board's funding objectives regarding intergenerational equity
- In our professional judgment levers D and E could materially impair the fiscal integrity of the system

Required Disclosures

The purpose of this presentation is to present actuarial the valuation results for the State Teachers Retirement System of Ohio. This presentation is for the use of the Board and System staff.

In preparing our presentation, we relied on information, some oral and some written, supplied by the State Teachers Retirement System of Ohio. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

The actuarial assumptions, data, and methods are those used in the preparation of the Actuarial Valuation Report as of June 30, 2021 and reflecting the updated assumptions adopted by the Board of Trustees February 17, 2022 based on the Quinquennial Experience Study.

The assumptions reflect our understanding of the likely future experience of the System, and the assumptions as a whole represent our best estimate for the future experience of the System. The results of this presentation are dependent upon future experience conforming to these assumptions. To the extent that future experience deviates from the actuarial assumptions, the true cost of the System could vary from our results.

Cheiron utilizes and relies upon ProVal, an actuarial valuation software leased from Winklevoss Technologies for the intended purpose of calculating liabilities and projected benefit payments. Projected results of future valuations in this presentation were developed using P-scan, our proprietary tool for the intended purpose of developing projections. As part of the review process for this presentation, we have performed a number of tests to verify that the results are reasonable and appropriate. We are not aware of any material inconsistencies, unreasonable output resulting from the aggregation of assumptions, material limitations or known weaknesses that would affect this presentation.

We hereby certify that this presentation and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this presentation. This presentation does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

This presentation was prepared exclusively for the State Teachers Retirement System of Ohio for the purpose described herein. Other users of this presentation are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.

STATE TEACHERS RETIREMENT SYSTEM OF OHIO
DEFINED BENEFIT PLAN AND COMBINED PLAN
QUINQUENNIAL EXPERIENCE STUDY

APPENDIX A - SUMMARY OF DEFINED BENEFIT AND COMBINED PLAN PRIOR AND UPDATED ASSUMPTIONS

1. Mortality Rates

Post-Retirement:

Prior Assumption - RP-2014 Annuitant Mortality Table with 50% of rates through age 69, 70% of rates between ages 70 and 79, 90% of rates between ages 80 and 84, and 100% of rates thereafter, projected forward generationally using mortality improvement scale MP-2016 (Adopted effective July 1, 2017).

Pub-2010 Teachers Healthy Annuitant Mortality Table, adjusted 110% for males, projected forward generationally using mortality improvement scale MP-2020 (Updated effective June 30, 2022).

Sample mortality rates prior to improvement are as follows:

	Prior Assumption		Updated Assumption	
Age	Male	Female	Male	Female
50	0.20%	0.14%	**0.11%**	**0.07%**
55	0.29%	0.18%	**0.25%**	**0.19%**
60	0.39%	0.26%	**0.39%**	**0.29%**
65	0.55%	0.40%	**0.65%**	**0.45%**
70	1.17%	0.90%	**1.18%**	**0.77%**
75	1.88%	1.47%	**2.23%**	**1.46%**
80	4.02%	3.14%	**4.23%**	**2.82%**
85	7.75%	6.05%	**7.96%**	**5.39%**
90	13.59%	10.71%	**14.59%**	**10.09%**
95	21.86%	17.90%	**24.55%**	**18.03%**
100	31.40%	27.09%	**35.87%**	**28.16%**

APPENDIX A - SUMMARY OF DEFINED BENEFIT AND COMBINED PLAN PRIOR AND UPDATED ASSUMPTIONS

Pre-Retirement:

Prior Assumption - RP-2014 Employee Mortality Table, projected forward generationally using mortality improvement scale MP-2016 (Adopted effective July 1, 2017).

Pub-2010 Teachers Employee Table adjusted 95% for females, projected forward generationally using mortality improvement scale MP-2020 (Updated effective June 30, 2022).

Sample mortality rates prior to improvement are as follows:

	Prior Assumption		Updated Assumption	
Age	Male	Female	Male	Female
25	0.05%	0.02%	**0.02%**	**0.01%**
30	0.05%	0.02%	**0.02%**	**0.01%**
35	0.05%	0.03%	**0.03%**	**0.02%**
40	0.06%	0.04%	**0.04%**	**0.03%**
45	0.10%	0.07%	**0.07%**	**0.05%**
50	0.17%	0.11%	**0.11%**	**0.07%**
55	0.28%	0.17%	**0.17%**	**0.10%**
60	0.47%	0.24%	**0.26%**	**0.15%**

Post-Retirement Disabled:

Prior Assumption - RP-2014 Disabled Mortality Table with 90% of rates for males and 100% of rates for females, projected forward generationally using mortality improvement scale MP-2016(Adopted effective July 1, 2017).

Pub-2010 Teachers Disabled Annuitant Table projected forward generationally using mortality improvement scale MP-2020 (Updated effective June 30, 2022).

Sample mortality rates prior to improvement are as follows:

	Prior Assumption		Updated Assumption	
Age	Male	Female	Male	Female
45	1.53%	0.90%	**1.01%**	**0.99%**
50	1.84%	1.19%	**1.61%**	**1.48%**
55	2.10%	1.45%	**2.11%**	**1.74%**
60	2.39%	1.70%	**2.50%**	**1.96%**
65	2.85%	2.09%	**3.04%**	**2.26%**
70	3.63%	2.82%	**3.90%**	**2.86%**
75	4.89%	4.10%	**5.19%**	**4.00%**

APPENDIX A - SUMMARY OF DEFINED BENEFIT AND COMBINED PLAN PRIOR AND UPDATED ASSUMPTIONS

2. Active Retirement Rates

Prior Assumption - The following rates of retirement are assumed for members eligible to retire (Adopted effective July 1, 2017).

Defined Benefit Plan – Grandfathered Male Rates				
Age	Under 25 Years of Service	25-29 Years of Service	30-34 Years of Service	35 or More Years of Service
<=52	0%	0%	20%	30%
53	0%	0%	20%	30%
54	0%	0%	20%	40%
55	0%	6%	20%	40%
56	0%	6%	20%	40%
57	0%	6%	20%	40%
58	0%	6%	20%	40%
59	0%	7%	20%	40%
60	10%	7%	20%	40%
61	10%	7%	20%	40%
62	12%	8%	20%	40%
63	12%	8%	25%	35%
64	12%	12%	25%	25%
65	20%	20%	25%	25%
66	20%	20%	25%	25%
67	15%	20%	25%	25%
68	15%	20%	25%	20%
69	15%	20%	25%	20%
70	15%	20%	25%	20%
71	15%	20%	25%	20%
72	15%	20%	25%	20%
73	15%	20%	25%	20%
74	15%	20%	25%	20%
75+	100%	100%	100%	100%

APPENDIX A - SUMMARY OF DEFINED BENEFIT AND COMBINED PLAN PRIOR AND UPDATED ASSUMPTIONS

Defined Benefit Plan – Grandfathered Female Rates				
Age	Under 25 Years of Service	25-29 Years of Service	30-34 Years of Service	35 or More Years of Service
<=52	0%	0%	20%	35%
53	0%	0%	20%	35%
54	0%	0%	20%	40%
55	0%	9%	20%	40%
56	0%	9%	20%	40%
57	0%	9%	20%	40%
58	0%	9%	20%	40%
59	0%	10%	25%	40%
60	10%	10%	30%	45%
61	10%	10%	30%	45%
62	10%	12%	30%	45%
63	10%	12%	35%	45%
64	15%	20%	35%	45%
65	25%	30%	35%	45%
66	20%	30%	35%	45%
67	20%	20%	35%	45%
68	20%	20%	35%	45%
69	20%	20%	35%	45%
70	20%	20%	35%	40%
71	20%	20%	35%	40%
72	20%	20%	35%	40%
73	20%	20%	35%	40%
74	20%	20%	35%	40%
75+	100%	100%	100%	100%

APPENDIX A - SUMMARY OF DEFINED BENEFIT AND COMBINED PLAN PRIOR AND UPDATED ASSUMPTIONS

Defined Benefit Plan – Non-grandfathered Male Rates				
Age	Under 25 Years of Service	25-29 Years of Service[1]	30-34 Years of Service[2]	35 or More Years of Service[2]
<=52	0%	3%	20%	20%
53	0%	3%	20%	20%
54	0%	3%	20%	20%
55	0%	3%	20%	20%
56	0%	3%	20%	20%
57	0%	3%	20%	20%
58	0%	3%	20%	20%
59	0%	5%	20%	20%
60	5%	5%	20%	25%
61	6%	6%	20%	25%
62	7%	7%	20%	25%
63	8%	8%	25%	25%
64	10%	10%	25%	25%
65	20%	20%	25%	25%
66	20%	20%	25%	25%
67	20%	20%	25%	25%
68	20%	20%	25%	20%
69	20%	20%	25%	20%
70	20%	20%	25%	20%
71	20%	20%	25%	20%
72	20%	20%	25%	20%
73	20%	20%	25%	20%
74	20%	20%	25%	20%
75+	100%	100%	100%	100%

[1] Rates prior to age 60 are zero if retirement eligibility requirements are not met.
[2] Use two times 25-29 Years of Service rates if not eligible for unreduced retirement (prior to age 65).

APPENDIX A - SUMMARY OF DEFINED BENEFIT AND COMBINED PLAN PRIOR AND UPDATED ASSUMPTIONS

Defined Benefit Plan – Non-grandfathered Female Rates				
Age	Under 25 Years of Service	25-29 Years of Service[1]	30-34 Years of Service[2]	35 or More Years of Service[2]
<=52	0%	5%	20%	20%
53	0%	5%	20%	20%
54	0%	5%	20%	20%
55	0%	5%	20%	20%
56	0%	5%	20%	20%
57	0%	5%	20%	20%
58	0%	5%	20%	20%
59	0%	5%	25%	25%
60	10%	10%	30%	30%
61	10%	10%	30%	30%
62	10%	10%	30%	30%
63	10%	10%	35%	35%
64	15%	15%	35%	35%
65	30%	30%	35%	35%
66	30%	30%	35%	35%
67	20%	20%	35%	35%
68	20%	20%	35%	35%
69	20%	20%	35%	35%
70	20%	20%	35%	30%
71	20%	20%	35%	30%
72	20%	20%	35%	30%
73	20%	20%	35%	30%
74	20%	20%	35%	30%
75+	100%	100%	100%	100%

[1] Rates prior to age 60 are zero if retirement eligibility requirements are not met.
[2] Use two times 25-29 Years of Service rates if not eligible for unreduced retirement (prior to age 65).

APPENDIX A - SUMMARY OF DEFINED BENEFIT AND COMBINED PLAN PRIOR AND UPDATED ASSUMPTIONS

The following rates of retirement are assumed for members eligible to retire with a reduced benefit (Updated effective June 30, 2022).

Defined Benefit Plan – Reduced Rates		
Age	Male	Female
50-51	2.0%	2.0%
52	3.0%	3.0%
53	5.0%	5.0%
54	9.0%	9.0%
55	12.0%	13.0%
56-57	10.0%	11.0%
58	8.0%	10.0%
59	11.0%	10.0%
60	6.5%	9.0%
61	8.0%	10.0%
62	8.0%	11.0%
63	10.0%	12.0%
64	15.0%	25.0%

The following rates of retirement are assumed for members once they are eligible to retire with an unreduced benefit (Updated effective June 30, 2022).

Defined Benefit Plan – Unreduced Rates		
Age	Male	Female
55	23%	18%
56	20%	20%
57	18%	20%
58	22%	22%
59	23%	26%
60	21%	28%
61-62	20%	28%
63	20%	30%
64	24%	30%
65	28%	36%
66	23%	28%
67	22%	26%
68	20%	25%
69	21%	25%
70-71	22%	25%
72	24%	25%
73	20%	25%
74	23%	28%
75+	100%	100%

APPENDIX A - SUMMARY OF DEFINED BENEFIT AND COMBINED PLAN PRIOR AND UPDATED ASSUMPTIONS

Combined Plan				
	Prior Assumption		Updated Assumption	
Age	Male	Female	Male	Female
60	13%	22%	**10%**	**10%**
61-63	7%	9%	**10%**	**15%**
64	9%	15%	**18%**	**20%**
65	17%	20%	**25%**	**30%**
66	15%	13%	**10%**	**25%**
67	12%	13%	**10%**	**15%**
68	12%	12%	**10%**	**15%**
69-74	12%	12%	**15%**	**15%**
75	100%	100%	**100%**	**100%**

3. Inactive Vested Retirement Rates

5% at each early retirement age through age 64 and 100% at age 65.

4. Disability Rates

Select rates are shown below **(Updated Rates effective June 30, 2022)**:

Age	Prior Unisex Rates	Updated Unisex Rates
Under 30	0.010%	**0.007%**
30	0.010%	**0.007%**
35	0.030%	**0.021%**
40	0.050%	**0.035%**
45	0.100%	**0.070%**
50	0.180%	**0.126%**
55	0.220%	**0.154%**
60	0.250%	**0.175%**
65 and Over	0.250%	**0.175%**

APPENDIX A - SUMMARY OF DEFINED BENEFIT AND COMBINED PLAN PRIOR AND UPDATED ASSUMPTIONS

5. Termination Rates

Termination rates based on service, for causes other than death, disability, or retirement. Select rates shown below **(Updated Rates effective June 30, 2022).**

Vested Terminations*				
	Prior Assumption		Updated Assumption	
Age	Male	Female	Male	Female
20	11.25%	13.25%	**6.00%**	**6.00%**
25	11.25%	12.50%	**6.00%**	**6.00%**
30	2.75%	3.75%	**2.70%**	**3.55%**
35	2.00%	2.00%	**2.05%**	**2.00%**
40	1.75%	1.50%	**1.75%**	**1.40%**
45	1.75%	1.25%	**1.60%**	**1.25%**
50	2.00%	1.75%	**1.95%**	**1.60%**
55	3.25%	3.00%	**4.00%**	**3.60%**
60	0.00%	0.00%	**4.00%**	**3.60%**

*Termination rates stop at first retirement eligibility.

Non-Vested Terminations				
	Prior Assumption		Updated Assumption	
Service	Male	Female	Male	Female
Under 1 Year	30.00%	25.00%	**40.00%**	**35.00%**
1 to 2 Years	20.00%	20.00%	**16.00%**	**15.00%**
2 to 3 Years	15.00%	10.00%	**12.00%**	**8.00%**
3 to 4 Years	10.00%	10.00%	**9.00%**	**8.00%**
4 to 5 Years	10.00%	10.00%	**8.00%**	**7.00%**

6. Percent Electing a Deferred Termination Benefit

Prior Assumption - 50% of terminating members of the Defined Benefit Plan are assumed to elect a deferred termination benefit. The remaining 50% are assumed to take an immediate lump-sum. (Reaffirmed effective July 1, 2017).

80% of future terminating members of the Defined Benefit Plan are assumed to elect a deferred termination benefit. The remaining 20% are assumed to take an immediate lump-sum. (Updated effective June 30, 2022).

95% of current terminated vested members of the Defined Benefit Plan are assumed to elect a deferred termination benefit. The remaining 5% are assumed to take a lump-sum on the valuation date. (Updated effective June 30, 2022).

7. Percent Married:

For valuation purposes, 80% of male members and 60% of female members are assumed to be married. Male members are assumed to be three years older than their spouses, and female members are assumed to be one year younger than their spouses. (The assumed age difference adopted effective July 1, 2017 and reaffirmed effective June 30, 2022).

8. Dependents for Survivor's Benefit

The spouse is the only assumed beneficiary for the survivor's benefit.

9. Missing Data

Where data was missing, the field was populated with the prior year's data, if available, or the average value of similar members.

10. Investment Return Rate

7.00% per annum, compounded annually and net of all expenses (Adopted effective July 1, 2021).

11. Salary Increase Rates

Prior Assumption - Total salary increases, as shown below (Adopted effective July 1, 2017).

Total salary increases, as shown below (Updated effective June 30, 2022).

APPENDIX A - SUMMARY OF DEFINED BENEFIT AND COMBINED PLAN PRIOR AND UPDATED ASSUMPTIONS

Prior Assumption			
Age	Rate	Age	Rate
<=19	0.00%	41	5.25%
20	12.50%	42	5.00%
21	12.50%	43	5.00%
22	12.50%	44	4.75%
23	12.50%	45	4.75%
24	12.25%	46	4.50%
25	11.50%	47	4.50%
26	9.75%	48	4.25%
27	8.75%	49	4.25%
28	8.25%	50	4.00%
29	8.00%	51	4.00%
30	7.75%	52	3.75%
31	7.50%	53	3.75%
32	7.25%	54	3.50%
33	7.00%	55	3.50%
34	6.75%	56	3.25%
35	6.50%	57	3.25%
36	6.25%	58	3.00%
37	6.00%	59	3.00%
38	5.75%	60	2.75%
39	5.50%	61	2.75%
40	5.25%	62+	2.50%

Updated Assumption			
Service	Rate	Service	Rate
<1	8.50%	16	4.20%
1	8.20%	17	4.00%
2	8.00%	18	3.80%
3	7.00%	19	3.60%
4	6.50%	20	3.50%
5	6.30%	21	3.40%
6	6.10%	22	3.30%
7	6.00%	23	3.20%
8	5.90%	24	3.10%
9	5.70%	25	3.00%
10	5.50%	26	2.90%
11	5.30%	27	2.80%
12	5.20%	28	2.70%
13	5.00%	29	2.60%
14	4.80%	30+	2.50%
15	4.50%		

12. Payroll Growth Rates

3.00% per annum (Adopted effective July 1, 2017 and reaffirmed effective June 30, 2022).

13. Defined Contribution Plan

The Defined Contribution account balance is added to the Actuarial Liability and the Actuarial Value of Assets. If a member retires and elects to have the Defined Contribution account balance paid as an annuity, then the account balance is transferred to the Defined Benefit Plan and the annuity is valued as part of the Defined Benefit Plan. There is no assumption regarding future transfers as this transfer would be handled on an actuarially equivalent basis.

14. Rationale for Assumptions

The prior demographic actuarial assumptions were adopted by the Board based on recommendations from the prior actuary from an experience study covering plan experience for the period July 1, 2011 through June 30, 2016. Cheiron has reviewed this experience study dated March 3, 2017. While we consider these assumptions to be generally reasonable, we have not yet performed our own actuarial experience study. An experience study will be performed once a sufficient amount of recent data has been accumulated.

The updated assumptions were adopted by the Board of Trustees at their February 17, 2022 meeting. The demographic assumptions adopted are based on an experience study covering the period from July 1, 2015 through June 30, 2021.

STATE TEACHERS RETIREMENT SYSTEM OF OHIO
DEFINED BENEFIT PLAN AND COMBINED PLAN
QUINQUENNIAL EXPERIENCE STUDY

APPENDIX B - SUMMARY OF RETIREE HEALTHCARE PLAN
PRIOR AND UPDATED ASSUMPTIONS

Economic Assumptions

1. **Expected Return on Assets** — 7.00% per year, based on the long-term rate of return on invested plan assets

2. **Municipal Bond Yield** — 2.16% as of June 30, 2021
   Bond Buyer 20-Bond GO Index as of June 26, 2021

3. **Discount Rate** — 7.00%, based on a blend of 2.16% municipal bond yield rate and the expected return on invested plan assets. The assets are sufficient to cover all expected benefits, thus the long-term rate of return is used.

4. **Payroll Increase Rate** — 3.00% per year for purposes of attributing individual costs under the Entry Age actuarial cost method

5. **Salary Increase Rate** — See Appendix A

6. **Per Person Health Care Cost Trends**

   Medical trend assumptions used were developed using the Society of Actuaries (SOA) Long-Run Medical Cost Trend Model. The SOA model was released in December 2007, and version 2020_b was used for this valuation. The following assumptions were used as input variables into this model:

Trend Assumption Inputs	
Variable	**Rate**
Rate of Inflation	2.50%
Rate of Growth in Real Income/GDP per capita 2029+	1.50%
Extra Trend due to Taste/Technology 2029+	1.20%
Expected Health Share of GDP 2029	20.0%
Health Share of GDP Resistance Point	25.0%
Year for Limiting Cost Growth to GDP Growth	2040

APPENDIX B - SUMMARY OF RETIREE HEALTHCARE PLAN PRIOR AND UPDATED ASSUMPTIONS

The SOA Long-Run Medical Cost Trend Model and its baseline projection are based on an econometric analysis of historical U.S. medical expenditures and the judgments of experts in the field. The long-run baseline projection and input variables have been developed under the guidance of the SOA Project Oversight Group.

Year	Medical		Prescription Drugs		Premium Trends		Contribution
	Pre-Medicare	Medicare	Pre-Medicare	Medicare	Pre-Medicare	Medicare	Limited Medicare
2021	5.00%	-16.18%	6.50%	29.98%	5.34%	-6.77%	-6.77%
2022	4.93%	2.20%	6.33%	21.83%	5.26%	-3.29%	-5.41%
2023	4.87%	13.11%	6.17%	13.06%	5.17%	10.16%	6.00%
2024	4.80%	11.05%	6.00%	13.57%	5.08%	9.32%	6.00%
2025	4.73%	9.13%	5.83%	10.96%	5.00%	8.22%	6.00%
2026	4.67%	7.41%	5.67%	10.02%	4.91%	7.27%	6.00%
2027	4.60%	6.43%	5.50%	7.42%	4.82%	6.83%	6.00%
2028	4.53%	6.08%	5.33%	5.13%	4.73%	6.54%	6.00%
2029	4.47%	5.75%	5.17%	5.00%	4.64%	6.26%	6.00%
2030	4.40%	5.50%	5.00%	4.86%	4.55%	5.94%	6.00%
2031	4.33%	5.25%	4.83%	4.71%	4.46%	5.61%	6.00%
2032	4.27%	5.00%	4.67%	4.57%	4.37%	5.29%	6.00%
2033	4.20%	4.75%	4.50%	4.43%	4.27%	4.97%	6.00%
2034	4.13%	4.50%	4.33%	4.29%	4.18%	4.65%	6.00%
2035	4.07%	4.25%	4.17%	4.14%	4.09%	4.32%	6.00%
2036+	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	6.00%

The ultimate trend rate reflects an assumed nominal per capita GDP growth.

Demographic Assumptions

1. **Retirement Rates – See Appendix A**

2. **Rates of Termination/Withdrawal – See Appendix A**

3. **Rates of Mortality – See Appendix A**

4. **Percent of Retirees Electing Coverage**

   - **Prior Assumption –** 75% of future eligible service retirees and 65% of future eligible disabled retirees are assumed to elect coverage.

   - **65% of future eligible service (i.e. healthy) and disabled retirees are assumed to elect coverage. (Update effective June 30, 2022.)**

   - 100% of combined plan and 50% of defined benefit plan future inactive vested participants are assumed to cash out.

   - 30% of inactive vested participants who do not cash out are assumed to elect coverage.

- Current and future participants for whom the value of the benefits received is less than their contribution are assumed to drop coverage.

5. Benefit Elections

Below is a summary of the medical plan election rates for future retirees by Medicare status.

Pre-Medicare Medical Plans	Benefit Election Rate
Medical Mutual / Aetna Basic PP(	93.7%
AdultCare PPO	3.0%
Paramount Health Care HMO	3.3%

Medicare Medical Plans	Benefit Election Rate
Aetna Medicare Advantage	94.2%
Medical Mutual / Aetna Basic PP(	3.9%
AdultCare PPO	1.0%
Paramount Health Care HMO	0.9%

These weights were used to blend premium rates developed by Wakely, less applicable subsidies, discounts, and rebates (the "Recoveries"), to estimate individual retiree and spouse costs by age and gender.

6. Spousal Coverage

Of those future retirees who elect to continue health coverage, 20% were assumed to have an eligible spouse who also opts for health coverage at that time.

7. Dependent Age

For current retirees, the actual spouse date of birth was used when available.

For future retirees, male retirees are assumed to be three-years older than their partners, and female retirees are assumed to be one-year younger than their partners.

8. Administrative Expenses

Health plan administrative expenses are included in the per capita claims costs.

9. Rationale for Assumptions

The prior demographic actuarial assumptions were adopted by the Board based on recommendations from the prior actuary from an experience study covering plan experience for the period July 1, 2011 through June 30, 2016. Cheiron has reviewed this experience study dated March 3, 2017. While we consider these assumptions to be generally reasonable, we have not yet performed our own actuarial experience study. An experience study will be performed once a sufficient amount of recent data has been accumulated.

The updated assumptions were adopted by the Board of Trustees at their February 17, 2022 meeting and expected to take effect with the June 30, 2022 actuarial valuation. The demographic assumptions adopted are based on an experience study covering the period from July 1, 2015 through June 30, 2021.

Claim and Expense Assumptions

The claims costs are developed based on CY 2020 and CY 2021 projected premiums provided by STRS Ohio and developed by its vendor (Wakely, Aetna, AultCare, and Paramount). For the EGWP plans, claims costs are defined as the Plan cost net of all recoveries (i.e., net of Rx rebates, Gap Discount rebates, Part D direct subsidy, Low-income cost share, and Federal Reinsurance), using the gross paid claims PMPM, the Rx rebates and pharma Gap Discounts PMPM, and the CMS Part D Direct subsidy and Federal Reinsurance payment PMPM as projected by Wakely and documented in Wakely's 2021 Final Self Funded Rates memo dated July 16, 2020. For each plan (e.g., Basic vs. Aetna vs. Aultcare vs. Paramount), each benefit (i.e., medical vs. Rx), and each population (i.e., Non-Medicare vs Medicare A&B vs. Medicare B only) we calculate the projected FYE 2021 rate PMPM as the average of the CY 2020 and CY 2021 rate. Using the June 30, 2020 retiree membership distribution by plan and population, we calculate four rates: a Non-Medicare Eligible (NME) medical rate, a NME Rx rate, a Medicare Eligible (ME) medical rate, and a ME Rx rate. The resulting PMPM rates are then adjusted using age curves.

1. Average Annual Claims and Expense Assumptions

The following 7/1/2020-6/30/2021 claims costs were developed based on:

- The average of the 2020 and 2021 premium rates the System pays its vendors,
- The average Wakely's projected 2019 and 2020 Employer Group Waiver Program (EGWP) Recoveries that the System is expected to receive for CY 2020 and CY 2021 prescription filled dates, and
- An estimate of the Rx rebates PPPM for the Non-Medicare population-based on actual 2018 Non-Medicare Rx rebates.

All rates were converted from a Per Adult or Per Child rate to a composite Per Person rate. A child load of 3.1% for medical and 1.9% for Rx was added onto the NME pre-65 claims and expenses to account for the fact that only adults are inputted in ProVal.

APPENDIX B - SUMMARY OF RETIREE HEALTHCARE PLAN PRIOR AND UPDATED ASSUMPTIONS

Fiscal Year Ending 6/30/2021 Average Claim and Expense Assumptions								
	Medical NME		Rx NME		Medical ME		Rx ME	
Age	Male	Female	Male	Female	Male	Female	Male	Female
40	$3,164	$5,740	$819	$1,016	$638	$574	$1,372	$1,315
45	$4,177	$5,944	$1,063	$1,213	$918	$827	$1,976	$1,893
50	$5,474	$6,841	$1,351	$1,433	$1,165	$1,049	$2,508	$2,403
55	$7,054	$8,375	$1,683	$1,678	$1,277	$1,150	$2,748	$2,633
60	$8,916	$9,860	$2,059	$1,948	$1,204	$1,084	$2,591	$2,483
64	$10,610	$10,015	$2,392	$2,180	$1,013	$912	$2,180	$2,089
65	$10,481	$9,916	$2,441	$2,206	$614	$562	$1,320	$1,288
70	$11,492	$10,994	$2,898	$2,518	$740	$637	$1,486	$1,348
75	$12,601	$12,190	$3,399	$2,854	$902	$760	$1,449	$1,324
80	$13,816	$13,516	$3,943	$3,214	$1,070	$894	$1,313	$1,249
85	$15,148	$14,986	$4,531	$3,597	$1,223	$1,012	$1,155	$1,154

For the Medicare population, we also calculate the projected FYE 2022 rates PMPM as the average of the CY 2021 and CY 2022 rate, using Wakely's 2022 Final Self Funded Rates memo dated June 15, 2021. 2021 trends were adjusted to match the current projected FYE 2022 Medicare rates.

2. Retiree Contributions

In 2020, non-Medicare retirees receive a subsidy of 1.984% per year of service to a maximum of 30 years, and Medicare AMA retirees receive a subsidy of 2.1% per year of service to a maximum of 30 years. In 2021, Non-Medicare retirees receive a subsidy of 2.055% per year of service to a maximum of 30 years. In 2022, Non-Medicare retirees will received a subsidy of 2.1%.

Beginning in 2023, the STRS Ohio subsidy dollar amount for Non-Medicare plans will be frozen at the current 2022 levels. Annual increases in the STRS Ohio subsidy dollar amount for Medicare plans will be based on the annual percentage increase in the Aetna Medicare Advantage Plan, limited at 6%.

For those who retire on or after August 2023, the first five years of service do not count towards the subsidy, so subsidy percentages are shifted five years, and those with less than 20 years of service receive no subsidy. The following table shows the blended medical and Rx premium for pre-Medicare and Medicare plans.

Sample monthly premium subsidies paid by the STRS of Ohio pays for Eligible Retirees for the year beginning January 1, 2021 are shown on the next page.

APPENDIX B - SUMMARY OF RETIREE HEALTHCARE PLAN PRIOR AND UPDATED ASSUMPTIONS

2022 Rates	Pre-Medicare Plans			Medicare Plans			
Years of Service	Medical Mutual / Aetna Basic PPO	AultCare PPO	Paramount HMO	Aetna Medicare Advantage	Medical Mutual Basic PPO	AultCare PPO	Paramount HMO
Total Cost[1]	$1,144	$910	$873	$289	$326	$288	$328
	Frozen at 2022 Levels			Based on increase in Aetna MA plan, limit 6%			
15	$360	$287	$275	$91	$91	$91	$91
16	$384	$306	$293	$97	$97	$97	$97
17	$408	$325	$312	$103	$103	$103	$103
18	$432	$344	$330	$109	$109	$109	$109
19	$456	$363	$348	$115	$115	$115	$115
20	$480	$382	$367	$121	$121	$121	$121
21	$505	$401	$385	$127	$127	$127	$127
22	$529	$420	$403	$134	$134	$133	$134
23	$553	$440	$422	$140	$140	$139	$140
24	$577	$459	$440	$146	$146	$145	$146
25	$601	$478	$458	$152	$152	$151	$152
26	$625	$497	$477	$158	$158	$157	$158
27	$649	$516	$495	$164	$164	$163	$164
28	$673	$535	$513	$170	$170	$169	$170
29	$697	$554	$532	$176	$176	$175	$176
30 +	$721	$573	$550	$182	$182	$181	$182
Cost Per Child	$293	$257	$247	$289	$326	$288	$328

[1] Also applies to spousal coverage, retirees not eligible for premium subsidy, and disabled adult child (sponsored dependent)

A weighted average total cost across the Plans shown above is used as the STRS Ohio subsidy. These amounts are assumed to increase with health trend.

Weighted Average Premiums		
Pre-65 retirees	$	13,139.52
Retirees age 65+	$	3,810.89

3. Medicare Part D Subsidy

The Medicare Part D subsidy is expected to be negative in CY 2022. An estimate of -$0.78 per Medicare participant is included in the FYE 2022 rates. We assumed the Part D Direct subsidy decreases by $36 annually for the first 3 years, then by 25% for the next 12 years; subsequently, the Part D Direct subsidy is implicitly trended when the trends showed on page 16 of this report are applied to the net Medicare Rx claims and expenses. Per GASB guidance, RDS Part D Subsidies are not reflected in valuations.

4. Medicare Part B Premium Subsidy

Service retirees and disabled retirees who are enrolled in an STRS Ohio medical plan and who participate in Medicare Part B receive $29.90 monthly reimbursement towards the Part B premiums.

5. Medicare Eligibility

All retirees who turn age 65 are assumed to be eligible for Medicare.

6. Geography

Implicitly assumed to remain the same as current retirees.