Connecticut State Teachers' Retirement System

Experience Study for the Five-Year Period Ending June 30, 2024

Prepared as of June 30, 2024

CavMac
Actuarial Consulting Services

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Actuarial Consulting Services

June 6, 2025

Board of Directors
Connecticut State Teachers' Retirement System
165 Capitol Ave
Hartford, CT 06106

Members of the Board:

We are pleased to submit the results of a study of the economic and demographic experience for the Connecticut Teachers' Retirement System (System). The purpose of this study is to assess the reasonability of the actuarial assumptions and methods currently used by the System. The actuarial assumptions are used by the actuary to provide a best estimate of the value of all benefits expected to be paid by the System over future years. The valuation uses various methods in determining the required funding necessary to accumulate a sufficient amount of assets to fully fund the expected benefit payments.

This experience study covers the five-year period from July 1, 2019 to June 30, 2024. As a result of the study, it is recommended that revised assumptions be adopted by the Board for future use. Changing assumptions will not change the actual cost of future benefits but will impact the measurement of the expected value of future benefits and the required contributions to maintain actuarial soundness.

The experience study includes all active and inactive members including retired members, disabled members and beneficiaries of deceased members. The demographic experience was studied separately for males and females where gender is a basis for material differences in experience.

This report shows comparisons between the actual and expected cases of separation from active service, actual and expected number of deaths, and actual and expected salary increases. Tables and graphs are used to show the actual rates measured, the rates expected under the current assumptions and, where applicable, the proposed change to rates.

The recommended decrement tables are shown in Appendix D of this report. Use of the new assumptions, when adopted by the Board, will commence with the June 30, 2025 valuation and are suitable for use until further experience indicates that modifications are desirable.

In order to prepare the measurement of the impact on liabilities in this report, we have utilized actuarial models that we developed to measure liabilities and develop actuarial costs. These models include tools that we have produced and tested, along with commercially available valuation software that we have reviewed to confirm the appropriateness and accuracy of the output. In utilizing these models, we develop and use input parameters and assumptions about future contingent events along with recognized actuarial approaches to develop the needed results.

We hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board (ASB) and the Code of Professional Conduct and Qualification Standards for Public Statements of Actuarial Opinion of the American Academy of Actuaries.

We further certify that, in our opinion, the assumptions developed in this report satisfy Actuarial Standards of Practice, in particular, No. 27 (Selection of Assumptions for Measuring Pension Obligations).

The experience study was performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems. The undersigned meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

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SECTION I – EXECUTIVE SUMMARY

The purpose of an actuarial valuation is to provide a timely best estimate of the ultimate costs of a retirement system. An actuarial valuation for the Connecticut State Teachers' Retirement System (System) is prepared annually to determine the actuarial contribution rate required to fund the System on an actuarial reserve basis, (i.e. the current assets plus future contributions, along with investment earnings will be sufficient to provide the benefits promised by the System). The valuation requires the use of certain assumptions with respect to the occurrence of future events, such as rates of investment return, death, termination of employment, retirement age, and salary changes to estimate the obligations of the System.

The basic purpose of an experience study is to determine whether the actuarial assumptions currently in use have adequately anticipated the actual emerging experience. This information, along with the professional judgment of System personnel and advisors, is used to evaluate the appropriateness of continued use of the current actuarial assumptions. When analyzing experience and assumptions, it is important to recognize that actual experience is reported in the short term while assumptions are intended to be long-term estimates of experience. Therefore, actual experience is expected to vary from study period to study period, without necessarily indicating a change in assumptions is needed.

CavMac has performed a study of the experience of the Connecticut Teachers' Retirement System for the five-year period ending June 30, 2024. This report presents the results, analysis, and resulting recommendations of our study. It is anticipated that the changes, if approved, will first be reflected in the June 30, 2025 actuarial valuation.

These assumptions have been developed in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the applicable Actuarial Standards of Practice adopted by the Actuarial Standards Board (ASB). The recommended assumptions represent our best estimate of future experience.

Our Philosophy

Similar to an actuarial valuation, the calculation of actual and expected experience is a fairly mechanical process, and differences between actuaries in this area are generally minor. However, the setting of assumptions differs, as it is more art than science. In this report, we have recommended changes to certain assumptions. To explain our thought process, we offer a brief summary of our philosophy:

- **Do Not Overreact**: When we see significant changes in experience, we generally do not adjust our rates to reflect the entire difference. We will typically recommend rates somewhere between the old rates and the new experience. If the experience during the next study period shows the same result, we will probably recognize the trend at that point in time or at least move further in the direction of the observed experience. On the other hand, if experience returns closer to its prior level, we will not have overreacted, possibly causing volatility in the actuarial contribution rates.

- **Anticipate Trends**: If there is an identified trend that is expected to continue, we believe that this should be recognized. An example is the retiree mortality assumption. It is an established trend that people are living longer. Therefore, we believe the best estimate of liabilities in the valuation should reflect the expected increase in life expectancy.

- **Simplify**: In general, we attempt to identify which factors are significant and eliminate or ignore the ones that do not materially improve the accuracy of the liability projections.

The following summarizes the findings and recommendations regarding the assumptions utilized for the System. Detailed explanations for the recommendations are found in the sections that follow.

Recommended Economic Assumptions

Economic assumptions are some of the most visible and significant assumptions used in the valuation process. The items in the broad economy modeled by these assumptions can be very volatile over short periods of time, as clearly seen in the economic recovery from the pandemic in 2021 followed by the downward trend in global markets in 2022. Our goal is to focus on the emerging long-term trends in the midst of this volatility so that we can then apply reasonable assumptions.

Most of the economic assumptions used by actuaries are developed through a building-block approach. For example, the expected return on assets is based on the expectation for inflation plus the expected real return on assets. As this is usually the most significant source of annual gains and losses to a mature pension plan, it is important that each of these components, inflation and real return, are primarily based on long-term future expectation and not the short-term historical performance.

At the core of the economic assumptions is the inflation assumption. As we discuss later in the report, although the System has experienced higher than normal inflation recently, based on the analysis presented in this report, we believe that long-term inflation will settle back down to the 2.50% range. Therefore, we are recommending that the price inflation assumption be maintained at 2.50%.

We are recommending that the long-term expected return on assets assumption remain at 6.90%, reflecting the 2.50% inflation assumption and a 4.40% real rate of return assumption. This will be discussed in detail later in this report, but a real rate of return of 4.40% is supported by the forecasting models developed using the System's target asset allocation and analysis of the average of the 41 sets of capital market assumptions included in the Horizon Actuarial Services, LLC. Survey conducted in 2024.

We are also recommending that the general wage inflation assumption be maintained at 3.00%. Although there have been higher rates of wage inflation in the last two years, it is primarily attributable to higher-than-expected inflation rather than the real (above price inflation) rate of wage increases.

SECTION I – EXECUTIVE SUMMARY

Actuarial Methods

The basic actuarial methodologies used in the valuation process include the:

- Actuarial Cost Method
- Asset Valuation Method
- Amortization Method

Based on our review, discussed in full detail in Section III of this report, we recommend no changes in these actuarial methods at this time.

Recommended Demographic Assumption Changes

In the experience study, actual demographic experience for the study period is compared to that expected based on the current actuarial assumption. Comparing the actual incidence of the event to what was expected (called the Actual-to-Expected ratio, or A/E ratio) then provides the basis for our analysis.

Mortality is perhaps the most important demographic assumption when valuing the liabilities of a pension plan. The issue of future mortality improvement is one that the actuarial profession has become increasingly focused on studying in recent years. There have been significant improvements in longevity in the past, although there are different opinions about future expectations. We believe it is prudent to anticipate that this trend will continue to some degree in the future.

Plans currently reflect mortality improvements with the use of a generational mortality approach. This approach directly anticipates future improvements in mortality by using a different set of mortality rates for each year of birth, with the rates for later years of birth assuming lower mortality rates than the rates for earlier years of birth. The varying mortality rates by year of birth create a series of tables that contain "built-in" mortality improvements, e.g., a member who turns age 65 in 2045 has a longer life expectancy than a member who turns age 65 in 2025. When using generational mortality, the A/E ratios for the observed experience are set near 100% since future mortality improvements will be taken into account directly in the actuarial valuation process.

The current mortality assumptions are based on the Pub-2010 family of mortality tables using a generational mortality approach as described above. The Society of Actuaries (SOA) in 2019 published these mortality tables which were developed exclusively from public sector retirement system experience. Earlier this year, the SOA released updates to these tables which are called the Pub-2016 family of mortality tables. In addition, the SOA has also made minor adjustments in the generational scales from our last experience study. We are recommending updating the mortality assumptions to use the newly released set of tables and reflect the actual experience of the System over the past five years. These published mortality tables will be discussed in the demographic section of this report.

The following is a list of other recommended changes to the demographic assumptions for the System.

Assumption	Recommended Change
Mortality	Recommend updating to the Pub-2016 tables.
Retirement	Recommend minor changes to rates of retirement at some ages to fine-tune our expectations of retirement in the future.
Withdrawal	Recommend a service-only based table with minor changes to rates of withdrawal.
Disability	Recommend no changes at this time.
Merit Salary Scale	Recommend small changes particularly between 10 and 20 years of service.

Section IV of this report provides additional details of these recommended demographic changes.

Recommended OPEB Assumptions

Assumption	Recommended Change
Participation	Recommend increasing spousal election to 50% participation.
Trend	Recommend no changes at this time.
Aging Factors	Recommend no changes at this time.

Recommended Other Assumption and Method Changes

The table below lists the other assumptions and methods that are considered in our valuations that should be reviewed during the experience study.

Assumption or Method	Recommended Change
Percent Married	Recommend no change to current assumption
Cost-of-Living Adjustments (COLA)	Recommend small increases in COLA rate assumptions
Plan N Partial Refund Option	Recommend no change to current assumption

Section IV of this report provides additional details of these recommended changes.

Pension Financial Impact

The following table highlights the impact of the recommended changes on the June 30, 2024 actuarial valuation results.

Impact on Principal Valuation Results ($ in thousands)	June 30, 2024 Valuation Results	Recommended Assumptions	Impact of Change
Actuarial Accrued Liability (AAL)	$42,259,956	$42,628,366	$368,410
Actuarial Value of Assets (AVA)	$26,333,611	$26,333,611	$0
Unfunded Actuarial Accrued Liability (UAAL)	$15,926,345	$16,294,755	$368,410
Funded Ratio	62.31%	61.77%	-0.54%
Employer Normal Cost	$293,607	$323,879	$30,272
Payment of UAAL	$1,361,514	$1,395,005	$33,491
Actuarially Determined Employer Contribution (ADEC)	$1,655,121	$1,718,884	$63,763

OPEB Financial Impact

The following table highlights the impact of the recommended changes on the June 30, 2024 actuarial valuation results.

Impact on Principal Valuation Results ($ in thousands)	June 30, 2024 Valuation Results	Recommended Assumptions	Impact of Change
Actuarial Accrued Liability (AAL)	$4,143,270	$4,118,025	($25,245)
Actuarial Value of Assets (AVA)	$258,353	$258,353	$0
Unfunded Actuarial Accrued Liability (UAAL)	$3,884,917	$3,859,672	($25,245)
Funded Ratio	6.24%	6.27%	0.03%
State Normal Cost	$103,565	$104,735	$1,170
State Supplemental Cost	$131,425	$130,572	($853)
Actuarially Determined Employer Contribution (ADEC)	$234,990	$235,307	$317

SECTION II – ECONOMIC ASSUMPTIONS

There are three economic assumptions used in the actuarial valuations performed for the System. They are:

- Price Inflation
- Investment Return
- Wage Inflation

Actuarial Standard of Practice (ASOP) No. 27, *"Selection of Assumptions for Measuring Pension Obligations,"* provides guidance to actuaries in selecting economic assumptions for measuring obligations under defined benefit plans and was revised in January 2025. The standard requires that each economic assumption selected by the actuary should be reasonable which means it has the following characteristics:

- It is appropriate for the purpose of the measurement;
- It reflects the actuary's professional judgment;
- It takes into account historical and current economic data that is relevant as of the measurement date;
- It reflects the actuary's estimate of future experience, the actuary's observation of the estimates inherent in market data, or a combination thereof; and
- It has no significant bias (i.e., it is not significantly optimistic or pessimistic), except when provisions for adverse deviation or plan provisions that are difficult to measure are included and disclosed, or when alternative assumptions are used for the assessment of risk.

Each economic assumption should individually satisfy this standard. Furthermore, with respect to any particular valuation, each economic assumption should be consistent with every other economic assumption over the measurement period.

In our opinion, the economic assumptions recommended in this report have been developed in accordance with ASOP No. 27, as revised in January 2025. The following table shows our recommendation followed by detailed discussions of each assumption.

Item	Current	Proposed
Price Inflation	2.50%	2.50%
Real Rate of Return	4.40%	4.40%
Investment Return	6.90%	6.90%
Price Inflation	2.50%	2.50%
Real Wage Growth	0.50%	0.50%
Wage Inflation	3.00%	3.00%

SECTION II – ECONOMIC ASSUMPTIONS

Price Inflation

Background: Assumed price inflation is used as the basis for both the investment return assumption and the wage inflation assumption. These latter two assumptions will be discussed in detail in the following sections.

It is important that the price inflation assumption be consistently applied throughout the economic assumptions utilized in an actuarial valuation. This is called for in ASOP No. 27 and is also required to meet the parameters for determining pension liabilities and expenses under Governmental Accounting Standards Board (GASB) Statements No. 67 and 68.

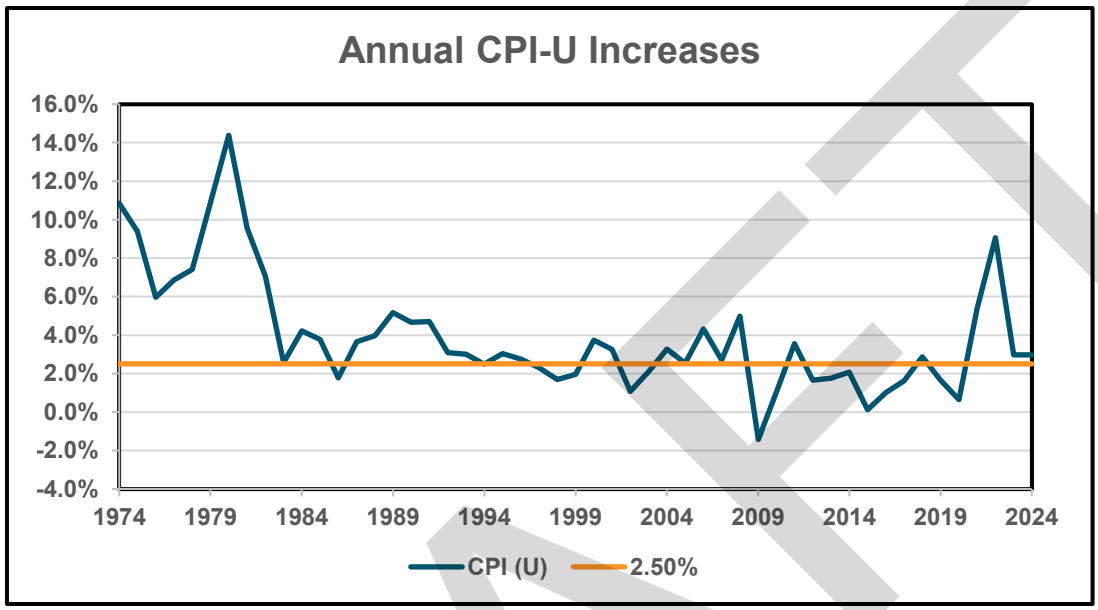
The current price inflation assumption is 2.50% per year.

Past Experience: The Consumer Price Index, US City Average, All Urban Consumers, CPI-U, has been used as the basis for reviewing historical levels of price inflation. The level of that index in June of each of the last 50 years is provided in Appendix A.

In analyzing this data, annual rates of inflation have been determined by measuring the compound growth rate of the CPI-U over various time periods. The results are as follows:

Period	Number of Years	Annualized Rate of Inflation	Annual Standard Deviation
1934 – 2024	90	3.57%	3.38%
1974 – 2024	50	3.79%	2.91%
1984 – 2024	40	2.81%	1.73%
1994 – 2024	30	2.54%	1.83%
2004 – 2024	20	2.55%	2.17%
2014 – 2024	10	2.80%	2.52%

The graph below shows the annual increases in the CPI-U over the 50-year period (1974-2024) compared to the 2.50% currently assumed.



As can be seen from the table on the previous page, over the last 30 years, the average annual rate of increase in the CPI-U has been just over 2.50%. The higher annual rates over the last few years have increased this average.

Forecasts:

Based upon information contained in the "Survey of Professional Forecasters" for the second quarter of 2025 as published by the Philadelphia Federal Reserve Bank, the median expected annual rate of inflation for the next ten years is 2.35%. Although 10 years of future expectation is too short of a period for the basis of our inflation assumption, the information does provide some evidence that the consensus expectations of these experts are for rates of inflation slightly less than our current assumption of 2.50% for the near-term future.

SECTION II – ECONOMIC ASSUMPTIONS

The spread between the yield on treasury securities (bonds) and the inflation indexed yield on Treasury Inflation Protected Securities (TIPS) of the same maturity is referred to as the "breakeven rate of inflation" and represents the bond market's expectation of inflation over the period to maturity. The table below provides the breakeven rates of inflation as of the beginning of June 2025.

Years to Maturity	Breakeven Rate of Inflation
10	2.33%
20	2.50%
30	2.31%

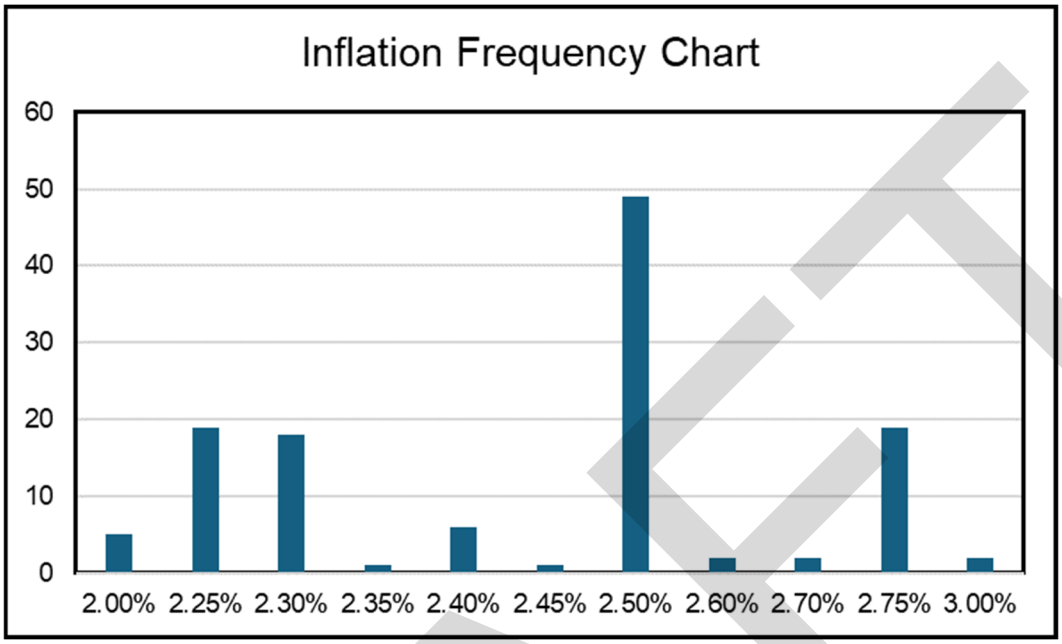
The bond market's expectation for the rate of inflation over the 30-year period is 2.31% which is lower than 30-year historical annualized rates and the current 2.50% assumed rate of inflation.

Social Security Administration:

Although many economists forecast lower inflation than the assumption used by most retirement plans, they are generally looking at a shorter time horizon than is appropriate for a pension valuation. To consider a longer, similar time frame, we looked at the expected increase in the CPI by the Office of the Chief Actuary for the Social Security Administration. In the 2024 annual report, the projected ultimate average annual increase in the CPI over the next 75 years was estimated to be 2.40%, under the intermediate (best estimate) cost assumption. The range of inflation assumptions used in the Social Security 75-year modeling, which includes a low and high-cost scenario, in addition to the intermediate cost projection, was 1.80% to 3.00%. These rates remained unchanged from their 2023 annual report.

Peer Comparison:

While we do not recommend the selection of any assumption based on what other systems use, it does provide another set of relevant information to consider. The following chart shows the inflation rate assumptions of 124 systems in the Research Database of the National Association of State Retirement Administrators (NASRA) for FY 2023 data. Based on the current data, the average inflation assumption is 2.46%. The assumptions are from actuarial valuations reported in FYE 2023. Although actual inflation spiked after the recovery from the pandemic, we have not really seen many plans increasing this assumption as we believe most systems expect long-term inflation to return to rates at or near where the Federal Reserve is targeting.



Recommendation:

Inflation's volatility has increased in the short-term, however, the longer-term annualized rate of inflation has remained relatively stable. Both the 10-year average of 2.80% and the 30-year average of 2.54% are slightly above the System's assumed rate of 2.50%. Further, the monetary policy of the Federal Reserve continues to target a 2.0% annual rate of inflation as measured by the rate of change in Personal Consumption Expenditures (PCE). Since the year 2000, the rate of change in the PCE has been 0.3% to 0.4% less than the rate of inflation as measured by the change in the CPI-U. We concur with these forecasts and recommend maintaining the inflation assumption for the System at 2.50%.

Price Inflation Assumption	
Current	2.50%
Recommended	2.50%

SECTION II – ECONOMIC ASSUMPTIONS

Investment Rate of Return

Background: The assumed investment return is one of the most significant assumptions in the annual actuarial valuation process as it is used to discount the expected future benefit payments for all active, inactive and retired members of the System. Minor changes in this assumption can have a major impact on valuation results. The investment return assumption should reflect the asset allocation target for the funds as established by the Fund's fiduciary, the State Treasurer.

The current assumption is 6.90% and is prescribed in state statutes. The assumption consists of a price inflation assumption of 2.50% and a real rate of return (return net of inflation) assumption of 4.40%. The return is net of investment expenses.

Long Term Perspective: Because the economy is constantly changing, assumptions about what may occur in the near term are volatile. Asset managers and investment consultants usually focus on this near-term horizon in order to make prudent choices regarding how to invest the trust funds. For actuarial calculations, we typically consider very long periods of time. For example, a newly hired employee who is 25 years old may work for 35 years, to age 60, and live another 30 years, to age 90 (or longer). The retirement system would receive contributions for the first 35 years and then pay out benefits for the next 30 years. During the entire 65-year period, the system is investing assets related to the member. For such a typical career employee, more than one-half of the investment income earned on assets accumulated to pay benefits is received after the employee retires. In addition, in an open, ongoing system, the stream of benefit payments is continually increasing as new hires replace current members who leave covered employment due to death, termination of employment, and retirement. This difference in the time horizon used by actuaries and investment consultants is frequently a source of debate and confusion when setting economic assumptions.

Past Experience: The assets for the System are valued using a widely accepted asset-smoothing methodology (4-year smoothing) that fully recognizes the expected investment income and also recognizes 25% of each year's investment gain or loss (the difference between actual and expected investment income). The recent experience over the last five years is shown in the table below.

Year Ending 6/30	Actuarial Value	Market Value
2020	6.48%	2.30%
2021	9.77%	25.58%
2022	5.49%	(8.70)%
2023	6.07%	8.57%
2024	8.06%	11.49%
Average	7.17%	7.85%

The impact of the asset smoothing method can be observed in the table. Although the average returns over the five-year period are very close, the return on actuarial value is, as expected, less variable. We also note, as provided by the guidance of the Actuarial Standards of Practice (ASOP), that we should not give undue weighting to recent experience when setting the long-term assumed future rate of return.

SECTION II – ECONOMIC ASSUMPTIONS

We next include in our analysis information concerning future expectations for the investment return assumption. The investment rate of return assumption has two component parts: the rate of price inflation and the real rate of investment return. This component approach is referred to as the building block method in ASOP No. 27. The price inflation component was discussed previously in this report; therefore, this section will focus on the real rate of investment return component.

Analysis: We utilized the current target asset allocation along with the 2024 Survey of Capital Market Assumptions produced by Horizon Actuarial Services, LLC. The Horizon survey includes both 10-year horizon and 20-year horizon capital market assumptions of several investment consultants. We further assumed that investment returns approximately follow a lognormal distribution with no correlation between years. The results below use the 20-year horizon assumptions and provide an expected range of real rates of return over and up to a 50-year time horizon. Looking at one-year results produces an expected real return of 6.1% but also has a high standard deviation or measurement of volatility. By expanding the time horizon, the compound average return approaches the expected median of future real returns, and the volatility declines significantly. The following table provides a summary of results. The geometric real rates of return are net of investment expenses.

Time Span In Years	Mean Real Return	Standard Deviation	Real Returns by Percentile				
			5th	25th	50th	75th	5th
1	6.1%	12.3%	-12.9%	-2.5%	5.4%	13.9%	27.4%
5	5.5%	5.5%	-3.2%	1.8%	5.4%	9.1%	14.7%
10	5.4%	3.9%	-0.8%	2.8%	5.4%	8.0%	11.9%
20	5.4%	2.7%	1.0%	3.5%	5.4%	7.2%	9.9%
30	5.4%	2.2%	1.8%	3.9%	5.4%	6.9%	9.1%
50	5.4%	1.7%	2.6%	4.2%	5.4%	6.5%	8.2%

Based on this analysis the median (50th percentile) real rate of return over a 50-year period is 5.4%. It can also be anticipated that for the 10-year time span, 50% of the expected compound average real rates of return were between 2.8% and 8.0%. As the time span increases, this spread begins to narrow. Over a 50-year time span, the analysis indicates there is a 25% likelihood that real returns will average below 4.2% and a 25% likelihood they will be above 6.5%. In other words, 50% of the distribution of expected compound average real returns will be between 4.2% and 6.5%.

SECTION II – ECONOMIC ASSUMPTIONS

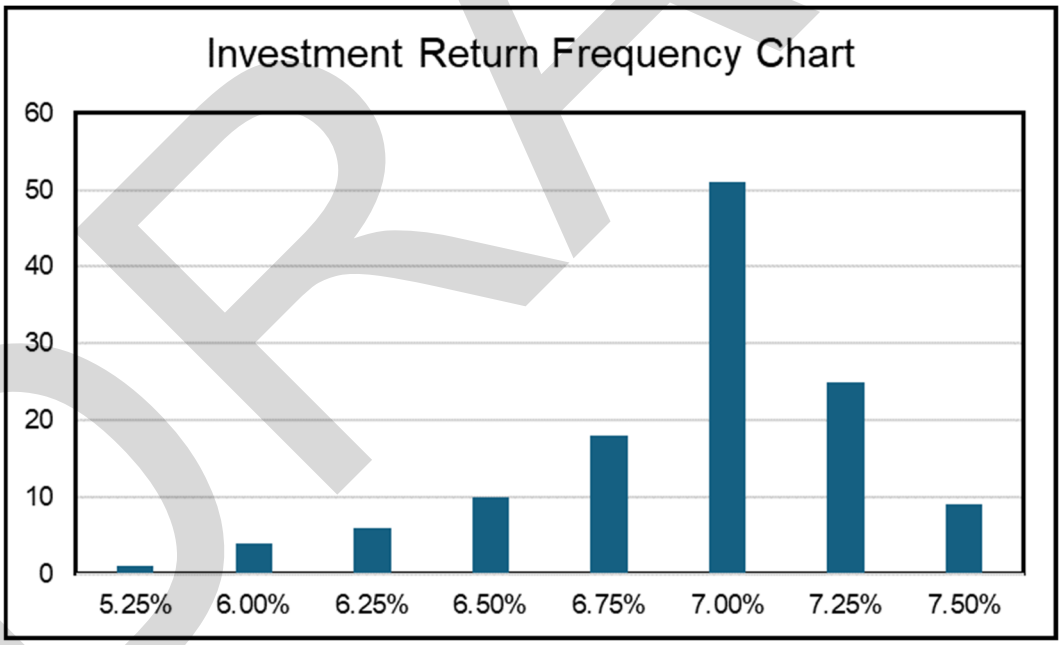
Using the building block approach of ASOP No. 27 and the projection results outlined above, we have determined a range for the investment return assumption of the 25th to 75th percentile real returns over the 50-year time span plus the recommended inflation assumption. The following table details the range.

Item	25th Percentile	50th Percentile	75th Percentile
Real Rate of Return*	4.2%	5.4%	6.5%
Inflation	2.5%	2.5%	2.5%
Net Investment Return	6.7%	7.9%	9.0%

* net of investment expenses

Using a 2.50% inflation assumption, the current investment return assumption of 6.90% utilizes a 4.40% real rate of return (using the "building block" methodology). Based on the analysis above, the assumed rate of return is reasonable.

Peer Comparison: The following chart shows the nominal investment return assumptions of 124 plans from the National Association of State Retirement Administrators (NASRA) Issue Brief entitled, "Public Pension Plan Investment Return Assumptions," updated March 2024. The median nominal investment return from this survey is 7.00%.



SECTION II – ECONOMIC ASSUMPTIONS

Recommendation: By actuarial standards, we are required to maintain a long-term perspective in setting all assumptions, including the investment return assumption. Therefore, we believe actuaries must be careful not to let recent experience or short-term expectations excessively impact our judgment regarding the appropriateness of the current assumption over the long term.

Since the investment return assumption is set in statute and the current assumed rate is reasonable based on current target asset allocation and capital market assumptions, in our opinion, the prescribed assumption of 6.90% is reasonable.

Below is a breakdown of the building block approach as recommended under ASOP No. 27.

Investment Return Assumption	
Real Rate of Return*	4.40%
Inflation	2.50%
Net Investment Return	6.90%

* net of investment expenses

Wage Inflation

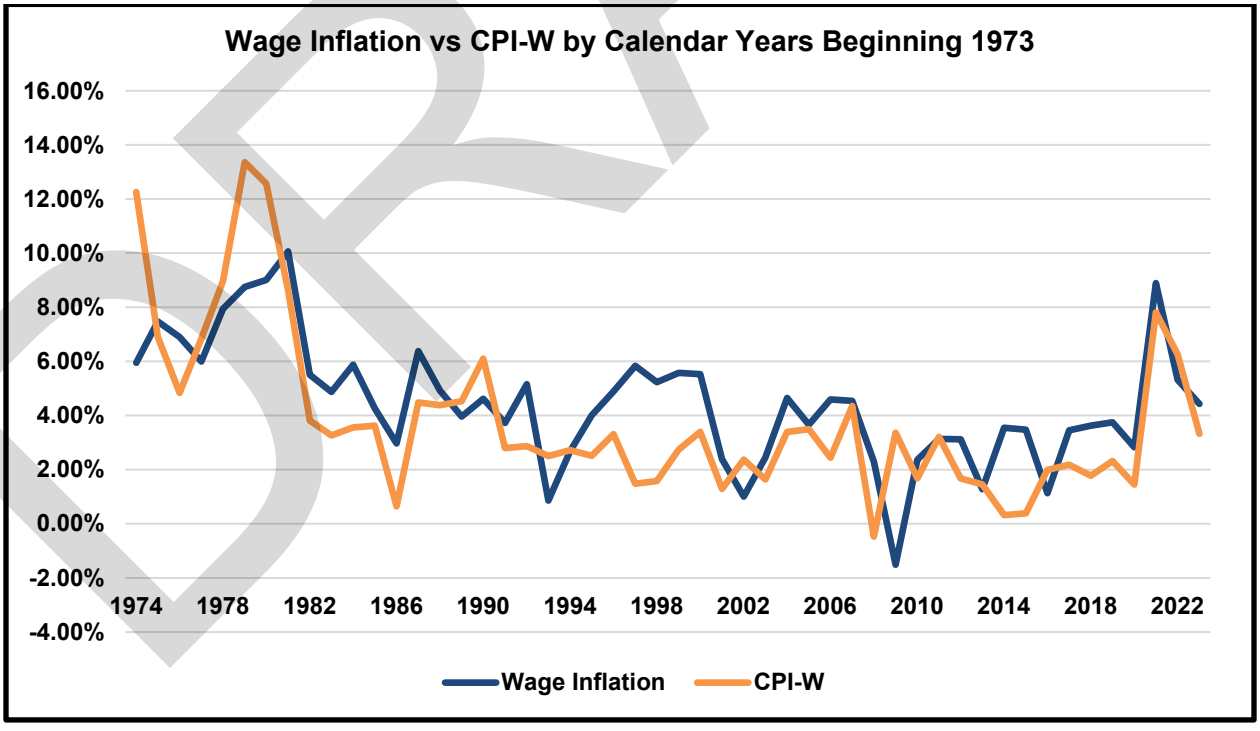
Background: The wage inflation assumption is composed of the price inflation assumption and an assumption for the real rate of wage increases. The salary increase assumption combines the wage inflation assumption with an assumption for promotion and longevity, often called merit increases. Merit assumptions are generally age and/or service related and will be dealt with in the demographic assumption section of the report. The excess of wage growth over price inflation is also considered the increase in productivity that labor provides.

The current wage inflation assumption is 3.00%, which is made up of the price inflation of 2.50% and the real wage growth assumption of 0.50%.

Past Experience:

The Social Security Administration maintains data on overall average wage growth in the United States and publishes the National Average Wage Index (NAWI). While this is the most comprehensive data available, it is based on all wage earners in the country so it can be influenced by the mix of jobs as well as by changes in certain sectors of the workforce that may not be seen by all segments.

Below is historical information on real wage inflation which uses the National Average Wage Index and inflation as measured by CPI (W). Currently, this wage data is only available through the calendar year 2023. We remove the rate of price inflation as measured by CPI (W) for each year from the data to review the historical real rate of wage inflation.



Based on the data in the chart above, it is difficult to assess a clear trend in the real rate of wage growth for our purposes. The recent historical impact of the pandemic on both wages and inflation is clearly evident in the recent rates.

Historical Data of Real Wage Growth Rate			
Ending 12/31/2023	Wage Inflation	Price Inflation	Real Wage Growth
10 Yr	4.03%	2.57%	1.46%
20 Yr	3.41%	2.52%	0.89%
30 Yr	3.59%	2.47%	1.11%
40 Yr	3.76%	2.76%	1.00%
50 Yr	4.44%	3.91%	0.53%

Over the 50-year period ending December 31, 2023, the annual real wage growth rate was negative 16 of the 50 years, nearly one-third of the time. This is commonly due to the lag in the rates of wage increases compared to rates of price inflation. For our purposes, we favor the longer-term annualized rates of real wage growth when considering this historical data in general.

The System's recent salary data over the study period for all plans is not useful for assessing the real rate of "across the board" wage increases due to the extreme rates of price inflation over the period. Any actual experience resulting in higher-than-expected rates of salary increases is attributable to the difference in the actual and expected rate of price inflation and not the assumed rate of real wage growth.

Recommendation

We are recommending maintaining the rate of real wage growth at 0.50% and adding it to the proposed 2.50% rate of price inflation assumptions results in an assumed rate of wage inflation of 3.00%.

Wage Inflation Assumption	
	Recommendation
Price Inflation	2.50%
Real Wage Growth	0.50%
Wage Inflation	3.00%

SECTION III – ACTUARIAL METHODS

Actuarial Cost Method

There are various actuarial cost methods, each of which has different characteristics, advantages and disadvantages. However, Governmental Accounting Standard Board (GASB) Statement Numbers 67 and 68 require that the Entry Age Normal cost method be used for financial reporting. Most systems do not want to use a different actuarial cost method for funding and financial reporting. In addition, the Entry Age Normal method has been the most common funding method for public systems for many years. This is the cost method currently used by the System.

The rationale of the Entry Age Normal (EAN) cost method is that the cost of each member's benefit is determined to be a level percentage of their salary from date of hire to the end of their employment with the employer. This level percentage multiplied by the member's annual salary is referred to as the normal cost and is that portion of the total cost of the employee's benefit that is allocated to the current year. The portion of the present value of future benefits allocated to the future is determined by multiplying this percentage times the present value of the member's assumed earnings for all future years including the current year. The Entry Age Normal actuarial accrued liability is then developed by subtracting from the present value of future benefits that portion of costs allocated to the future. To determine the unfunded actuarial accrued liability, the value of plan assets is subtracted from the Entry Age Normal actuarial accrued liability. The current year's cost to amortize the unfunded actuarial accrued liability is developed by applying an amortization factor.

It is to be expected that future events will not occur exactly as anticipated by the actuarial assumptions in each year. Actuarial gains/losses from experience under this actuarial cost method can be directly calculated and are reflected as a decrease/increase in the unfunded actuarial accrued liability. Consequently, the gain/loss results in a decrease/increase in the amortization payment, and therefore the contribution rate.

Considering that the Entry Age Normal cost method is the most commonly used cost method by public plans, that it develops a normal cost rate that tends to be stable and less volatile and is the required cost method under calculations required by GASB Numbers 67 and 68, we recommend use of the Entry Age Normal actuarial cost method be continued for the System.

SECTION III – ACTUARIAL METHODS

Actuarial Value of Assets

In preparing an actuarial valuation, the actuary must assign a value to the assets of the fund. An adjusted market value is often used to smooth out the volatility that is reflected in the market value of assets. This is because most employers would rather have annual costs remain relatively smooth, as a percentage of payroll or in actual dollars, as opposed to a cost pattern that is extremely volatile.

The actuary does not have complete freedom in assigning this value. The Actuarial Standards Board also has basic principles regarding the calculation of a smoothed asset value, Actuarial Standard of Practice No. 44 (ASOP 44), *Selection and Use of Asset Valuation Methods for Pension Valuations.*

ASOP 44 provides that the asset valuation method should bear a reasonable relationship to the market value. Furthermore, the asset valuation method should be likely to satisfy both of the following:

- Produce values within a reasonable range around market value, AND
- Recognize differences from market value in a reasonable amount of time.

In lieu of both of the above, the standard will be met if either of the following requirements is satisfied:

- There is a sufficiently narrow range around the market value, OR
- The method recognizes differences from market value in a sufficiently short period.

These rules or principles prevent the asset valuation methodology from being used to manipulate annual funding patterns. No matter what asset valuation method is used, it is important to note that, like a cost method or actuarial assumptions, the asset valuation method does not affect the true cost of the plan; it only impacts the incidence of cost.

Currently, the actuarial value of assets recognizes a portion of the difference between the market value of assets and the expected market value of assets, based on the assumed valuation rate of return. The amount recognized each year is 25% of the difference between market value and expected market value or a 4-year smoothed period. This method is in widespread use and complies with ASOP 44 guidance. We recommend no change to the asset smoothing method.

Amortization of the Unfunded Actuarial Accrued Liability

The actuarial accrued liability is the portion of the actuarial present value of future benefits that is not included in future normal costs. Thus, it represents the liability that, in theory, should have been funded through normal costs for past service. Unfunded actuarial accrued liability (UAAL) exists when the actuarial accrued liability exceeds the actuarial value of plan assets. These deficiencies can result from:

(i) plan improvements that have not been completely paid for,
(ii) experience that is less favorable than expected,
(iii) assumption changes that increase liabilities, or
(iv) contributions that are less than the expected amount.

With the enactment of Public Act 19-117 (PA 19-117), the amortization method is provided under State statutes. Effective with the June 30, 2020 actuarial valuation, the method establishes a 30-year amortization period for the UAAL which exists as of June 30, 2018 with subsequent changes to the UAAL amortized separately over closed 25-year periods. This is commonly referred to as a layered amortization method and is expected to reduce the future contribution volatility as compared to the prior method. Also, PA 19-117 provides the payment amounts will be determined under a 5-year phase-in from level percent of payroll amortization payments to a level dollar amount amortization.

Under the level percent method, the initial amortization payments are lower than they would be under a level dollar amortization payment method, but the payments increase at the expected payroll growth rate each year so that ultimately the annual payment far exceeds the level dollar payment. In contrast, the level dollar amortization payment method is similar to the method in which a homeowner commonly pays off a mortgage. The liability, once calculated, is financed by a constant fixed dollar amount, based on the amortization period until the liability is fully amortized. This results in the liability steadily decreasing as each payment, like a mortgage, pays all the interest on the UAAL and a portion of the principal amount of the UAAL.

We recommend no change in the current methodology.

SECTION IV – DEMOGRAPHIC ASSUMPTIONS

There are several demographic assumptions used in the actuarial valuations performed for the System. They are:

- Rates of Mortality
- Rates of Retirement
- Rates of Withdrawal
- Rates of Disability
- Rates of Salary Increase

The Actuarial Standards Board has issued a revised Actuarial Standard of Practice (ASOP) No. 27, *"Selection of Assumptions for Measuring Pension Obligations"* as of January 2025, which provides guidance to actuaries in selecting demographic assumptions for measuring obligations under defined benefit plans. In our opinion, the demographic assumptions recommended in this report have been developed in accordance with ASOP No. 27.

The purpose of a study of demographic experience is to compare what actually happened to the membership during the study period (July 1, 2019 through June 30, 2024) with what was expected to happen based on the assumptions used in the most recent Actuarial Valuations.

Detailed tabulations by age, service and/or gender are performed over the entire study period. These tabulations look at all active and retired members during the period as well as separately annotating those who experience a demographic event, also referred to as a decrement. In addition, the tabulation of all members together with the current assumptions permits the calculation of the number of expected decrements during the study period.

If the actual experience differs significantly from the overall expected results, or if the pattern of actual decrements, or rates of decrement, by age, gender, or service does not follow the expected pattern, new assumptions are recommended. Recommended changes usually do not follow the exact actual experience during the observation period. Judgment is required to extrapolate future experience from past trends and current member behavior.

The remainder of this section presents the results of the demographic study. We have prepared tables that show a comparison of the actual and expected decrements and the overall ratio of actual to expected results (A/E Ratios) under the current assumptions. If a change is being proposed, the revised A/E Ratios are shown as well. Salary adjustments, other than the economic assumption for wage inflation discussed in the previous section, are treated as demographic assumptions.

SECTION IV – DEMOGRAPHIC ASSUMPTIONS

RATES OF MORTALITY

One of the most important demographic assumptions in the valuation is mortality because it projects how long benefit payments will be made. The longer members live, the greater the true cost of future benefit obligations will be.

Over the last few generations, rates of mortality have been declining, meaning people are generally living longer. Furthermore, the actual experience of large, public retirement systems that include school employees indicate that school groups, and teachers in particular, continue to exhibit better mortality than the average working population.

Because of the substantial amount of data required to construct a mortality table, actuaries usually rely on standard tables published by the Society of Actuaries. Actuaries often then use various adjustments to these published mortality tables in order to better match the observed mortality rates of a specific group.

The first of these adjustments can be an age adjustment that is either a "set back" or a "set forward". A one-year age set back treats all members as if they were one year younger than they truly are when applying the rates in the mortality table. So, a one-year age set back would treat a 61-year-old retiree as if she will exhibit the mortality of a 60-year-old in the standard mortality table.

The second adjustment that can be used to adjust the mortality rates in a standard table to better fit actual experience is to "scale" a mortality table by multiplying the probabilities of death by factors less than one (to reflect better mortality) or factors greater than one (to reflect poorer mortality). Scaling factors can be applied to an entire table or a portion of the table. Of course, if needed, actuaries may use both of these methods to develop an appropriate table to model the mortality of the specific plan population.

In 2019, the Society of Actuaries (SOA) released a family of mortality tables named the Pub-2010 tables. While prior pension mortality tables have been based solely on private corporate and union retirement plans, these new tables are based entirely on public sector plan data. These tables are split by three membership types: Safety, Teachers, and General to reflect the observed differences in mortality patterns related to the three groups. Tables are further split for healthy retirees, disabled retirees, contingent beneficiaries, and employees. In May of 2025, the SOA released an updated set of mortality tables named the Pub-2016 tables which are organized in a similar fashion as the Pub-2010 tables.

The issue of future mortality improvement is one that the actuarial profession has become increasingly focused on studying and monitoring. This has resulted in changes to the relevant Actuarial Standard of Practice, ASOP 27, *Selection of Assumptions for Measuring Pension Obligations*. This ASOP requires the pension actuary to make and disclose a specific recommendation with respect to future improvements in mortality after the valuation date, although it does not require that an actuary assume there will be future improvements. There have been significant improvements in longevity in the past, although there are different opinions about future expectations, and thus there is a subjective component in the estimation of future mortality improvement. We believe it is prudent to anticipate that the trend will continue to some degree in the future and that it is appropriate to reflect future mortality improvement as part of the mortality assumption.

SECTION IV – DEMOGRAPHIC ASSUMPTIONS

There are two widely used ways to reflect future improvements in mortality:

(1) Static table with "margin"
(2) Generational mortality

The first approach to reflecting mortality improvements is through the use of a static mortality table with "margin." Under this approach, the Actual to Expected Ratio is intentionally targeted to be over 100% so that mortality can improve without expecting to create significant actuarial losses over the period until the following experience study. In this manner, it could be expected that as mortality improves, each successive experience study will require mortality assumption changes which will have an increase in the measured liabilities.

Another approach, referred to as generational mortality, directly anticipates future improvements in mortality by using a different set of mortality rates based on each year of birth, with the rates for later years of birth assuming lower mortality than the rates for earlier years of birth. The varying mortality rates by year of birth create a series of tables that contain "built-in" mortality improvements, e.g., a member who turns age 65 in 2045 has a longer life expectancy than a member who turns age 65 in 2025. When using generational mortality, the Actual to Expected Ratios for the observed experience are set near 100% as future mortality improvements will be considered directly in the actuarial valuation process. The generational approach is the preferred method for recognizing future mortality improvements in the valuation process because it is more direct and results in longer life expectancy for members who are younger, consistent with established trends in improved longevity. In this manner, with future mortality improvements already considered, the adjustments to the mortality assumptions in each experience study will be expected to be minor and not significantly impact the measured liabilities.

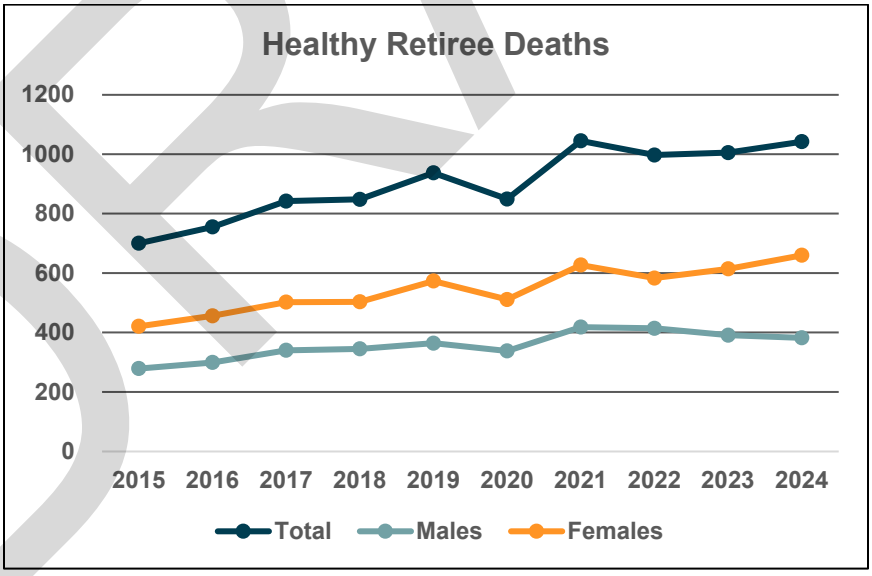
The generational approach is our preferred method for recognizing future mortality improvements in the valuation process because it is more direct and results in longer life expectancy for members who are younger, consistent with what we believe is more likely to occur.

Mortality – Healthy Retirees

The current basis for rates of mortality for healthy retirees is the PubT-2010 Healthy Retiree Table with rates adjusted by 105% for males and 103% for females at ages 82 and above. These rates are projected generationally with scale MP-2019.

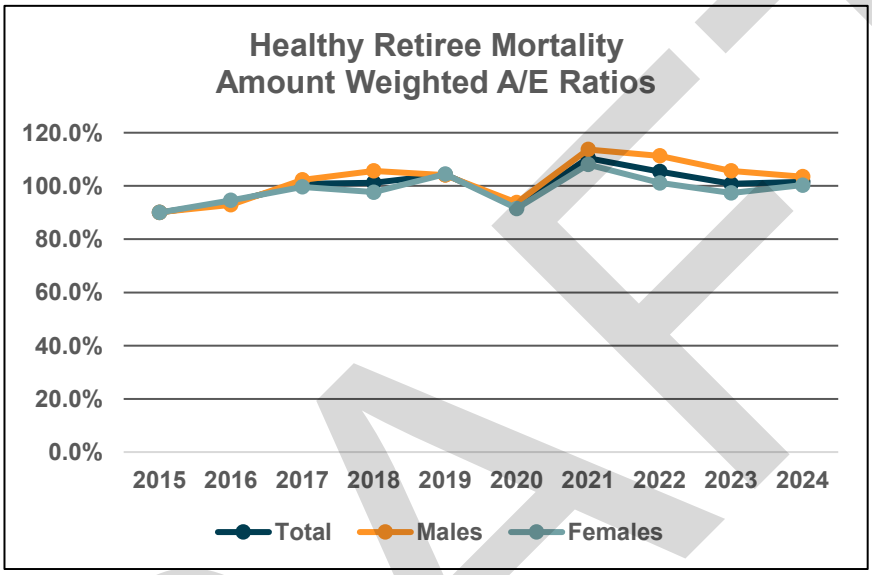
It is common in demographic studies to weight the exposures and decrements by an approximation of the associated liability. In this study we have analyzed recent experience on a benefit-weighted basis where the exposures and deaths are weighted by annual retirement benefit amounts. Because a valuation is designed to measure the amount and timing of future benefit payments (liability) rather than simply the number of retirees leaving pay status, this benefit-weighted approach is an important factor in valuing plan obligations. (Note that most mortality tables used by actuaries are developed on a weighted basis.) This also helps to reflect any differences that arise from better mortality experience among those with larger benefits. Please note that we are not saying that larger benefits definitely lead to better mortality, but simply that there is a correlation between the two.

The graph below shows the number of healthy retiree deaths for the System over the last 10 years in total as well as by gender. Over that span, the number of deaths each year has steadily increased from around 700 in 2015 to a little over 1,000 in 2024. Much of this increase can be attributed to the increase in the number of retired members in the System over that time and that this population continues to age as a group. There is an apparent dip in the number of deaths in 2020 followed by a spike in 2021. This was at the very beginning of the COVID-19 pandemic. It seems likely that the dip in 2020 may have been due to a lag in the reporting of some deaths which in turn may have inflated the number of deaths in 2021. If those two years were to be averaged together, the longer 10-year trend would seem to hold.



SECTION IV – DEMOGRAPHIC ASSUMPTIONS

It is unclear at this time how the pandemic will continue to affect both short term and long-term mortality patterns. It is quite possible that expected deaths will, in the coming years, continue to return to their previous norms. When comparing the weighted A/E ratios over the last 10 years (as shown in the figure below), for the most part actual deaths have been approximately 100% of the expected deaths. There was an increase in 2021 which may be considered the height of the pandemic in terms of excess deaths but the A/E ratios have steadily been trending back down to 100% in recent years.



The tables below and on the next page present the actual to expected analysis of mortality experience. While the graphs above looked at 10-year trends, the tables below and the remaining analysis focuses on the 5-year study period from July 1, 2019 through June 30, 2024.

Healthy Retirees Mortality Experience
Males

Central Age	Exposures	Actual Deaths	Expected Deaths under Current Assumptions	Count Based A/E Ratio	Weighted A/E Ratio
62 & Under	1,545	8	6.0	133.3%	128.2%
65	5,250	30	32.7	91.7%	80.0%
70	11,178	129	116.9	110.4%	104.6%
75	15,017	299	279.4	107.0%	102.6%
80	9,842	366	348.6	105.0%	98.3%
85	5,314	441	370.4	119.1%	116.9%
90	2,933	419	373.6	112.2%	107.4%
93 & Over	1,025	251	224.4	111.9%	109.2%
Total	52,104	1,943	1,752.0	110.9%	105.7%

Healthy Retirees Mortality Experience Females					
Central Age	Exposures	Actual Deaths	Expected Deaths under Current Assumptions	Count Based A/E Ratio	Weighted A/E Ratio
62 & Under	5,787	23	18.0	127.8%	114.5%
65	19,027	77	85.3	90.3%	88.7%
70	35,076	214	251.9	85.0%	81.5%
75	33,535	433	442.1	97.9%	99.3%
80	18,371	469	481.5	97.4%	96.1%
85	10,102	554	528.0	104.9%	106.5%
90	5,986	618	584.5	105.7%	106.1%
93 & Over	2,941	607	559.6	108.5%	111.1%
Total	130,825	2,995	2,950.9	101.5%	99.8%

Overall, the current assumed mortality rates performed quite well over the study period as A/E ratios are very close to 100% both in total and for many age sub-groups. We do note that at the highest ages, actual deaths tended to be higher than expected for both males and females even though the current mortality assumption rates had adjustments made specifically to avoid this.

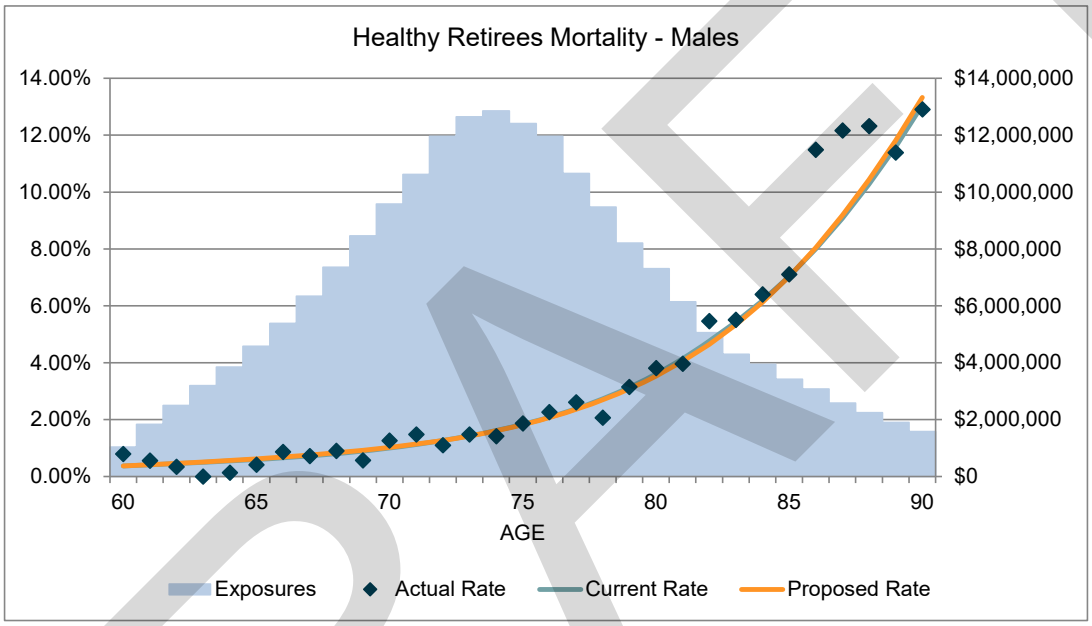
In May of 2025, the SOA released updated mortality tables called the Pub-2016 tables. Like the Pub-2010 tables, these mortality rates were developed exclusively from public sector retirement system data and include Teacher specific tables among tables for other employee types. We also note that, since the last experience study, there have been additional mortality improvement scales released by the SOA. The most recent of these is MP-2021. After analyzing the study data, we have concluded that the Pub-2016 Teacher table in conjunction with MP-2021 provides a better fit to mortality patterns than the current mortality assumption tables.

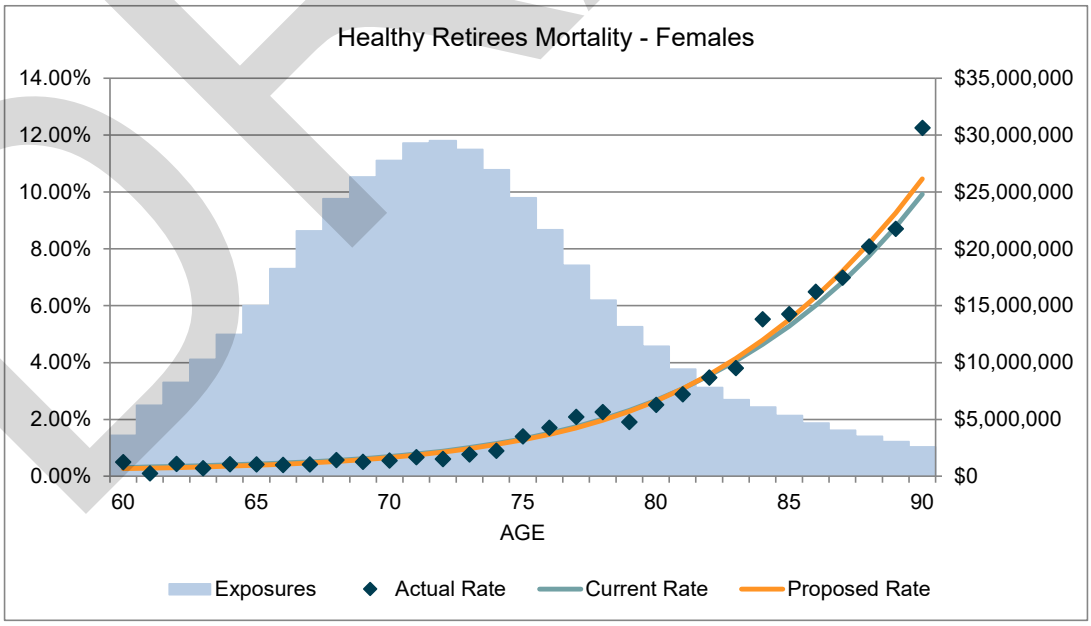
We recommend that the rates of healthy post-retirement mortality be revised to the PubT-2016 Healthy Retiree Table, without adjustments. We further recommend the use of the MP-2021 mortality improvement scale generationally to anticipate future mortality improvements.

SECTION IV – DEMOGRAPHIC ASSUMPTIONS

The following graphs show a comparison of the current, actual and proposed rates of healthy retiree mortality. The right axis of the charts below represents the number of exposed benefit amounts. The exposed benefit amounts are a proxy for the liability subject to mortality rates based upon the benefit recipient's age during the experience period. When recommending assumption changes, it is important to recognize actual experience in areas of higher exposures versus areas of lower exposures when recommending changes to the assumed retirement rates.

The left axis of the charts below show (i) the actual rates of mortality for retirees by age during the past five years, (ii) the current assumed rates of mortality and (iii) the recommended rates of mortality.





The resulting A/E ratios are shown in the following tables.

Healthy Retirees Mortality Experience
Males

Central Age	Actual Deaths	Expected Deaths under Proposed Assumptions	Weighted A/E Ratio under Current Assumptions	Weighted A/E Ratio under Proposed Assumptions
62 & Under	8	6.2	128.2%	125.2%
65	30	34.1	80.0%	76.7%
70	129	119.4	104.6%	102.4%
75	299	279.2	102.6%	102.7%
80	366	343.5	98.3%	99.7%
85	441	372.0	116.9%	116.4%
90	419	383.1	107.4%	104.7%
93 & Over	251	235.8	109.2%	104.0%
Total	1,943	1,773.3	105.7%	104.8%

Healthy Retirees Mortality Experience
Females

Central Age	Actual Deaths	Expected Deaths under Proposed Assumptions	Weighted A/E Ratio under Current Assumptions	Weighted A/E Ratio under Proposed Assumptions
62 & Under	23	15.8	114.5%	130.1%
65	77	77.7	88.7%	97.4%
70	214	241.7	81.5%	84.9%
75	433	433.2	99.3%	101.4%
80	469	480.3	96.1%	96.4%
85	554	552.6	106.5%	101.8%
90	618	617.2	106.1%	100.5%
93 & Over	607	576.6	111.1%	107.5%
Total	2,995	2,995.1	99.8%	99.2%

Other Mortality Tables

There was limited data available to analyze mortality for other groups within the System. We assume the trend of future mortality experience should follow the expectation of the retirees and we recommend the same family of mortality tables as follows:

For disabled retirees, we recommend adopting the PubT-2016 Disabled Retiree Table with no adjustments projected generationally with MP-2021.

For contingent survivors and beneficiaries, we recommend adopting the PubT-2016 Contingent Survivor Table with no adjustments projected generationally with MP-2021.

For active members, we recommend adopting the PubT-2016 Employee Table with no adjustments projected generationally with MP-2021.

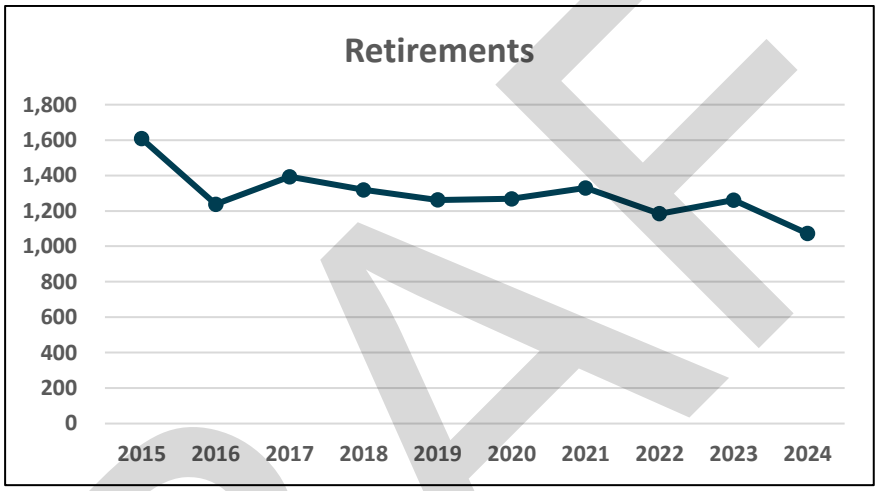
For deferred vested members, we recommend adopting the active member mortality table for the period before commencement of benefits and the healthy retiree mortality table for the period after commencement of benefits.

SECTION IV – DEMOGRAPHIC ASSUMPTIONS

RATES OF RETIREMENT

The rates of retirement are used to determine the expected number of separations from active service due to election of retirement under the applicable retirement provisions. The plan provides for unreduced (normal), proratable, and early forms of retirement based on different eligibility requirements. There are four sets of retirement rates to handle the different types of retirement.

The graph below shows the number of retirements for the System over the last 10 years. During that time, there has been a downward trend in the number of retirements each year. It is unclear to what degree the COVID-19 pandemic has had an impact on recent retirement patterns or what it means for the near term.



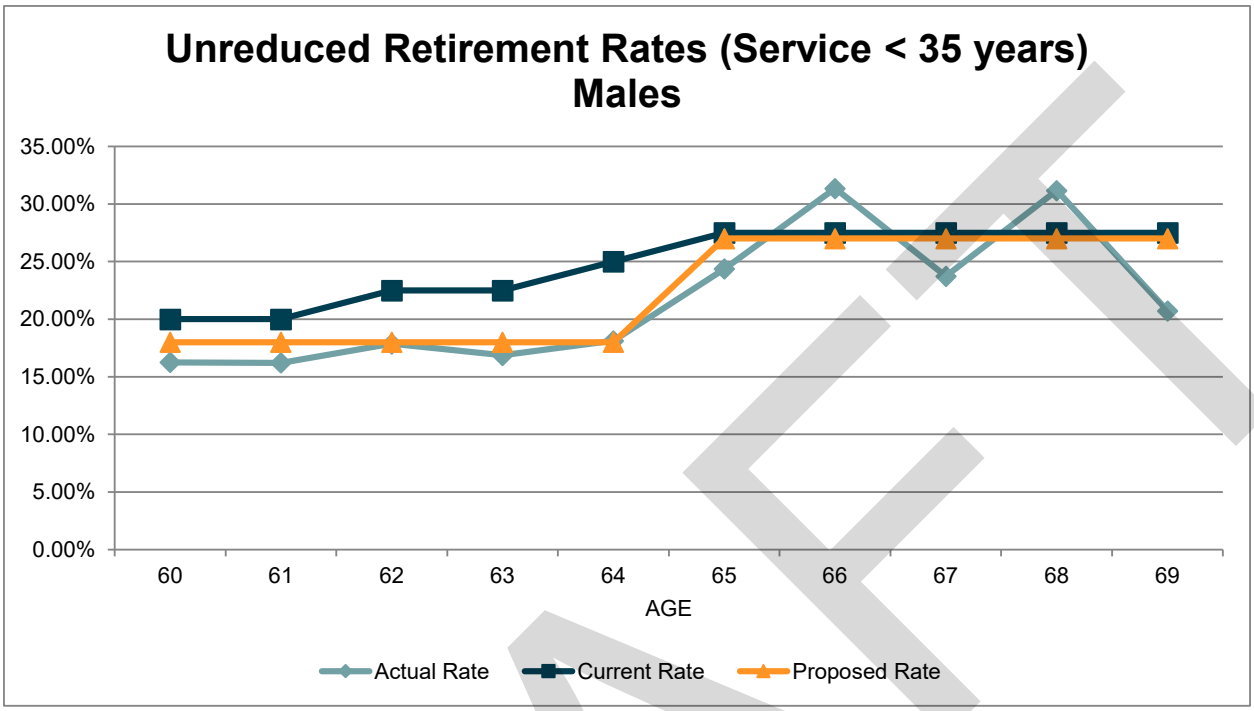
The tables that follow on the next several pages present the actual to expected analysis of retirement experience. While the graph above looked at 10-year trends, the tables that follow and the remaining analysis focuses on the 5-year study period from July 1, 2019 through June 30, 2024. In this study we have analyzed recent retirement experience on a benefit-weighted basis where the exposures and retirements are weighted by annual member salary amounts.

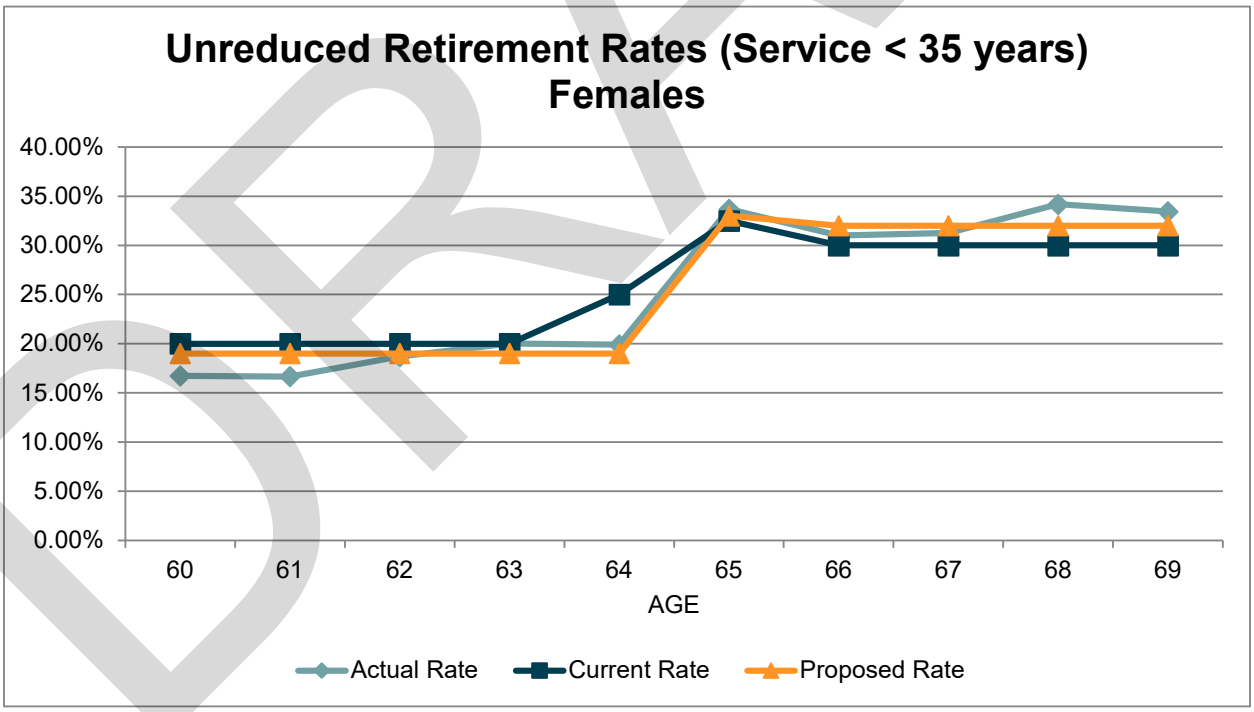
Rates of Unreduced Retirement (with less than 35 years of service)

Males eligible for unreduced retirement with less than 35 years of service				
			A/E Ratio	
Age	Actual	Expected	Count	Weighted
60	92	111.8	0.823	0.813
61	77	92.6	0.832	0.810
62	67	88.0	0.762	0.794
63	55	71.6	0.769	0.749
64	53	70.3	0.754	0.725
65	58	63.8	0.909	0.886
66	57	49.2	1.158	1.140
67	30	35.8	0.839	0.863
68	34	29.4	1.155	1.133
69	17	20.9	0.813	0.753
70 and over	76	117.9	0.645	0.648
Total	616	751.2	0.820	0.810

Females eligible for unreduced retirement with less than 35 years of service				
			A/E Ratio	
Age	Actual	Expected	Count	Weighted
60	284	338.8	0.838	0.836
61	248	291.2	0.852	0.833
62	251	264.8	0.948	0.935
63	230	229.8	1.001	1.002
64	208	255.0	0.816	0.796
65	321	306.8	1.046	1.036
66	232	222.6	1.042	1.033
67	185	175.2	1.056	1.042
68	156	133.2	1.171	1.139
69	116	103.5	1.121	1.114
70 and over	244	356.1	0.685	0.683
Total	2,475	2,677.0	0.925	0.914

For males, there were fewer retirements than expected particularly at ages below age 65. For females there were also fewer retirements than expected below age 65 but slightly more retirements at ages above 65. We believe modest adjustment to the current rates would be appropriate. We recommend slight decreases to the female assumed retirement rates below age 65 and slight increases in retirement rates above age 65 and slight decreases to the male assumed retirement rates. The following graphs show the actual rates of retirement by age compared with the current assumed retirement rates as well as the recommended rates.


Unreduced Retirement Rates (Service < 35 years)
Males
35.00%
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
60
61
62
63
64
65
66
67
68
69
AGE
Actual Rate
Current Rate
Proposed Rate


Unreduced Retirement Rates (Service < 35 years)
Females
40.00%
35.00%
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
60
61
62
63
64
65
66
67
68
69
AGE
Actual Rate
Current Rate
Proposed Rate

The resulting A/E ratios are shown in the following tables.

Males eligible for unreduced retirement with less than 35 years of service		
	Weighted A/E Ratio	
Age	Current	Proposed
60	0.813	0.903
61	0.810	0.900
62	0.794	0.993
63	0.749	0.937
64	0.725	1.007
65	0.886	0.902
66	1.140	1.161
67	0.863	0.879
68	1.133	1.154
69	0.753	0.767
70 and over	0.648	0.655
Total	0.810	0.902

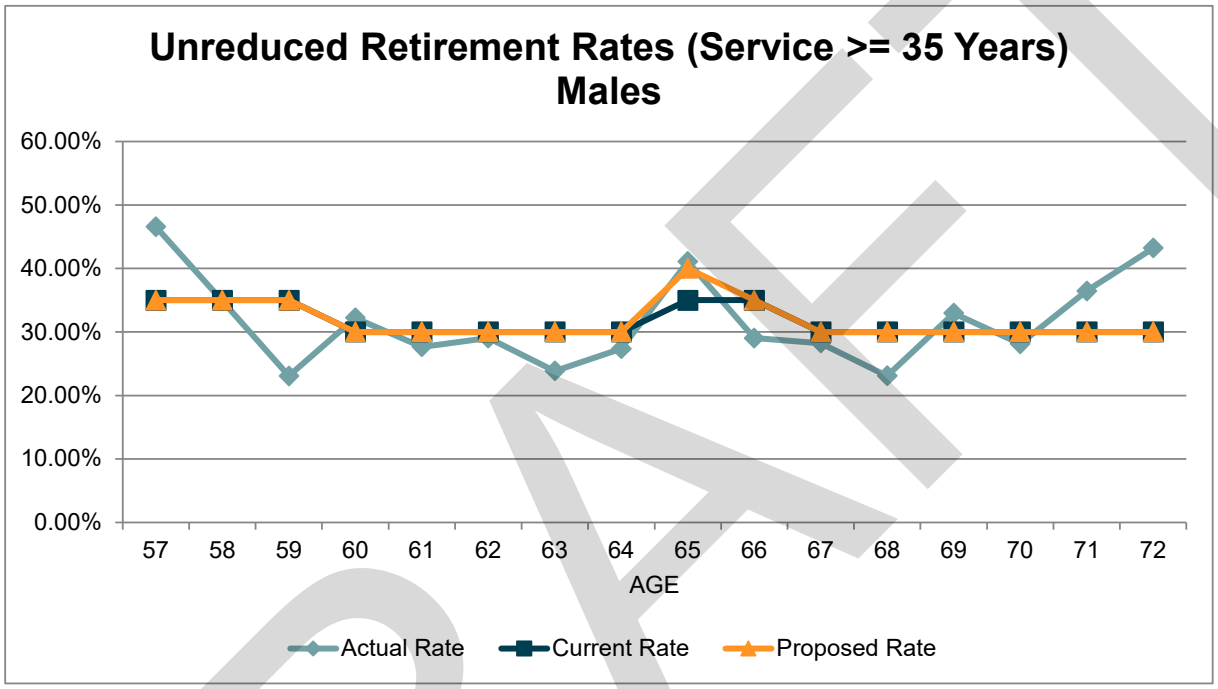
Females eligible for unreduced retirement with less than 35 years of service		
	Weighted A/E Ratio	
Age	Current	Proposed
60	0.836	0.880
61	0.833	0.877
62	0.935	0.984
63	1.002	1.054
64	0.796	1.047
65	1.036	1.020
66	1.033	0.968
67	1.042	0.977
68	1.139	1.068
69	1.114	1.045
70 and over	0.683	0.655
Total	0.914	0.933

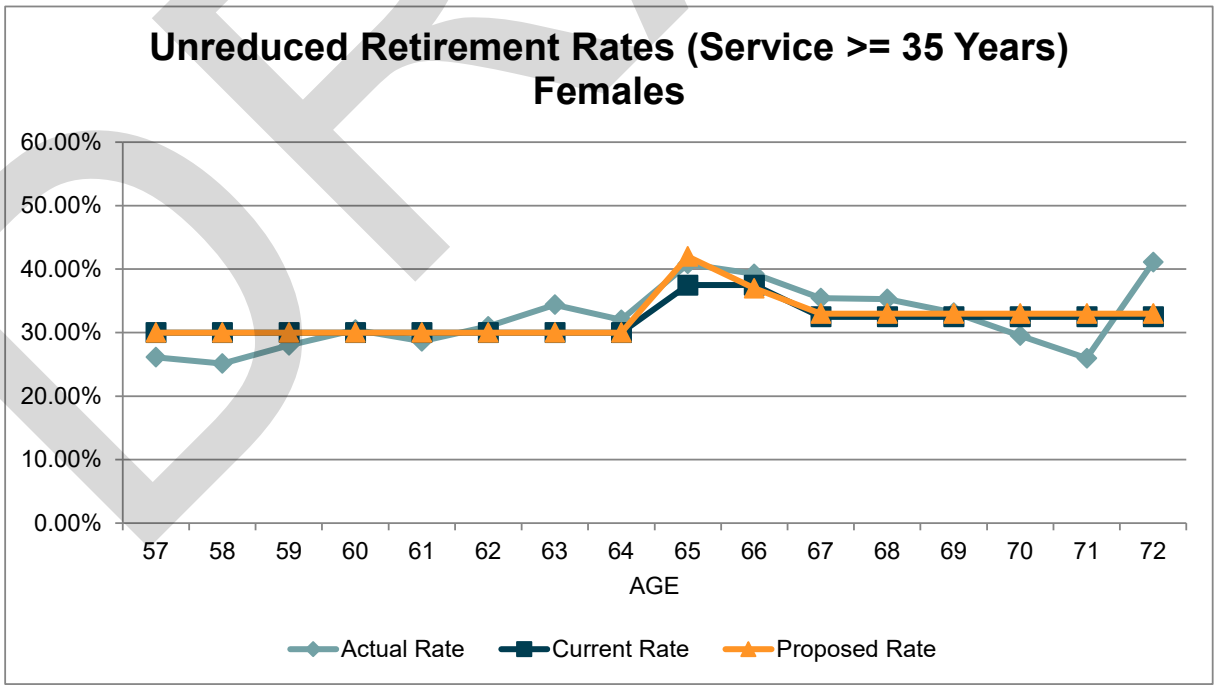
Rates of Unreduced Retirement (with 35 or more years of service)

Males eligible for unreduced retirement with 35 or more years of service				
			A/E Ratio	
Age	Actual	Expected	Count	Weighted
55	0	0.0	0.000	0.000
56	0	0.0	0.000	0.000
57	11	8.8	1.257	1.330
58	17	17.9	0.952	0.996
59	17	26.6	0.639	0.659
60	36	33.3	1.081	1.074
61	31	35.1	0.883	0.922
62	38	40.8	0.931	0.968
63	30	37.2	0.806	0.795
64	31	35.4	0.876	0.912
65	46	40.3	1.143	1.174
66	23	26.6	0.865	0.830
67	18	20.4	0.882	0.941
68	14	17.7	0.791	0.769
69	17	15.6	1.090	1.098
70 and over	51	75.2	0.678	0.669
Total	380	430.8	0.882	0.895

Females eligible for unreduced retirement with 35 or more years of service				
			A/E Ratio	
Age	Actual	Expected	Count	Weighted
55	0	0.0	0.000	0.000
56	1	1.5	0.667	0.672
57	52	62.1	0.837	0.871
58	100	119.7	0.835	0.837
59	132	141.3	0.934	0.933
60	147	145.5	1.010	1.016
61	127	135.0	0.941	0.954
62	124	118.2	1.049	1.033
63	124	107.7	1.151	1.147
64	113	102.9	1.098	1.067
65	128	115.9	1.105	1.088
66	78	74.3	1.051	1.047
67	55	51.7	1.064	1.090
68	55	49.7	1.106	1.086
69	37	34.8	1.064	1.020
70 and over	129	188.4	0.685	0.670
Total	1,402	1,448.6	0.968	0.963

Over the study period, there were slightly fewer retirements for males than expected with the notable exception at age 65. We recommend increasing the rate of retirement at age 65 but maintaining the current rates at all other ages. Likewise for females, but to a lesser extent, there were fewer retirements than expected but more at age 65. We believe only modest adjustments to the current rates are appropriate. The following graphs show the actual rates of retirement by age compared with the current assumed retirement rates as well as the recommended rates.





The resulting A/E ratios are shown in the following tables.

Males eligible for unreduced retirement with 35 or more years of service		
	Weighted A/E Ratio	
Age	Current	Proposed
55	0.000	0.000
56	0.000	0.000
57	1.330	1.330
58	0.996	0.996
59	0.659	0.659
60	1.074	1.074
61	0.922	0.922
62	0.968	0.968
63	0.795	0.795
64	0.912	0.912
65	1.174	1.027
66	0.830	0.830
67	0.941	0.941
68	0.769	0.769
69	1.098	1.098
70 and over	0.669	0.669
Total	0.895	0.883

Females eligible for unreduced retirement with 35 or more years of service		
	Weighted A/E Ratio	
Age	Current	Proposed
55	0.000	0.000
56	0.672	0.672
57	0.871	0.871
58	0.837	0.837
59	0.933	0.933
60	1.016	1.016
61	0.954	0.954
62	1.033	1.033
63	1.147	1.147
64	1.067	1.067
65	1.088	0.972
66	1.047	1.061
67	1.090	1.074
68	1.086	1.070
69	1.020	1.005
70 and over	0.670	0.664
Total	0.963	0.952

In addition, we recommend introducing 100% retirement rates for members upon attaining 37.5 years of service and thus reach the maximum benefit accrual of 75% of final average earnings. Some teachers do elect to continue working beyond this point even though it can represent a declining value in their pension as the amount of their retirement benefit may not grow with each additional year of service enough to offset the cumulative benefit payments not received by delaying retirement. We believe it would be more prudent to assume that teachers will behave in a way to maximize the value of their benefit.

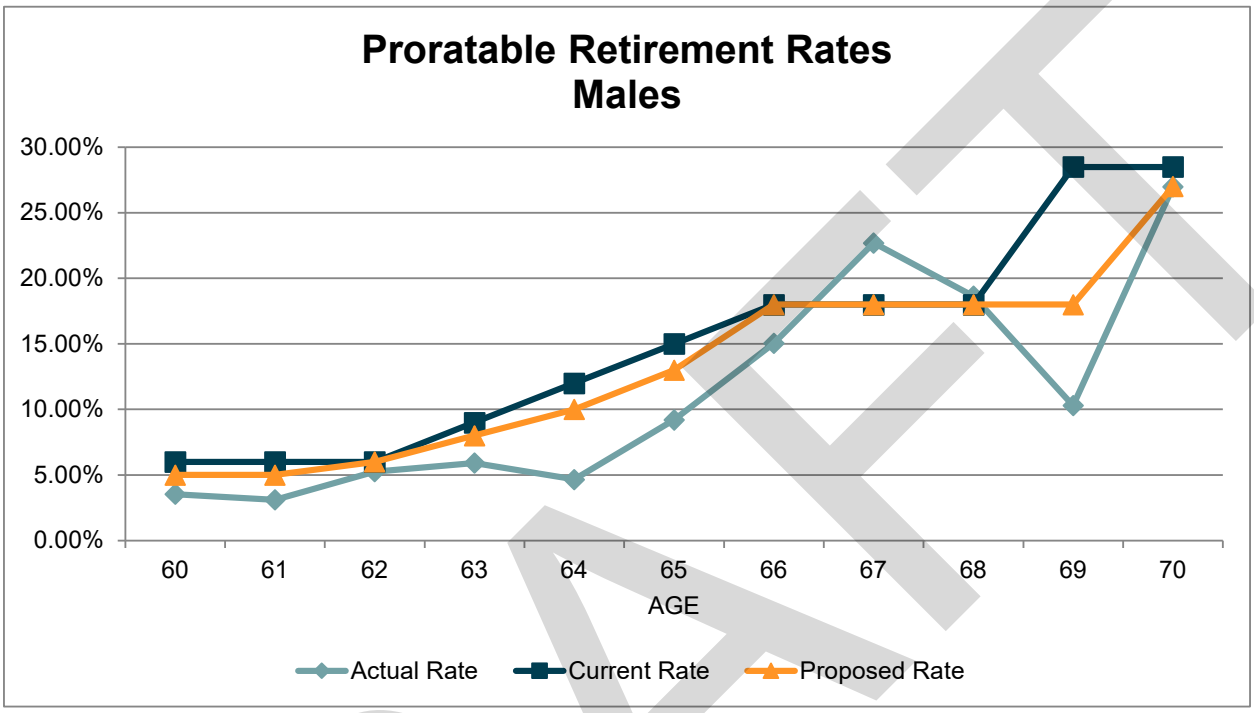
Rates of Proratable Retirement

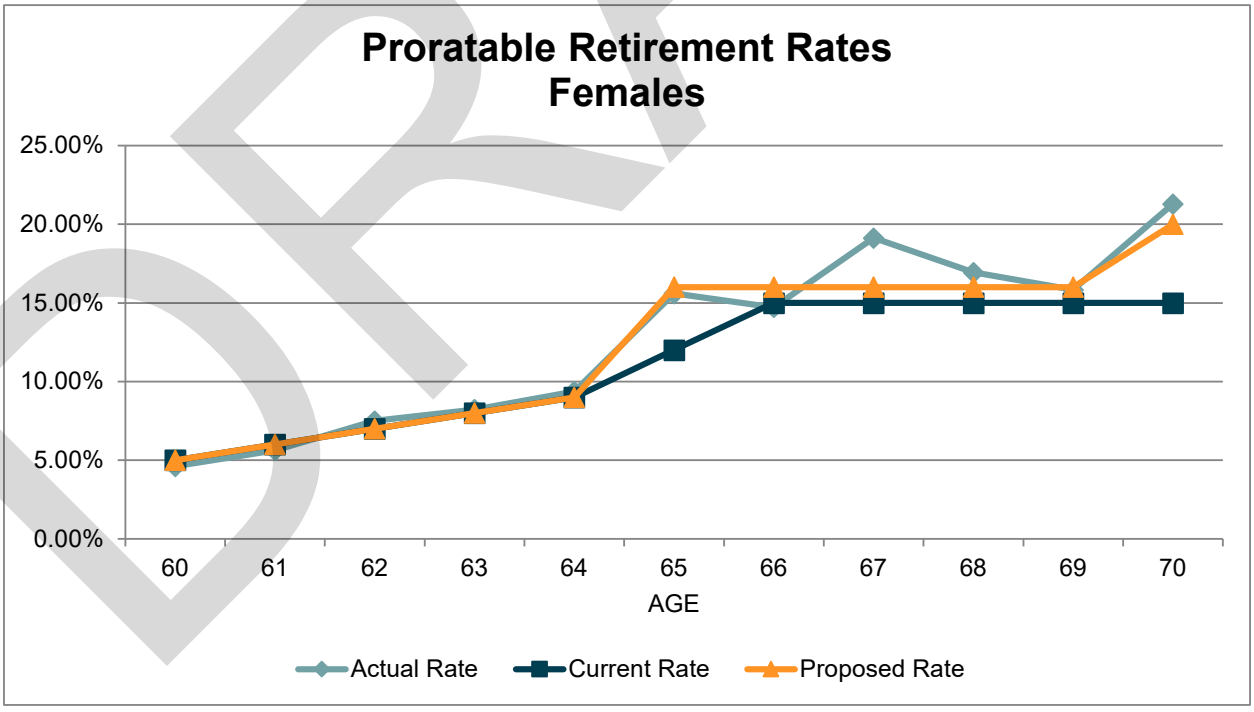
Males eligible for proratable retirement				
			A/E Ratio	
Age	Actual	Expected	Count	Weighted
60	10	15.8	0.634	0.589
61	8	14.1	0.567	0.519
62	11	11.6	0.945	0.876
63	11	15.8	0.698	0.657
64	7	18.2	0.384	0.388
65	13	19.7	0.662	0.614
66	16	20.3	0.787	0.836
67	25	17.5	1.432	1.261
68	13	12.4	1.047	1.035
69	7	15.7	0.446	0.361
70 and over	30	44.1	0.681	0.695
Total	151	205.1	0.736	0.703

Females eligible for proratable retirement				
			A/E Ratio	
Age	Actual	Expected	Count	Weighted
60	49	50.7	0.966	0.923
61	55	55.4	0.993	0.937
62	62	56.4	1.099	1.071
63	57	53.4	1.067	1.029
64	58	54.0	1.074	1.042
65	85	62.4	1.362	1.300
66	60	58.1	1.034	0.981
67	52	41.0	1.270	1.275
68	31	28.5	1.088	1.129
69	23	20.0	1.153	1.055
70 and over	48	34.7	1.385	1.361
Total	580	514.4	1.127	1.091

Over the study period, there were generally fewer retirements for males than expected generally more retirements for females than expected. We recommend slightly lower rates of retirement for males at ages 65 and below and at ages 69 and above. For females, we recommend only slight increases in rates at ages 65 and above.

The following graphs show the actual rates of retirement by age compared with the current assumed retirement rates as well as the recommended rates.





The resulting A/E ratios are shown in the following tables.

Males eligible for proratable retirement		
	Weighted A/E Ratio	
Age	Current	Proposed
60	0.589	0.707
61	0.519	0.623
62	0.876	0.876
63	0.657	0.739
64	0.388	0.465
65	0.614	0.708
66	0.836	0.836
67	1.261	1.261
68	1.035	1.035
69	0.361	0.572
70 and over	0.695	0.888
Total	0.703	0.814

Females eligible for proratable retirement		
	Weighted A/E Ratio	
Age	Current	Proposed
60	0.923	0.923
61	0.937	0.937
62	1.071	1.071
63	1.029	1.029
64	1.042	1.042
65	1.300	0.975
66	0.981	0.920
67	1.275	1.195
68	1.129	1.059
69	1.055	0.989
70 and over	1.361	1.020
Total	1.091	1.008

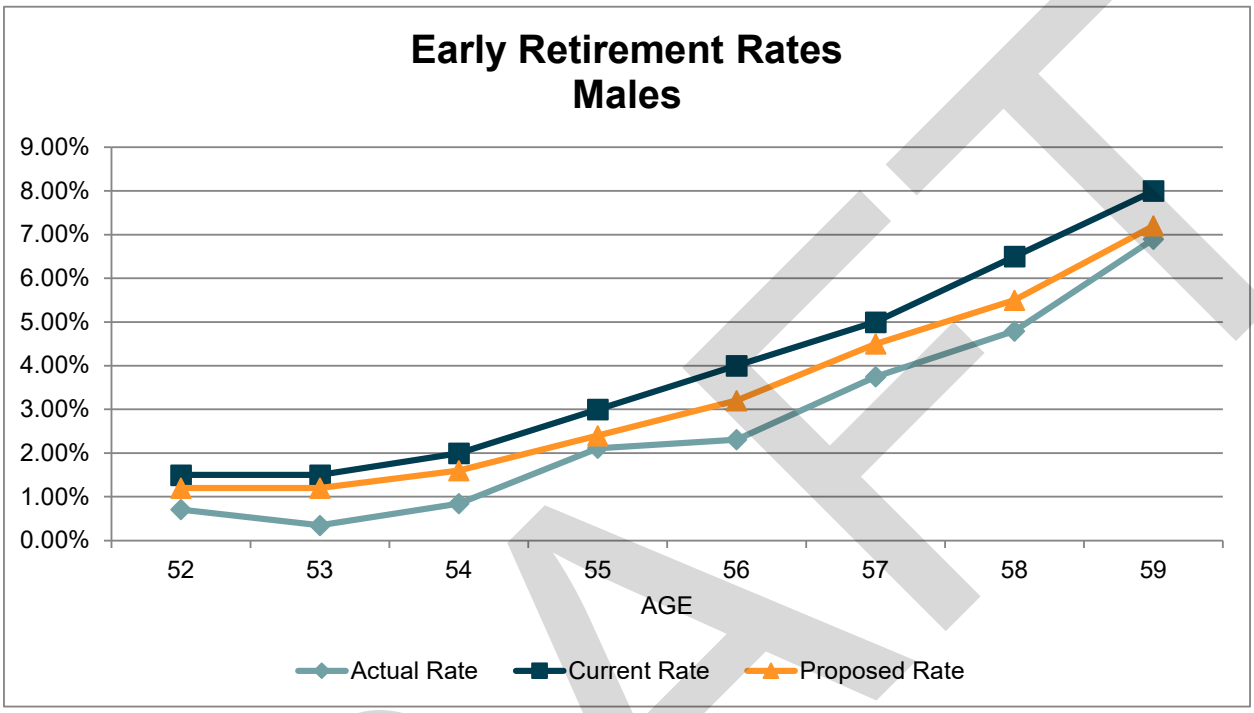
Rates of Early Retirement

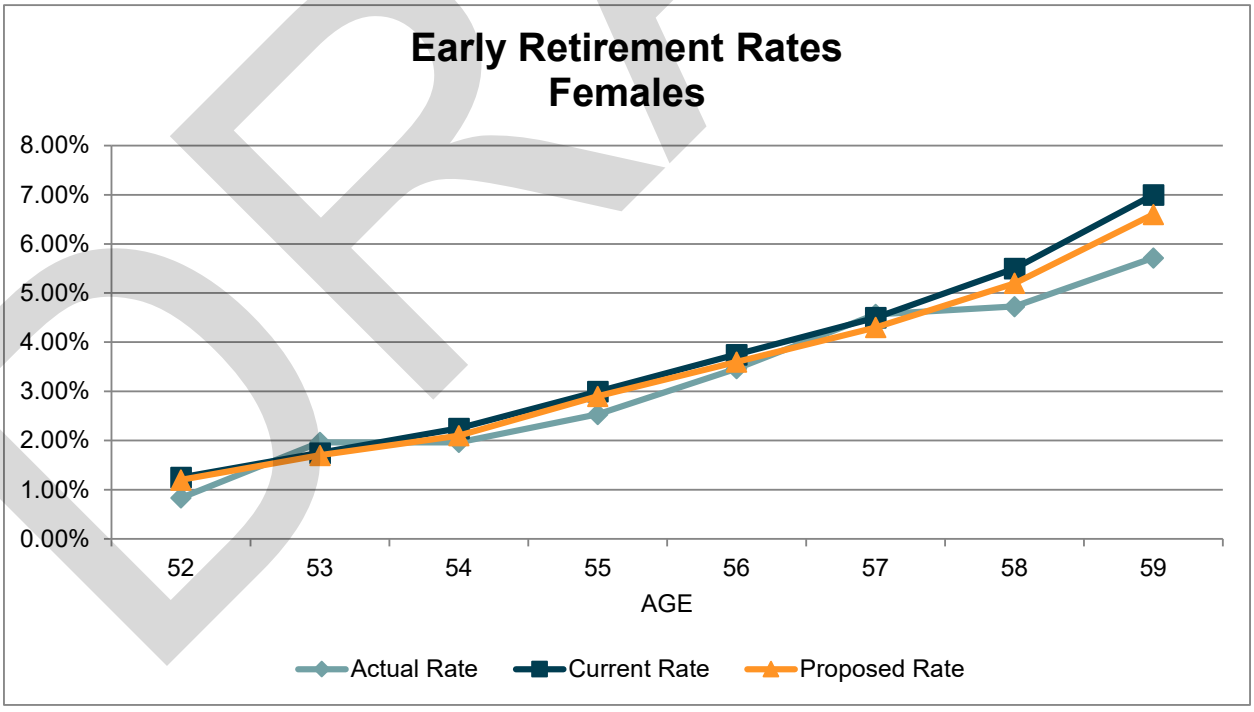
Males eligible for early retirement				
			A/E Ratio	
Age	Actual	Expected	Count	Weighted
Under 50	1	6.6	0.152	0.126
50	0	5.5	0.000	0.000
51	1	7.5	0.134	0.100
52	4	8.6	0.466	0.472
53	3	9.2	0.326	0.231
54	5	11.5	0.433	0.423
55	21	28.1	0.747	0.704
56	18	34.5	0.521	0.577
57	29	39.0	0.745	0.749
58	35	45.5	0.769	0.737
59	40	49.0	0.817	0.862
Total	157	244.9	0.641	0.636

Females eligible for early retirement				
			A/E Ratio	
Age	Actual	Expected	Count	Weighted
Under 50	9	17.6	0.510	0.485
50	7	14.3	0.490	0.445
51	5	17.9	0.279	0.248
52	15	20.3	0.740	0.667
53	32	29.3	1.091	1.122
54	34	38.1	0.893	0.873
55	68	76.7	0.887	0.844
56	86	93.0	0.925	0.924
57	100	99.6	1.004	1.015
58	94	105.8	0.888	0.859
59	104	126.4	0.823	0.817
Total	554	639.1	0.867	0.851

Over the study period, there were fewer early retirements for both males and females than expected. This continues a trend also seen in the last experience study. We believe a decrease in the current rates are appropriate. We recommend reducing the early retirement rates for males to be 80% of the current rates and for females to be 95% of the current rates.

The following graphs show the actual rates of retirement by age compared with the current assumed retirement rates as well as the recommended rates.





The resulting A/E ratios are shown in the following tables.

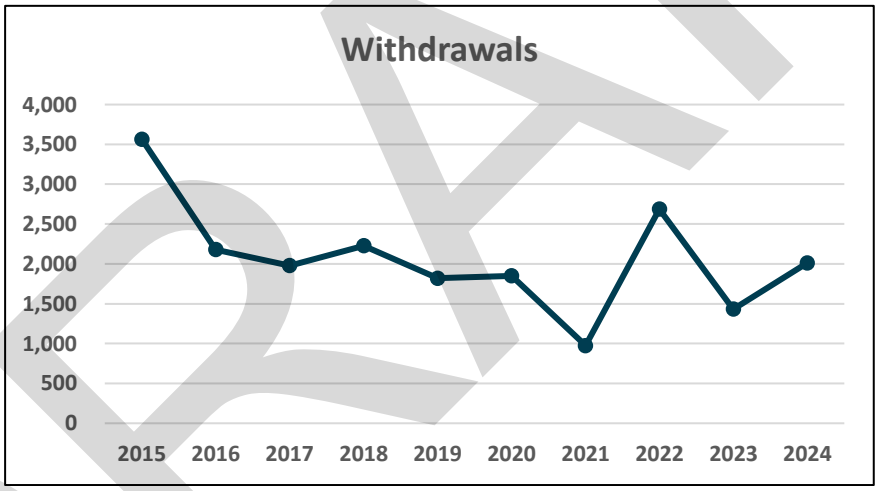
Males eligible for early retirement		
	Weighted A/E Ratio	
Age	Current	Proposed
Under 50	0.126	0.157
50	0.000	0.000
51	0.100	0.125
52	0.472	0.590
53	0.231	0.289
54	0.423	0.529
55	0.704	0.880
56	0.577	0.722
57	0.749	0.832
58	0.737	0.872
59	0.862	0.958
Total	0.636	0.753

Females eligible for early retirement		
	Weighted A/E Ratio	
Age	Current	Proposed
Under 50	0.485	0.505
50	0.445	0.463
51	0.248	0.258
52	0.667	0.695
53	1.122	1.154
54	0.873	0.935
55	0.844	0.873
56	0.924	0.962
57	1.015	1.062
58	0.859	0.909
59	0.817	0.866
Total	0.851	0.893

RATES OF WITHDRAWAL

The rates of withdrawal are used to determine the expected number of separations from active service which will occur prior to eligibility for retirement for reasons other than death and disability (e.g., termination of employment). The assumption does not involve the analysis of the election of separating members to receive a refund of eligible funds. Currently there are two sets of assumed rates for the withdrawal assumption. The first set of rates is the expected rates of withdrawal from active service for each year of service less than 10 years of service. These separating members are entitled to only a full refund of eligible funds. The second set of rates is the expected age-based rates for active members with 10 or more years of service. These separating members are eligible to elect between a full refund of eligible funds or a deferred annuity based upon benefit accrued to date of separation payable as early as age 60.

The graph below shows the number of withdrawals for the System over the last 10 years. During that time, like with retirement, there has been a downward trend in the number of withdrawals each year, though there has noticeably been more volatility in the most recent years. It would make sense that much of this volatility would be for one or even several reasons related to the COVID-19 pandemic. It remains unclear how much of an impact the pandemic will continue to display on termination rates in the near or long-term.



The tables that follow on the next several pages present the actual to expected analysis of withdrawal experience. While the graph above looked at 10-year trends, the tables that follow and the remaining analysis focuses on the 5-year study period from July 1, 2019 through June 30, 2024. In this study we have analyzed recent withdrawal experience on a benefit-weighted basis where the exposures and withdrawals are weighted by annual member salary amounts.

Males

Males with less than 10 years of service				
			A/E Ratio	
Service	Actual	Expected	Count	Weighted
0	82	42.6	1.925	1.682
1	342	317.5	1.077	1.004
2	249	210.0	1.186	1.190
3	170	151.8	1.120	1.184
4	141	111.1	1.269	1.212
5	101	90.5	1.116	1.027
6	80	80.8	0.990	0.922
7	67	71.8	0.933	0.830
8	50	69.2	0.722	0.697
9	44	67.6	0.651	0.637
Total	1,326	1,212.8	1.093	1.024

Males with 10 or more years of service				
			A/E Ratio	
Age	Actual	Expected	Count	Weighted
Under 35	8	11.0	0.731	0.711
35-39	80	83.8	0.955	0.829
40-44	98	134.8	0.727	0.663
45-49	97	139.4	0.696	0.684
50-54	113	145.1	0.779	0.754
55-59	68	78.5	0.057	0.676
Total	464	592.6	0.783	0.715

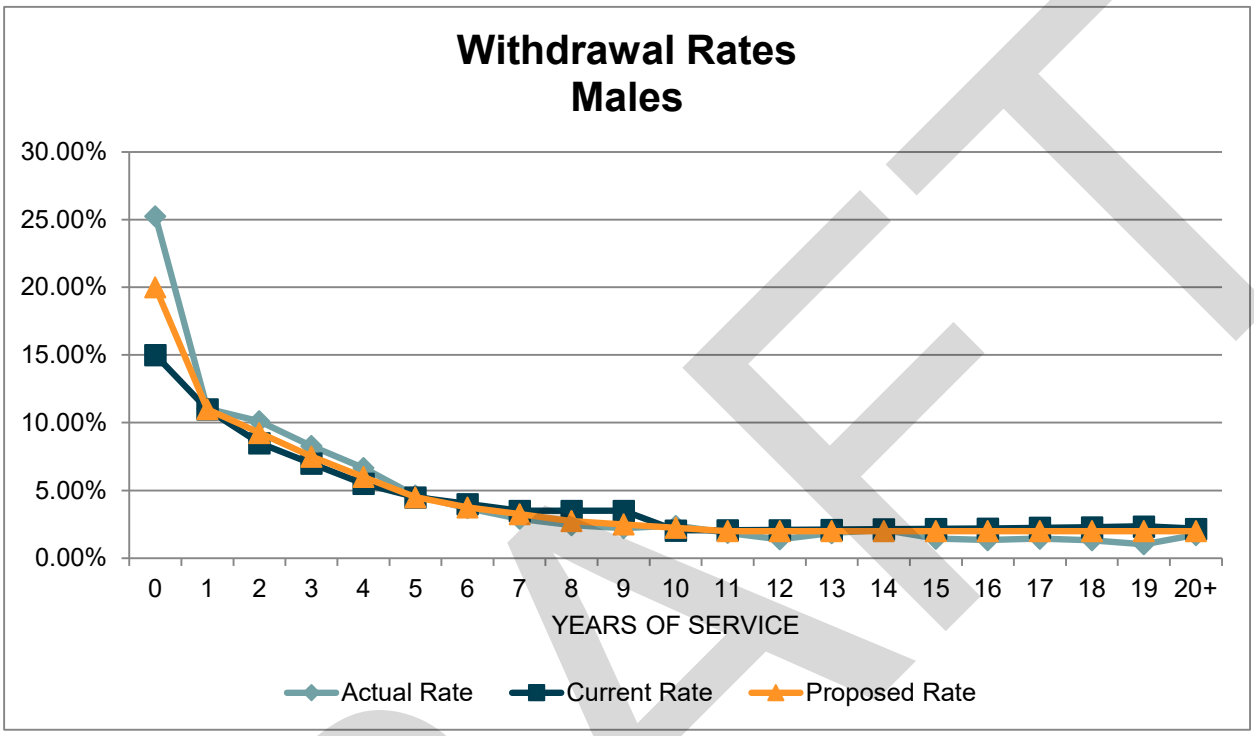
Females

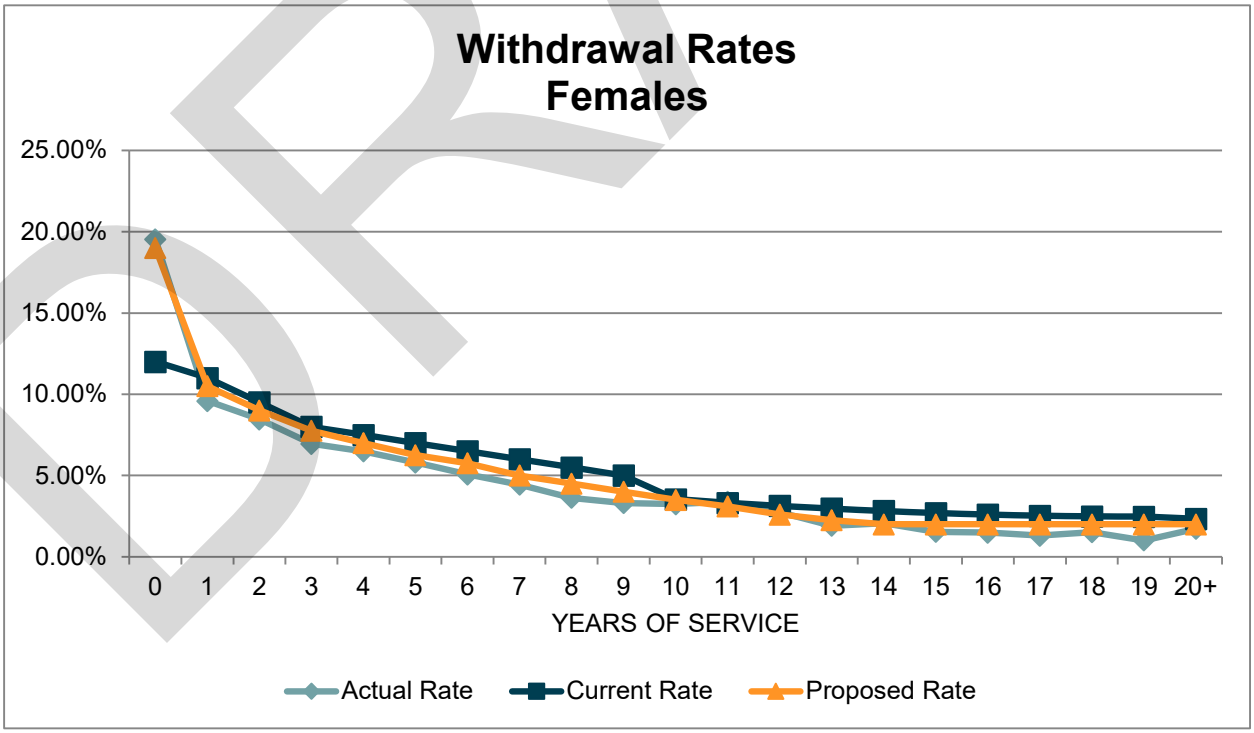
Females with less than 10 years of service				
			A/E Ratio	
Service	Actual	Expected	Count	Weighted
0	198	110.8	1.788	1.627
1	1,085	1,151.0	0.943	0.872
2	812	867.7	0.936	0.890
3	582	642.0	0.907	0.868
4	524	578.4	0.906	0.865
5	493	541.7	0.910	0.829
6	444	506.8	0.876	0.779
7	384	472.3	0.813	0.739
8	321	419.3	0.766	0.660
9	270	358.5	0.753	0.662
Total	5,113	5,648.6	0.905	0.818

Females with 10 or more years of service				
			A/E Ratio	
Age	Actual	Expected	Count	Weighted
Under 35	117	126.8	0.922	0.851
35-39	433	557.0	0.777	0.662
40-44	340	499.1	0.681	0.595
45-49	301	437.8	0.687	0.600
50-54	299	432.8	0.691	0.634
55-59	257	251.3	1.023	0.948
Total	1,747	2,304.9	0.758	0.669

Over the study period, there were significantly more withdrawals for males than expected, though this was mostly for 5 years of service or less while there tended to be fewer withdrawals than expected for 5 to 9 years of service. For males with 10 or more years of service, there were also fewer withdrawals than expected and note as well that the rates of withdrawal didn't vary much with age. For females, there were fewer withdrawals than expected at most ages and levels of service. While rates of withdrawal did seem to vary a bit more for females by age when having 10 or more years of service, we are of the opinion that the amount of service is the greater predictor on rates of withdrawal than age. We recommend moving to a service-only set of withdrawal rates and recommend only minor changes to rates of withdrawal at this time.

The following graphs show the actual rates of withdrawal by years of service compared with the current assumed withdrawal rates as well as the recommended rates.





The resulting A/E ratios are shown in the following tables.

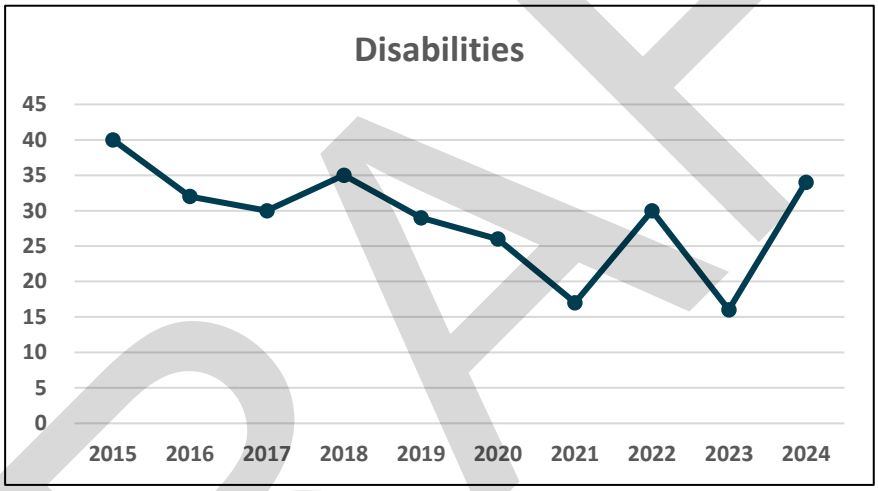
Males		
	Weighted A/E Ratio	
Service	Current	Proposed
0	1.682	1.262
1	1.004	1.004
2	1.190	1.093
3	1.184	1.105
4	1.212	1.111
5	1.027	1.027
6	0.922	0.984
7	0.830	0.894
8	0.697	0.887
9	0.637	0.892
10	1.166	1.066
11	0.898	0.930
12	0.669	0.696
13	0.883	0.927
14	0.979	1.044
15	0.668	0.723
16	0.613	0.669
17	0.642	0.720
18	0.579	0.660
19	0.438	0.515
20 and over	0.789	0.857
Total	0.898	0.934

Females		
	Weighted A/E Ratio	
Service	Current	Proposed
0	1.627	1.028
1	0.872	0.913
2	0.890	0.939
3	0.868	0.896
4	0.865	0.926
5	0.829	0.929
6	0.779	0.881
7	0.739	0.887
8	0.660	0.806
9	0.662	0.827
10	0.913	0.924
11	1.022	1.093
12	0.870	1.049
13	0.645	0.851
14	0.728	1.027
15	0.570	0.766
16	0.575	0.746
17	0.517	0.652
18	0.610	0.757
19	0.407	0.502
20 and over	0.740	0.862
Total	0.774	0.882

RATES OF DISABILITY

The rates of disability are used to anticipate the expected number of separations due to disabilities of eligible active members. As rates of disability are very small, the number of disabilities incurred and expected is small relative to other decrements. When a disability does occur, it will result in an increase in the plan liability to reflect the immediate annuity payable to eligible disabled members at typically earlier ages.

The graph below shows the number of disabilities for the System over the last 10 years. During that time, like with retirement and termination, there has been a downward trend in the number of disabilities each year with noticeably more volatility in the most recent years just like there was for withdrawals. In the last experience study, it was observed that rates of disability appeared to have been decreasing which is a trend we have been seeing for many retirement systems across the country. With the increased volatility in the last few years, it is hard to tell if this trend is continuing for the System.

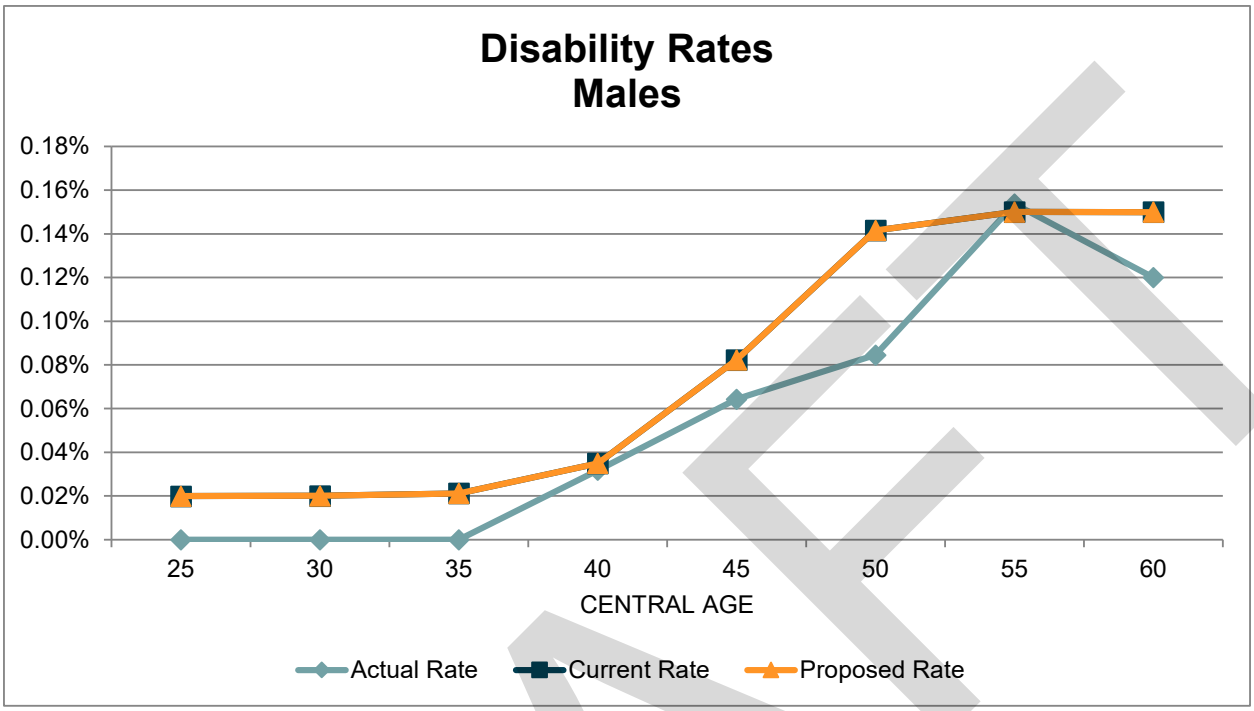


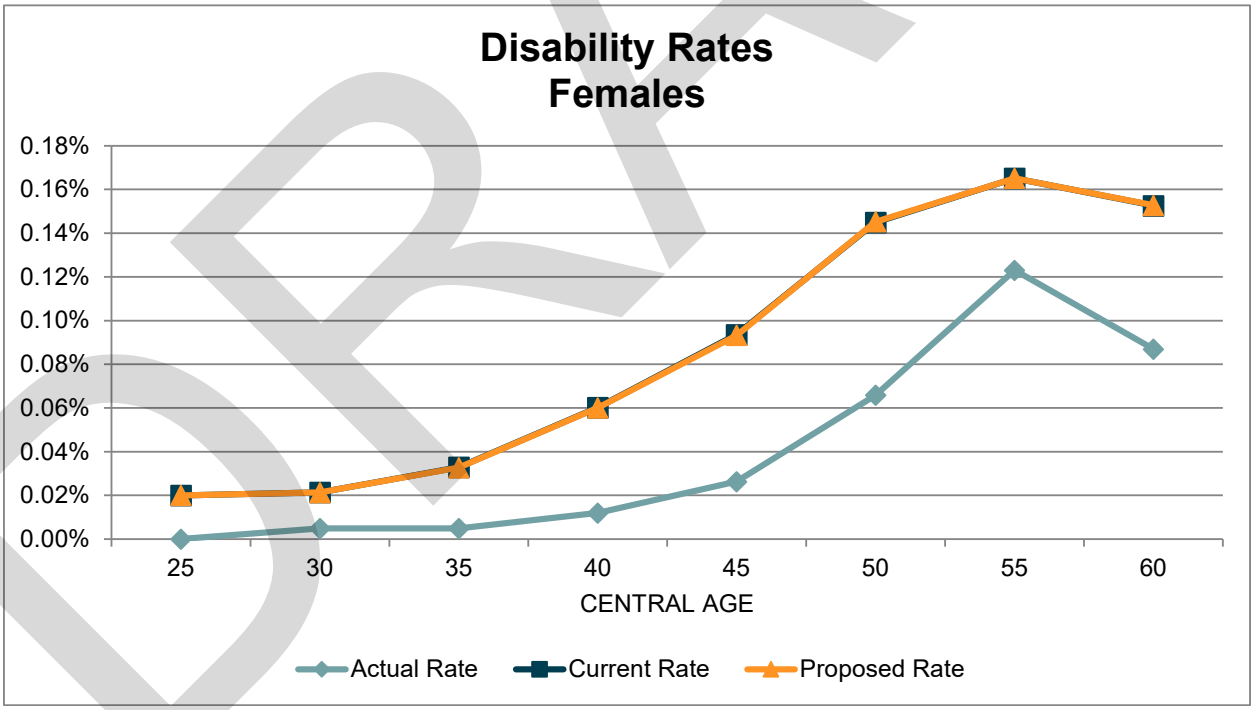
The tables that follow on the next several pages present the actual to expected analysis of disability experience. While the graph above looked at 10-year trends, the tables that follow and the remaining analysis focuses on the 5-year study period from July 1, 2019 through June 30, 2024. Unlike the decrements in previous sections, we have analyzed recent disability experience on a count basis rather than a benefit-weighted basis. This is because there can often be a prevalence of lower salaries and service disruptions ahead of a disability determination which can make using a benefit-weighted basis less reliable.

Males			
Central Age	Actual	Expected	A/E Ratio
30	0	1.2	0.000
35	0	1.6	0.000
40	3	3.3	0.909
45	6	7.7	0.779
50	8	13.4	0.597
55	11	10.7	1.028
60	6	7.5	0.800
Total	34	45.4	0.749

Females			
Central Age	Actual	Expected	A/E Ratio
30	2	4.7	0.426
35	1	8.8	0.114
40	4	18.2	0.220
45	8	26.9	0.297
50	20	41.1	0.487
55	31	38.3	0.809
60	17	26.2	0.649
Total	83	164.2	0.505

Experience over the study period shows slightly fewer disabilities than expected. This continues a trend also seen in the last experience study when rates were decreased. Because of the increased volatility in disabilities during the study period we are reluctant to make further changes to the current rates of disability but will reexamine in the next experience study. The following graphs show the actual rates of disability by age compared with the current assumed disability rates as well as the recommended rates.


Disability Rates
Males
0.18%
0.16%
0.14%
0.12%
0.10%
0.08%
0.06%
0.04%
0.02%
0.00%
25
30
35
40
45
50
55
60
CENTRAL AGE
Actual Rate
Current Rate
Proposed Rate


Disability Rates
Females
0.18%
0.16%
0.14%
0.12%
0.10%
0.08%
0.06%
0.04%
0.02%
0.00%
25
30
35
40
45
50
55
60
CENTRAL AGE
Actual Rate
Current Rate
Proposed Rate

RATES OF SALARY INCREASE

The assumed rates of salary increase provide the expected growth in future salaries both for approximating the future benefits to be provided and the future amounts expected to be contributed to the System through normal cost contributions of members and the employer. Therefore, this assumption is very material to valuation results. The tables that follow on the next several pages present the actual to expected analysis of salary increase.

SERVICE	SALARIES AT END OF YEAR ($1,000's)		
	Actual	Expected	Ratio of Actual to Expected
Less than 5	2,628	2,636	99.7%
5-9	3,378	3,378	100.0%
10-14	3,567	3,560	100.2%
15-19	4,682	4,684	100.0%
20-24	4,019	4,039	99.5%
25 & Over	3,347	3,376	99.1%
TOTAL	**21,621**	**21,673**	**99.8%**

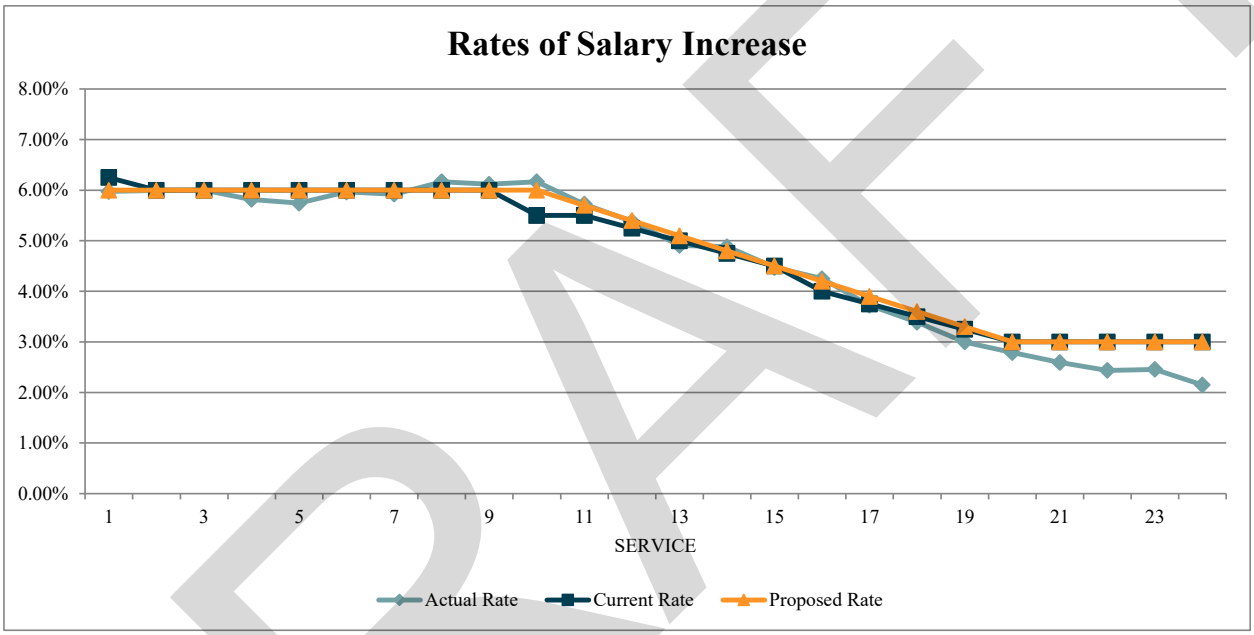
Over the study period, actual rates of salary increase both in total and when broken down into smaller service bands were very close to expected. As can be seen in the table below the ratio of actual to expected salary increases can vary significantly from year to year.

Period	SALARIES AT END OF YEAR ($1,000's)		
	Actual	Expected	Ratio of Actual to Expected
2019-2020	4,063	4,090	99.3%
2020-2021	4,194	4,225	99.3%
2021-2022	4,268	4,278	99.8%
2022-2023	4,450	4,446	100.1%
2023-2024	4,646	4,634	100.3%
TOTAL	**21,621**	**21,673**	**99.8%**

SECTION IV – DEMOGRAPHIC ASSUMPTIONS

In the first three years of the study period, actual salary increases were less than expected while in the last two years of the study period they were more than expected. There was also a trend where the A/E ratios steadily increased over the study period. This year-to-year difference is very common as pay increases are largely driven by economic forces and policy decisions more so than by member behavior alone. We fully expect that our pay increase assumptions may not exactly match actual experience in a given year but seek to set this assumption so that, over the long term, actual salary increases will on average be close to expected salary increases. We recommend only minor changes to the current assumption primarily by slightly increasing some of the rates between 10 and 20 years of service.

The following graphs show a comparison of the actual, current and proposed rates of salary increases.



The following table shows a comparison between the current and proposed rates of salary increases.

SERVICE	SALARY INCREASE RATES	
	Current	Proposed
<1	6.50%	6.00%
1	6.25%	6.00%
2	6.00%	6.00%
3	6.00%	6.00%
4	6.00%	6.00%
5	6.00%	6.00%
6	6.00%	6.00%
7	6.00%	6.00%
8	6.00%	6.00%
9	6.00%	6.00%
10	5.50%	6.00%
11	5.50%	5.70%
12	5.25%	5.40%
13	5.00%	5.10%
14	4.75%	4.80%
15	4.50%	4.50%
16	4.00%	4.20%
17	3.75%	3.90%
18	3.50%	3.60%
19	3.25%	3.30%
20	3.00%	3.00%
21	3.00%	3.00%
22	3.00%	3.00%
23	3.00%	3.00%
24	3.00%	3.00%
25+	3.00%	3.00%

The resulting A/E ratios are shown in the following tables.

SERVICE	Ratio of Actual to Expected	
	Current	Proposed
Less than 5	99.7%	99.8%
5-9	100.0%	100.0%
10-14	100.2%	100.0%
15-19	100.0%	99.9%
20-24	99.5%	99.5%
25 & Over	99.1%	99.1%
TOTAL	**99.8%**	**99.7%**

OTHER ASSUMPTIONS

Percent Married:

Currently 85% of active male members and 75% of active female members are assumed to be married with the male spouse three years older than the female spouse. The data we receive for valuations is limited for the purpose of evaluating this assumption. In practice, this assumption is only relevant for valuing pre-retirement death benefits. Without sufficient data to analyze the marital status of plan members and given the assumption does not have a material effect on the actuarial measurements, we believe the current assumption is reasonable and we recommend it be retained.

Cost of Living Increases:

For teachers who retired prior to September 1, 1992, pension benefit adjustments are made in accordance with increases in the Consumer Price Index, with a minimum of 3% and a maximum of 5% per annum. These members are currently assumed to receive an annual Cost-of-Living Adjustment (COLA) of 3.0%. Since we are recommending that our inflation assumption remain at 2.5% and this is below the minimum 3.0% members are to receive, we recommend no change to our current assumption.

For teachers who were members of the Teachers' Retirement System before July 1, 2007, and retire on or after September 1, 1992, pension benefit adjustments are made that are consistent with those provided for Social Security benefits on January 1 of the year granted, with a maximum of 6% per annum. If the return on assets in the previous year was less than 6.9%, the maximum increase is 1.5%. These members are currently assumed to receive an annual COLA of 2.0%. Based on the one-year mean and standard deviation results from our analysis using the Horizon Survey of Capital Market Assumptions and assuming a normal distribution of returns, the probability of exceeding an annual return of 6.90% is 55.15%, while the probability of falling short of that threshold is 44.85%. Accordingly, the expected cost-of-living adjustment (COLA) in any given year is calculated as follows:

- 1.50% multiplied by the probability of not achieving a 6.90% return (44.85%),
- plus 2.50% (assumed inflation) multiplied by the probability of meeting or exceeding a 6.90% return (55.15%).

This results in an expected COLA of 2.05%, which exceeds the current assumption. Based on this modeling, we recommend increasing the COLA assumption to 2.10% to incorporate a modest margin of conservatism.

For teachers who were members of the Teachers' Retirement System after July 1, 2007, pension benefit adjustments are made that are consistent with those provided for Social Security benefits on January 1 of the year granted, with a maximum of 5% per annum. If the return on assets in the previous year was less than 9.9%, the maximum increase is 3%, and if the return on the assets in the previous year was less than 6.9%, the maximum increase is 1.0%. These members are currently assumed to receive an annual COLA of 1.75%. Similar to the previous group, we modeled an expectation for the COLA for this group and calculated a value of 1.8% which is also above the current assumption. We recommend changing the assumption to 1.9% to provide for some additional margin for conservatism.

Plan N Partial Refund Option (Normal Form of Payment):

For any member who retires prior to July 1, 2019, upon death, the member's beneficiary will receive a lump sum payment of the member's contributions with interest to the member's date of retirement less 25% of the total payments received to the member's date of death. We recommend continuing to use a 12-year Certain and Life payment form to approximate the Plan N option where available data does not allow liabilities to be calculated directly.

For any member who retires on or after July 1, 2019, upon death, the member's beneficiary will receive a lump sum payment of the member's contributions with interest to the member's date of retirement less 50% of the total payments received to the member's date of death. We recommend continuing to use a 9-year Certain and Life payment form to approximate the Plan N option where available data does not allow liabilities to be calculated directly.

SECTION V – OTHER POST-EMPLOYMENT BENEFIT ASSUMPTIONS

We are recommending no specific assumption changes attributable to the COVID-19 pandemic, the impacts of the Affordable Care Act (ACA) or the Inflation Reduction Act (IRA) at this time other than plan design features and fees currently mandated by the ACA and incorporated in the plan designs, which are included in the current baseline claims costs, and the changes to Medicare due to the IRA, which are included in our baseline Medicare costs and trend assumption. Continued monitoring of the impact on the Plan's liability due to this and other legislation, if applicable, will be required.

In conjunction with the pension experience study, several OPEB assumptions were reviewed to determine whether updates were appropriate. Mortality, retirement, and withdrawal assumptions were updated to reflect the pension study results. The assumption for spouse participation in OPEB was adjusted, while the remaining OPEB assumptions were not changed. The rationale for each decision is outlined below.

COVERAGE ASSUMPTIONS

The Actuarial Standards Board has issued Actuarial Standard of Practice (ASOP) No. 6, "Measuring Retiree Group Benefit Obligations", which provides guidance to actuaries in selecting coverage assumptions for measuring obligations of post-retirement plans other than pensions. The "Coverage Assumptions" section includes the key components the actuary should consider in setting the coverage assumptions per ASOP No. 6:

- Plan Participation
- Spouse Coverage Eligibility

PARTICIPATION RATES

Not all eligible retirees and disabled members elect to receive the medical benefit. As such, an assumption needs to be set for benefit election. Similarly, not all participating retirees elect to cover their spouse, and an assumption must also be set for spousal coverage.

Experience: During the study period, we reviewed the participation assumptions for:

- Retirees currently participating in the pre-65 subsidy continuing coverage at age 65,
- Actives retiring and participating in either the subsidy or the medical plan, and
- Spousal participation rates.

The following tables summarize observed participation and recommended assumptions:

SECTION V – OTHER POST-EMPLOYMENT BENEFIT ASSUMPTIONS

Retirees participating in pre-65 subsidy turning 65:

	Total Exposures	Actual	Expected	Recommended
Participants Electing to Continue Subsidy				
Number	1,589	295	397.25	
Percentage		19%	25%	25%
Participants Electing to Join Medical Plan				
Number	1,589	1,102	1,191.75	
Percentage		69%	75%	75%
Participants Dropping Coverage				
Number	1,589	192	0.00	
Percentage		12%	0%	0%

Participation – retiring actives:

	Total Exposures	Actual	Expected	Recommended
Eligible New Pre-65 retirees electing Subsidy				
Number	2,559	1,183	1,535.40	
Percentage		46%	60%	60%
Eligible New Post-65 retirees electing Subsidy				
Number	2,355	115	235.50	
Percentage		5%	10%	10%
Eligible New Post-65 retirees electing Medical				
Number	2,355	1,600	1,648.50	
Percentage		68%	70%	70%

Spouse Participation:

	Total Exposures	Actual	Expected	Recommended
New Pre-65 Subsidy participants covering spouse				
Number	573	245	257.85	
Percentage		43%	45%	50%
New Post-65 Subsidy participants covering spouse				
Number	46	21	20.70	
Percentage		46%	45%	50%
New Post-65 Medical participants covering spouse				
Number	734	344	330.30	
Percentage		47%	45%	50%

SECTION V – OTHER POST-EMPLOYMENT BENEFIT ASSUMPTIONS

Background: The Actuarial Standards Board has issued a revised Actuarial Standard of Practice (ASOP) No. 27, *"Selection of Assumptions for Measuring Pension Obligations"* as of January 2025, which provides guidance to actuaries in selecting demographic assumptions for measuring obligations under defined benefit plans. In our opinion, the demographic assumptions recommended in this report have been developed in accordance with ASOP No. 27.

System-Wide Recommendation: We recommend updating the spousal participation rate to 50% and maintaining the current assumptions for pre-65 retirees turning 65 and active participation.

HEALTHCARE COST TREND

The Health Care Cost Trend Rates reflect the change in per capita health claims rates over time due to the following factors:

- medical inflation
- utilization
- plan design
- technology improvements

The Actuarial Standards Board has issued Actuarial Standard of Practice (ASOP) No. 6, *"Measuring Retiree Group Benefit Obligations,"* which provides guidance to actuaries in selecting economic assumptions for measuring obligations of post-retirement plans other than pensions. The actuary should not consider aging of the covered population when selecting the trend assumption for projecting future costs but should consider the following key components in setting the health care cost trend rate as noted in ASOP No. 6:

- inflation
- medical inflation
- definition of covered charges
- frequency of services
- leveraging caused by plan design features not explicitly modeled
- plan participation

When setting assumptions for projecting medical and prescription drug costs, CavMac assumes the health benefit plan cost trend rates will decrease from an initial rate to an ultimate level. CavMac's methodology for setting the initial trend rate includes the use of published annual health care inflation surveys in conjunction with actual plan experience, where credible. The initial trend rate assumption is subject to continued update and review with each valuation performed, given the volatile nature of medical and prescription drug costs and the impact of Federal legislation. There are various approaches used to determine the timing and level of decreases to the ultimate trend rate. The assumed decrease in medical and prescription drug trend rates reflects the belief that health care inflation cannot indefinitely outstrip the growth rate of employer budgets and the overall economy. For the ultimate trend assumption, CavMac looks to the *Long-Term Projection Assumptions for Medicare and Aggregate National Health Expenditures* published by Center for Medicare and Medicaid Services on April 22, 2020, which states that:

> "One way of analyzing health spending trends is to compare the growth rate of the U.S. health sector with that of the overall economy. Using a definition of "excess cost growth" as the difference between (i) the U.S. per capita growth rate in health-care costs adjusted for demographic factors and (ii) the per capita growth rate in GDP (both in constant dollars), Table 1 shows average excess cost growth rates for selected time periods since 1975. Average excess cost growth rates for national health expenditures (NHE) exhibit some volatility depending on which time periods are used for defining averages, but over the long run this differential has for extended periods been above 2 percent per year or just slightly below this level."

As a standard of practice, CavMac believes the use of a "GDP+1.5%" to "GDP+2.5%" assumption is reasonable, and CavMac typically assumes an ultimate trend rate of price inflation +2.0%. As with any standard of practice, the specifics of each plan are reviewed to ensure there is nothing unusual that would necessitate a long-term trend rate that is either higher or lower than what is typical. We note that a May 17, 2024 analysis by KFF titled *How Does Medical Inflation Compare to Inflation in the Rest of the Economy?* states:

> "Inflation in medical care prices and overall health spending typically outpaces inflation in the rest of the economy. However, since 2021, medical prices have grown at a similar rate as in past years while prices in some other parts of the economy grew much more rapidly than in the past."

We note that updated analysis on August 2, 2024 states that:

> "using the CPI, overall prices grew by 3.0% in June 2024 from the previous year, while prices for medical care increased by 3.3%. Overall prices excluding medical care grew by 2.9%. This marks the first month since early 2021 that prices for medical care had grown faster than overall inflation."

We note that our long term price inflation assumption remains 2.50% in spite of recent short term experience of higher price inflation. Therefore, it appears to be reasonable to use an ultimate health care trend rate of price inflation +2.0%, or 4.50%. We expect that this assumption will be revisited each year, particularly in the case of any changes to Federal legislation regarding Medicare.

Background: In our opinion, the economic assumptions recommended in this report have been developed in accordance with ASOP No. 6. Currently, the short-term health care trend rates are set on an annual basis based on the information and data as previously described, with an ultimate trend rate of price inflation plus excess cost growth that is reached after an appropriate grading period.

System-Wide Recommendation: Continue to update the short-term health care trends annually and base the health care trends on plan experience and demographics while considering the projected trend from external sources. Use an ultimate trend rate of price inflation + 2.0%, or 4.50%, with the expectation that this assumption will be revisited each year.

SECTION V – OTHER POST-EMPLOYMENT BENEFIT ASSUMPTIONS

AGING FACTORS

The Age-Related Morbidity rates reflect the change in per capita health claims rates over time due to anticipated individual and covered population age-related cost changes.

ASOP No. 6, *"Measuring Retiree Group Benefit Obligations,"* states that:

> In general, for health coverage, benefit costs vary by age. Therefore, … the actuary should use age specific costs in the development of the initial per capita costs and in the projection of future benefit plan costs. In general, the development of the age-specific costs should be based on the demographics of the group being valued and the group's total expected claims or premiums. Any age ranges used should not be overly broad. The relationship between the costs at various ages is an actuarial assumption that may be based on normative databases.

As mentioned above, most plans, including large State-level plans, use normative databases rather than plan specific data due to the enormous amount of data needed to create credible factors. The most common resources for age related morbidity factors used by members of the Society of Actuaries (SOA) are the two papers listed below:

- *Aging Curves for Health Care Costs in Retirement*
  By Jeffrey P. Petertil, ASA, MAAA, FCA
  August 1, 2003
- *Health Care Costs—From Birth to Death*
  Prepared by Dale H. Yamamoto
  June 2013

CavMac uses the age-related morbidity factors from the Petertil paper for the System. The paper developing the Yamatoto factors is more recent and contains sex distinct factors, which is useful for active and pre-65 retiree populations. However, since the aging factors used by the System are primarily used for retirees on Medicare, CavMac believes that the Petertil factors are appropriate for use and we recommend no changes.

Background: In our opinion, the age-related morbidity assumptions recommended in this report have been developed in accordance with ASOP No. 6. CavMac currently uses the factors developed in the paper titled *Aging Curves for Health Care Costs in Retirement* by Jeffrey P. Petertil, ASA, MAAA, FCA.

System-Wide Recommendation: Recommend retaining the current Petertil aging factors and continuing to monitor developments in aging factor guidance and industry practice in future experience studies.

APPENDIX A – HISTORICAL JUNE CPI-U INDEX

Fiscal Year Ending 6/30	CPI (U)	Fiscal Year Ending 6/30	CPI (U)
1964	31.0	1995	152.5
1965	31.6	1996	156.7
1966	32.4	1997	160.3
1967	33.3	1998	163.0
1968	34.7	1999	166.2
1969	36.6	2000	172.4
1970	38.8	2001	178.0
1971	40.6	2002	179.9
1972	41.7	2003	183.7
1973	44.2	2004	189.7
1974	49.0	2005	194.5
1975	53.6	2006	202.9
1976	56.8	2007	208.352
1977	60.7	2008	218.815
1978	65.2	2009	215.693
1979	72.3	2010	217.965
1980	82.7	2011	225.722
1981	90.6	2012	229.478
1982	97.0	2013	233.504
1983	99.5	2014	238.343
1984	103.7	2015	238.638
1985	107.6	2016	241.018
1986	109.5	2017	244.955
1987	113.5	2018	251.989
1988	118.0	2019	256.143
1989	124.1	2020	257.797
1990	129.9	2021	271.696
1991	136.0	2022	296.311
1992	140.2	2023	305.109
1993	144.4	2024	314.175
1994	148.0		

APPENDIX B – CAPITAL MARKET ASSUMPTIONS AND ASSET ALLOCATION

As Determined by the 2024 Horizon Actuarial Services, LLC.
Survey of Capital Market Assumptions (20-year Horizon)

Asset Allocation Targets

Asset Class	Asset Allocation
Domestic Equity	22.0%
Developed Markets Equity	11.0%
Emerging Markets Equity	4.0%
Core Fixed Income	13.0%
Non-Core Fixed Income	2.0%
Private Equity	15.0%
Private Credit	10.0%
Absolute Return	5.0%
Real Estate	10.0%
Infrastructure	7.0%
Liquidity	1.0%

Arithmetic Real Rates of Return and Standard Deviations by Asset Class

Asset Class	Expected Real Rate of Return*	Standard Deviation
Domestic Equity	5.81%	16.52%
Developed Markets Equity	6.64%	18.06%
Emerging Markets Equity	8.56%	23.61%
Core Fixed Income	2.60%	5.90%
Non-Core Fixed Income	4.42%	9.94%
Private Equity	9.89%	22.57%
Private Credit	6.65%	12.00%
Absolute Return	4.08%	8.03%
Real Estate	4.94%	16.61%
Infrastructure	6.12%	16.02%
Liquidity	1.00%	1.10%

**Net of 2.44% assumed inflation*

APPENDIX B – CAPITAL MARKET ASSUMPTIONS AND ASSET ALLOCATION

Asset Class Correlation Coefficients

Asset Class	Domestic Equity	Developed Markets Equity	Emerging Markets Equity	Core Fixed Income	Non-Core Fixed Income	Private Equity	Private Credit	Absolute Return	Real Estate	Infra structure	Liquidity
Domestic Equity	1.00										
Developed Markets Equity	0.81	1.00									
Emerging Markets Equity	0.70	0.79	1.00								
Core Fixed Income	0.28	0.26	0.24	1.00							
Non-Core Fixed Income	0.68	0.64	0.62	0.49	1.00						
Private Equity	0.75	0.66	0.61	0.18	0.55	1.00					
Private Credit	0.55	0.52	0.50	0.17	0.66	0.58	1.00				
Absolute Return	0.71	0.68	0.66	0.26	0.63	0.62	0.55	1.00			
Real Estate	0.57	0.50	0.45	0.27	0.49	0.48	0.37	0.45	1.00		
Infrastructure	0.66	0.64	0.60	0.29	0.60	0.56	0.48	0.57	0.50	1.00	
Liquidity	-0.03	-0.02	-0.02	0.14	-0.03	-0.07	-0.08	-0.01	-0.03	-0.01	1.00

APPENDIX C – SOCIAL SECURITY ADMINISTRATION WAGE INDEX

Social Security Administration Calendar Year Wage Index

Calendar Year	Wage Index	Annual Increase	Calendar Year	Wage Index	Annual Increase
1963	4,396.64	2.45%	1994	23,753.53	2.68%
1964	4,576.32	4.09	1995	24,705.66	4.01
1965	4,658.72	1.80	1996	25,913.90	4.89
1966	4,938.36	6.00	1997	27,426.00	5.84
1967	5,213.44	5.57	1998	28,861.44	5.23
1968	5,571.76	6.87	1999	30,469.84	5.57
1969	5,893.76	5.78	2000	32,154.82	5.53
1970	6,186.24	4.96	2001	32,921.92	2.39
1971	6,497.08	5.02	2002	33,252.09	1.00
1972	7,133.80	9.80	2003	34,064.95	2.44
1973	7,580.16	6.26	2004	35,648.55	4.65
1974	8,030.76	5.94	2005	36,952.94	3.66
1975	8,630.92	7.47	2006	38,651.41	4.60
1976	9,226.48	6.90	2007	40,405.48	4.54
1977	9,779.44	5.99	2008	41,334.97	2.30
1978	10,556.03	7.94	2009	40,711.61	(1.50)
1979	11,479.46	8.75	2010	41,673.83	2.36
1980	12,513.46	9.01	2011	42,979.61	3.13
1981	13,773.10	10.07	2012	44,321.67	3.12
1982	14,531.34	5.51	2013	44,888.16	1.28
1983	15,239.24	4.87	2014	46,481.52	3.55
1984	16,135.07	5.88	2015	48,098.63	3.48
1985	16,822.51	4.26	2016	48,642.15	1.13
1986	17,321.82	2.97	2017	50,321.89	3.45
1987	18,426.51	6.38	2018	52,145.80	3.62
1988	19,334.04	4.93	2019	54,099.99	3.75
1989	20,099.55	3.96	2020	55,628.60	2.83
1990	21,027.98	4.62	2021	60,575.07	8.89
1991	21,811.60	3.73	2022	63,795.13	5.32
1992	22,935.42	5.15	2023	66,621.80	4.43
1993	23,132.67	0.86			

APPENDIX D – RECOMMENDED RATES

TABLE 1 - RATES OF MORTALITY WHILE IN ACTIVE SERVICE*

Age	Male	Female	Age	Male	Female
20	0.00023	0.00008	46	0.00076	0.00052
21	0.00024	0.00008	47	0.00083	0.00057
22	0.00024	0.00008	48	0.00091	0.00062
23	0.00024	0.00008	49	0.00099	0.00067
24	0.00024	0.00008	50	0.00109	0.00073
25	0.00024	0.00008	51	0.00120	0.00079
26	0.00025	0.00009	52	0.00131	0.00085
27	0.00026	0.00010	53	0.00144	0.00092
28	0.00027	0.00011	54	0.00158	0.00099
29	0.00027	0.00012	55	0.00174	0.00107
30	0.00028	0.00013	56	0.00190	0.00115
31	0.00029	0.00014	57	0.00208	0.00125
32	0.00030	0.00016	58	0.00228	0.00135
33	0.00032	0.00017	59	0.00248	0.00146
34	0.00033	0.00019	60	0.00271	0.00159
35	0.00035	0.00020	61	0.00294	0.00174
36	0.00036	0.00022	62	0.00320	0.00191
37	0.00038	0.00024	63	0.00347	0.00211
38	0.00041	0.00027	64	0.00377	0.00232
39	0.00044	0.00029	65	0.00410	0.00256
40	0.00047	0.00032	66	0.00445	0.00283
41	0.00050	0.00034	67	0.00485	0.00314
42	0.00054	0.00037	68	0.00528	0.00347
43	0.00059	0.00041	69	0.00575	0.00385
44	0.00064	0.00044	70	0.00627	0.00427
45	0.00070	0.00048			

*Base mortality rates as of 2016 before application of the improvement scale

TABLE 2 - RATES OF MORTALITY FOR HEALTHY RETIREES*

Age	Male	Female	Age	Male	Female
50	0.00109	0.00073	86	0.08298	0.06462
51	0.00120	0.00079	87	0.09443	0.07350
52	0.00131	0.00085	88	0.10711	0.08327
53	0.00144	0.00092	89	0.12109	0.09407
54	0.00158	0.00099	90	0.13640	0.10609
55	0.00230	0.00189	91	0.15328	0.11944
56	0.00254	0.00202	92	0.17177	0.13414
57	0.00281	0.00216	93	0.19177	0.15015
58	0.00310	0.00231	94	0.21309	0.16739
59	0.00342	0.00247	95	0.23544	0.18570
60	0.00377	0.00264	96	0.25850	0.20494
61	0.00416	0.00283	97	0.28193	0.22492
62	0.00458	0.00304	98	0.30538	0.24547
63	0.00505	0.00328	99	0.32858	0.26641
64	0.00557	0.00356	100	0.35131	0.28760
65	0.00615	0.00391	101	0.37345	0.30893
66	0.00680	0.00432	102	0.39502	0.33033
67	0.00753	0.00482	103	0.41584	0.35162
68	0.00836	0.00541	104	0.43574	0.37259
69	0.00931	0.00613	105	0.45458	0.39307
70	0.01042	0.00697	106	0.47226	0.41288
71	0.01169	0.00797	107	0.48873	0.43188
72	0.01317	0.00912	108	0.50000	0.44995
73	0.01487	0.01045	109	0.50000	0.46701
74	0.01685	0.01195	110	0.50000	0.48299
75	0.01914	0.01368	111	0.50000	0.49786
76	0.02178	0.01568	112	0.50000	0.50000
77	0.02482	0.01800	113	0.50000	0.50000
78	0.02832	0.02074	114	0.50000	0.50000
79	0.03234	0.02395	115	0.50000	0.50000
80	0.03697	0.02771	116	0.50000	0.50000
81	0.04230	0.03206	117	0.50000	0.50000
82	0.04843	0.03707	118	0.50000	0.50000
83	0.05549	0.04280	119	0.50000	0.50000
84	0.06356	0.04927	120	1.00000	1.00000
85	0.07270	0.05654			

*Base mortality rates as of 2016 before application of the improvement scale

TABLE 3 - RATES OF MORTALITY FOR SURVIVORS AND BENEFICIARIES*

Age	Male	Female	Age	Male	Female
50	0.00755	0.00286	86	0.10719	0.07252
51	0.00779	0.00307	87	0.11966	0.08154
52	0.00803	0.00329	88	0.13356	0.09158
53	0.00829	0.00353	89	0.14902	0.10277
54	0.00855	0.00378	90	0.16622	0.11522
55	0.00883	0.00405	91	0.18400	0.12870
56	0.00912	0.00434	92	0.20172	0.14305
57	0.00943	0.00465	93	0.21914	0.15821
58	0.00976	0.00499	94	0.23632	0.17417
59	0.01012	0.00535	95	0.25353	0.19094
60	0.01051	0.00575	96	0.27113	0.20858
61	0.01093	0.00618	97	0.28951	0.22710
62	0.01140	0.00665	98	0.30898	0.24650
63	0.01192	0.00717	99	0.32963	0.26671
64	0.01251	0.00775	100	0.35131	0.28760
65	0.01319	0.00840	101	0.37345	0.30893
66	0.01398	0.00911	102	0.39502	0.33033
67	0.01489	0.00991	103	0.41584	0.35162
68	0.01596	0.01080	104	0.43574	0.37259
69	0.01721	0.01180	105	0.45458	0.39307
70	0.01870	0.01290	106	0.47226	0.41288
71	0.02048	0.01412	107	0.48873	0.43188
72	0.02257	0.01549	108	0.50000	0.44995
73	0.02501	0.01702	109	0.50000	0.46701
74	0.02784	0.01874	110	0.50000	0.48299
75	0.03109	0.02071	111	0.50000	0.49786
76	0.03481	0.02295	112	0.50000	0.50000
77	0.03903	0.02550	113	0.50000	0.50000
78	0.04379	0.02843	114	0.50000	0.50000
79	0.04914	0.03178	115	0.50000	0.50000
80	0.05509	0.03562	116	0.50000	0.50000
81	0.06168	0.04002	117	0.50000	0.50000
82	0.06897	0.04505	118	0.50000	0.50000
83	0.07705	0.05075	119	0.50000	0.50000
84	0.08602	0.05720	120	1.00000	1.00000
85	0.09603	0.06444			

*Base mortality rates as of 2016 before application of the improvement scale

TABLE 4 - RATES OF MORTALITY FOR DISABLED RETIREES*

Age	Male	Female	Age	Male	Female
50	0.00865	0.00733	86	0.10847	0.09502
51	0.00941	0.00797	87	0.12062	0.10351
52	0.01024	0.00867	88	0.13397	0.11248
53	0.01115	0.00943	89	0.14854	0.12195
54	0.01213	0.01025	90	0.16429	0.13197
55	0.01321	0.01115	91	0.18068	0.14265
56	0.01437	0.01213	92	0.19745	0.15414
57	0.01564	0.01319	93	0.21449	0.16659
58	0.01702	0.01435	94	0.23188	0.18013
59	0.01853	0.01561	95	0.24976	0.19488
60	0.02016	0.01698	96	0.26833	0.21094
61	0.02117	0.01733	97	0.28775	0.22833
62	0.02204	0.01766	98	0.30811	0.24701
63	0.02279	0.01800	99	0.32937	0.26684
64	0.02345	0.01835	100	0.35131	0.28760
65	0.02406	0.01874	101	0.37345	0.30893
66	0.02466	0.01920	102	0.39502	0.33033
67	0.02531	0.01976	103	0.41584	0.35162
68	0.02608	0.02047	104	0.43574	0.37259
69	0.02705	0.02138	105	0.45458	0.39307
70	0.02831	0.02256	106	0.47226	0.41288
71	0.02995	0.02408	107	0.48873	0.43188
72	0.03201	0.02598	108	0.50000	0.44995
73	0.03450	0.02828	109	0.50000	0.46701
74	0.03743	0.03104	110	0.50000	0.48299
75	0.04084	0.03429	111	0.50000	0.49786
76	0.04472	0.03807	112	0.50000	0.50000
77	0.04906	0.04236	113	0.50000	0.50000
78	0.05385	0.04709	114	0.50000	0.50000
79	0.05901	0.05217	115	0.50000	0.50000
80	0.06446	0.05742	116	0.50000	0.50000
81	0.07012	0.06267	117	0.50000	0.50000
82	0.07608	0.06800	118	0.50000	0.50000
83	0.08252	0.07364	119	0.50000	0.50000
84	0.08968	0.07986	120	1.00000	1.00000
85	0.09789	0.08708			

*Base mortality rates as of 2016 before application of the improvement scale

TABLE 5 - RATES OF RETIREMENT FROM ACTIVE SERVICE

Age	Unreduced				Proratable		Early	
	Less than 35 years of service		35 or more years of service*					
	Male	Female	Male	Female	Male	Female	Male	Female
50			0.3500	0.3000			0.0120	0.0120
51			0.3500	0.3000			0.0120	0.0120
52			0.3500	0.3000			0.0120	0.0120
53			0.3500	0.3000			0.0120	0.0170
54			0.3500	0.3000			0.0160	0.0210
55			0.3500	0.3000			0.0240	0.0290
56			0.3500	0.3000			0.0320	0.0360
57			0.3500	0.3000			0.0450	0.0430
58			0.3500	0.3000			0.0550	0.0520
59			0.3500	0.3000			0.0720	0.0660
60	0.1800	0.1900	0.3000	0.3000	0.0500	0.0500		
61	0.1800	0.1900	0.3000	0.3000	0.0500	0.0600		
62	0.1800	0.1900	0.3000	0.3000	0.0600	0.0700		
63	0.1800	0.1900	0.3000	0.3000	0.0800	0.0800		
64	0.1800	0.1900	0.3000	0.3000	0.1000	0.0900		
65	0.2700	0.3300	0.4000	0.4200	0.1300	0.1600		
66	0.2700	0.3200	0.3500	0.3700	0.1800	0.1600		
67	0.2700	0.3200	0.3000	0.3300	0.1800	0.1600		
68	0.2700	0.3200	0.3000	0.3300	0.1800	0.1600		
69	0.2700	0.3200	0.3000	0.3300	0.1800	0.1600		
70	0.2700	0.3200	0.3000	0.3300	0.2700	0.2000		
71	0.2700	0.3200	0.3000	0.3300	0.2000	0.2000		
72	0.2700	0.3200	0.3000	0.3300	0.2000	0.2000		
73	0.2700	0.3200	0.3000	0.3300	0.2000	0.2000		
74	0.2700	0.3200	0.3000	0.3300	0.2000	0.2000		
75	1.0000	1.0000	1.0000	1.0000	0.2000	0.2000		
76					0.2000	0.2000		
77					0.2000	0.2000		
78					0.2000	0.2000		
79					0.2000	0.2000		
80					1.0000	1.0000		

*100% assumed rate of retirement for members with 38 or more years of service.

TABLE 6 - RATES OF WITHDRAWAL FROM ACTIVE SERVICE

Years of Service	Male	Female
0	0.2000	0.1900
1	0.1100	0.1050
2	0.0925	0.0900
3	0.0750	0.0775
4	0.0600	0.0700
5	0.0450	0.0625
6	0.0375	0.0575
7	0.0325	0.0500
8	0.0275	0.0450
9	0.0250	0.0400
10	0.0225	0.0350
11	0.0200	0.0310
12	0.0200	0.0260
13	0.0200	0.0225
14	0.0200	0.0200
15	0.0200	0.0200

TABLE 7 - RATES OF DISABILITY WHILE IN ACTIVE SERVICE

Age	Male	Female
20	0.00020	0.00020
21	0.00020	0.00020
22	0.00020	0.00020
23	0.00020	0.00020
24	0.00020	0.00020
25	0.00020	0.00020
26	0.00020	0.00020
27	0.00020	0.00020
28	0.00020	0.00020
29	0.00020	0.00020
30	0.00020	0.00020
31	0.00020	0.00022
32	0.00020	0.00024
33	0.00020	0.00026
34	0.00020	0.00028
35	0.00020	0.00030
36	0.00022	0.00036
37	0.00024	0.00042
38	0.00026	0.00048
39	0.00028	0.00054
40	0.00030	0.00060
41	0.00040	0.00066
42	0.00050	0.00072
43	0.00060	0.00078
44	0.00070	0.00084
45	0.00080	0.00090
46	0.00094	0.00102
47	0.00108	0.00114
48	0.00122	0.00126
49	0.00136	0.00138
50	0.00150	0.00150
51	0.00150	0.00154
52	0.00150	0.00158
53	0.00150	0.00162
54	0.00150	0.00166
55	0.00150	0.00170
56	0.00150	0.00166
57	0.00150	0.00162
58	0.00150	0.00158
59	0.00150	0.00154
60	0.00150	0.00150

TABLE 8 - RATES OF SALARY INCREASES

Years of Service	
0	0.0600
1	0.0600
2	0.0600
3	0.0600
4	0.0600
5	0.0600
6	0.0600
7	0.0600
8	0.0600
9	0.0600
10	0.0600
11	0.0570
12	0.0540
13	0.0510
14	0.0480
15	0.0450
16	0.0420
17	0.0390
18	0.0360
19	0.0330
20	0.0300
21+	0.0300