Vermont State Employees' Retirement System

# Actuarial Experience Review

July 1, 2019, through June 30, 2022

September 2023 / Matt Strom / Kathy Riley / Patryk Tabernacki / Austin Miller

Segal

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# Actuarial Certification

We are pleased to submit this report on the actuarial experience of the Vermont State Employees' Retirement System for the three-year period ending June 30, 2022.  This investigation is the basis for our recommendation of the assumptions and methods to be used for the June 30, 2023, actuarial valuation.

All current actuarial assumptions and methods were reviewed as part of this study.  Some of our recommendations reflect changes to the assumptions and methods used in the June 30, 2022, actuarial valuation while other current assumptions and methods remain appropriate.

Our analysis was conducted in accordance with generally accepted actuarial principles as prescribed by the Actuarial Standards Board (ASB) and the American Academy of Actuaries.  Additionally, the development of all assumptions contained herein is in accordance with ASB Actuarial Standard of Practice (ASOP) No. 27 (Selection of Economic Assumptions for Measuring Pension Obligations) and ASOP No. 35 (Selection of Demographic and Other Non-Economic Assumptions for Measuring Pension Obligations).

The undersigned actuary is experienced with performing experience studies for large public-sector pension plans and is qualified to render the opinions contained in this report. To the best of my knowledge, the information supplied in this experience study is complete and accurate. Further, in my opinion, the recommended assumptions are reasonably related to the experience of and the expectations for the System.

September 18, 2023
_____
Date

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Matthew A. Strom, FSA, MAAA, EA
Senior Vice President and Actuary

✦ Segal

# Agenda

**Overview and Executive Summary**

**Analysis:**

- Economic Assumptions
- Demographic Assumptions

**Summary of Recommended Assumptions**

**Cost Impact**

**Appendix**

# Overview: Purpose of an Experience Study

**An experience study provides the basis for developing recommended assumptions to be used in the annual actuarial valuation**

- Performed on a periodic basis, typically every three-to-five years

- Last VSERS experience study reviewed demographic and economic assumptions over the **five-year** period ending June 30, 2019

- Current study is based on the **three-year**[1] period from July 1, 2019, through June 30, 2022

**Segal's role is to make appropriate recommendations to the Board for each assumption**

- The assumptions are the Board's assumptions, and the Board can adopt all, none, or some of the recommendations of the actuary

- Segal's recommendations will follow the guidance of the applicable Actuarial Standards of Practice. Assumptions should be reasonable individually and in the aggregate (ASOP No. 27 and 35).

- The Vermont Pension Investment Commission (VPIC) has authority over setting the inflation and investment return assumptions. The inflation and investment return assumptions were recommended by VPIC's actuary, GRS, and were adopted by VPIC during their meeting on July 25, 2023.

[1] To increase the credibility of the data set, five years of historical data (July 1, 2017, through June 30, 2022) were studied for pre- and post-retirement mortality.

# Overview: How Assumptions Are Set

**Review past experience ("actual") and compare with assumptions ("expected")**

**Determine trends – make judgments about the future**

**Develop component parts of each assumption**

- Maintain internal consistency

**Keep in mind:**

- No "right" answer

- Assumptions are long-term in nature

- Assumptions do not directly affect the payment of benefits, only the timing of contributions

# Overview: Actuarial Assumptions

## Economic

- Inflation[1]
- Investment return[1]
- Salary increase[2]
- Payroll growth[2]
- COLA[2]
- Administrative expense

## Demographic

- Death after retirement
- Death in active service
- Retirement
- Termination before retirement
- Disability incidence
- Other miscellaneous

**Actuaries make assumptions as to when and why a member will leave active service and estimate the amount, duration and present value of the pension benefits paid.**

[1] The inflation and investment return assumptions were recommended by VPIC's actuary, GRS, and adopted by VPIC during their July 25, 2023, meeting.
[2] The salary increase, payroll growth, and COLA assumptions reflect the inflation assumption referenced above.

# Executive Summary

## Five-Year History of Gain/(Loss)

Based on changes adopted from prior experience study

| $ in thousands | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Investments | −$10,076 | −$13,758 | −$23,940 | $52,181 | −$32,288 |
| Admin expenses | N/A | N/A | N/A | N/A | $44 |
| Demographics | | | | | |
| • Turnover | −$7,932 | −$1,589 | −$2,813 | $3,447 | $13,686 |
| • Retirement | −17,049 | −13,425 | −8,892 | −19,016 | −22,922 |
| • Mortality | −4,855 | −1,885 | 3,692 | −4,440 | 10,207 |
| • Disability retirement | −491 | 292 | −434 | −158 | −1,599 |
| • Salary/service | −7,121 | 344 | −3,698 | −4,449 | −30,740 |
| • COLA experience | −727 | 11,994 | 23,970 | −35,589 | −46,707 |
| • Miscellaneous | −16,190 | −14,995 | −2,407 | −3,195 | −9,645 |
| • Subtotal | −$54,364 | −$19,263 | $9,417 | −$63,401 | −$87,721 |
| **Total** | **−$64,440** | **−$33,021** | **−$14,523** | **−$11,220** | **−$119,965** |

Due to rounding, values shown here may not sum as expected

**Anomalous turnover and retirement experience related to pandemic**

- Recommend no changes to turnover and retirement rates and reassess with the next experience study

**Mortality gains coinciding with the pandemic**

- Adjustment to approximate no lingering impact

**Fiscal 2022 included 27 pay periods instead of 26, which contributed to a loss**

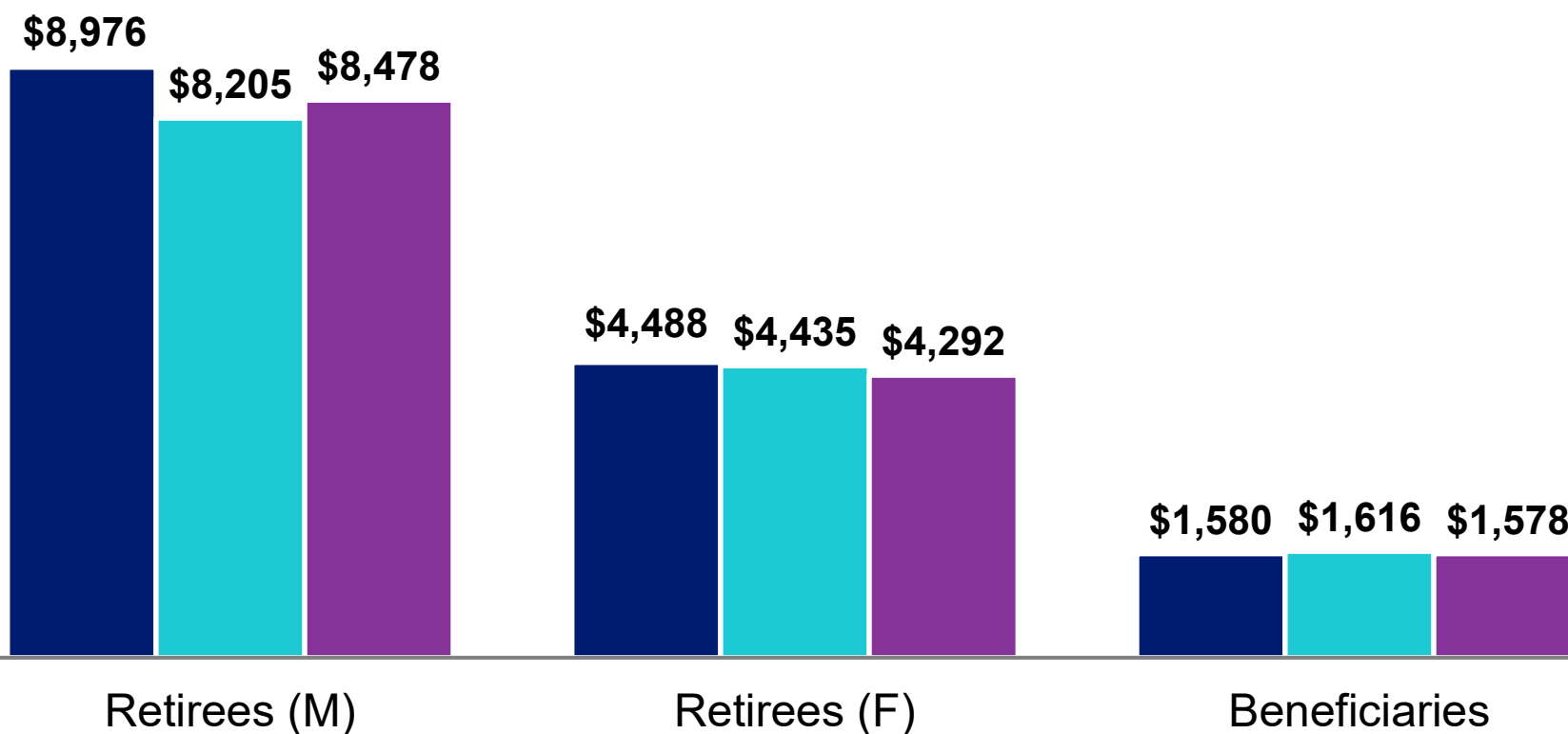- Adjust for 27th pay period and recommend increases to assumed salary raises

# Executive Summary *(continued)*

**Five-year history of benefits released due to post-retirement mortality ($ in thousands)**

## Post-retirement Mortality

■ Expected   ■ Actual[1]   ■ Proposed

| | Retirees (M) | Retirees (F) | Beneficiaries |
|---|---|---|---|
| Expected | $8,976 | $4,488 | $1,580 |
| Actual | $8,205 | $4,435 | $1,616 |
| Proposed | $8,478 | $4,292 | $1,578 |

**Actual amounts have been adjusted[1] to approximate the level of mortality expected in the absence of the pandemic**

- $8.21M and $4.44M actual benefits released were lower than the $8.98M and $4.49M expected for male and female retirees, respectively

- $1.62M actual benefits released were only slightly higher than the $1.58M expected for all beneficiaries

**Proposed tables based on Pub-2010 General (Public Safety for Group C) and Contingent Survivor mortality rates, adjusted for "credible" actual experience[2]; updated mortality improvement scale**

- Net impact is a slight increase in liabilities and contributions

[1] Adjusted based on data from the CDC related to observed "excess mortality" (all causes) relative to expected
[2] If/where applicable

# Executive Summary *(continued)*

**VPIC elected to maintain the current investment return assumption of 7.00% per year**

- Segal has independently reviewed this assumption and believes 7.00% continues to be reasonable

**VPIC elected to maintain the current inflation assumption of 2.30% per year**

- Segal has independently reviewed this assumption and believes 2.30% continues to be reasonable

**Expected COLAs are primarily driven by assumed inflation, subject to applicable provisions**

- While the inflation assumption is not changing, we recommend slight decreases to the various COLA assumptions based on changes to plan provisions and methodology used to develop these assumptions, which results in a decrease in liabilities and required contributions:
  - Approximately 0.05% to 0.15% decreases depending on the applicable Group

**Administrative expenses are assumed to equal 0.40% of projected payroll**

- Current assumption has tracked closely; however, increases to staff warrant a slight increase in this assumption from 0.40% to 0.45%

# Executive Summary *(continued)*

**Estimated cost impact of recommended assumption changes**
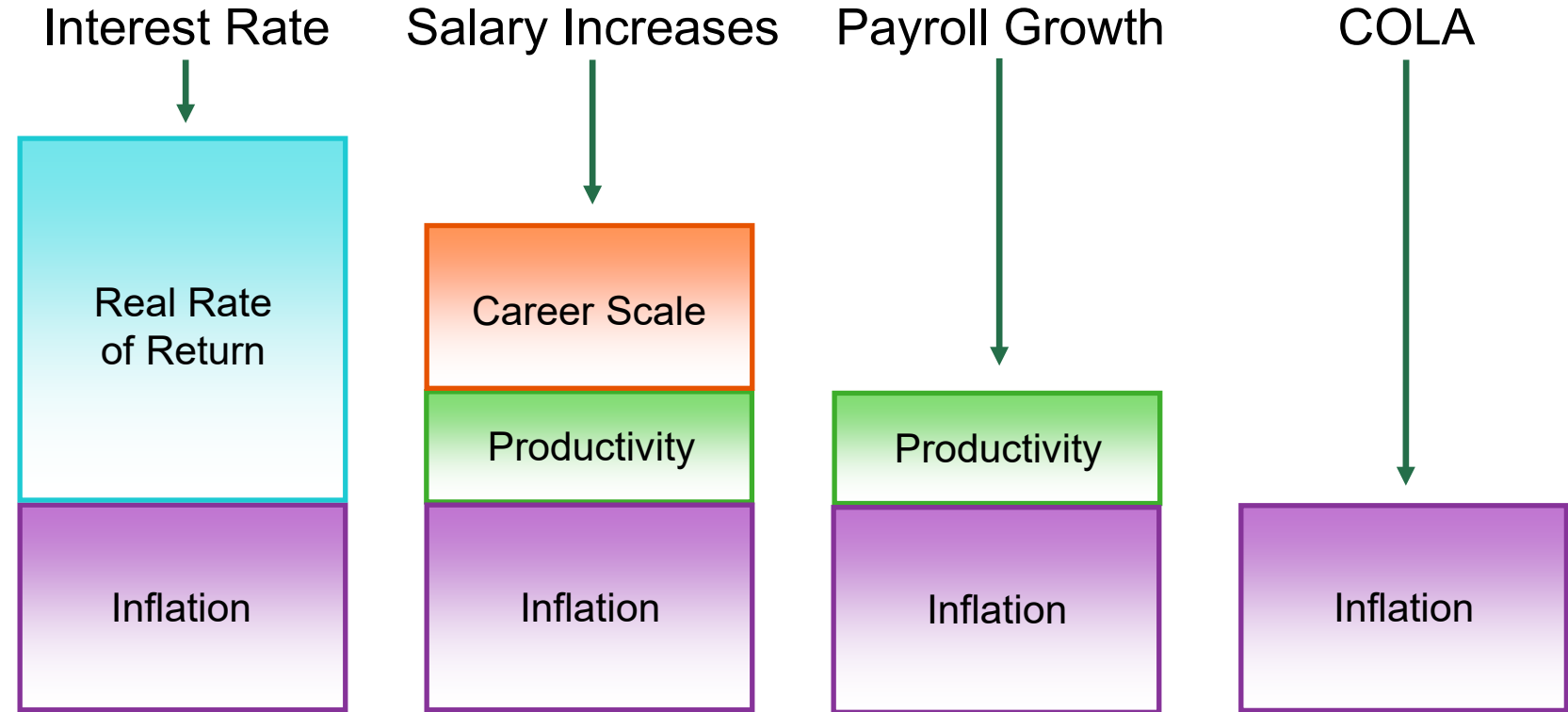**Based on the June 30, 2022, actuarial valuation**
*($ in millions)*

| | Before Changes (Baseline) | Reflecting COLA | Reflecting COLA and Mortality | Reflecting COLA, Mortality, and All Other Assumptions |
|---|---|---|---|---|
| **Present Value of Future Benefits** | $4,100.6 | $4,071.3 | $4,090.0 | $4,149.0 |
| *% Change* | | -0.7% | 0.5% | 1.4% |
| *Cumulative* | | -0.7% | -0.3% | 1.2% |
| **Actuarial Accrued Liability** | $3,444.1 | $3,419.5 | $3,435.1 | $3,457.1 |
| *% Change* | | -0.7% | 0.5% | 0.6% |
| *Cumulative* | | -0.7% | -0.3% | 0.4% |
| **Total Normal Cost**[1] | $74.1 | $73.6 | $74.0 | $75.8 |
| *% Change* | | -0.7% | 0.5% | 2.4% |
| *Cumulative* | | -0.7% | -0.1% | 2.3% |
| **Funded Percentage** | 69.9% | 70.4% | 70.0% | 69.6% |
| *Delta* | | 0.5% | -0.4% | -0.4% |
| *Cumulative* | | 0.5% | 0.1% | -0.3% |
| **Actuarially Determined Contribution for FY24** | $121.9 | $119.0 | $120.9 | $125.0 |
| *% Change* | | -2.4% | 1.6% | 3.4% |
| *Cumulative* | | -2.4% | -0.8% | 2.5% |

Due to rounding, values shown here may not sum as expected

[1] Total normal cost as of July 1, 2022, adjusted for timing

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# Basis for Setting Economic Assumptions

**Most economic assumptions have 2 or 3 components**

Interest Rate

Salary Increases

Payroll Growth

COLA

| Real Rate of Return | | | |
|---|---|---|---|
| | Career Scale | | |
| | Productivity | Productivity | |
| Inflation | Inflation | Inflation | Inflation |

Each component should be consistent across all economic assumptions, but may include a provision for adverse deviation.

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# Assumed Rate of Inflation

**Inflation represents the annual increase in the cost of living and reflects long-term expectations**

**The current inflation assumption is 2.30%**

- Inflation is a component of the following economic assumptions:
  - Investment return
  - Individual salary increases
  - Payroll growth
  - Cost-of-living-adjustments

**VPIC's actuary, GRS, recommended maintaining the current inflation assumption of 2.30% and this recommendation was adopted by VPIC during their meeting on July 25, 2023.**

# Assumed Rate of Inflation

**Our analysis of inflation is based on a review of historical inflation as well as expectations of the future**

Historical national inflation (CPI-U) averages are:

| As of | 1-year | 5-year | 10-year | 20-year | 30-year | 50-year |
|---|---|---|---|---|---|---|
| 06/30/2023 | 2.97% | 3.90% | 2.71% | 2.57% | 2.52% | 3.94% |
| 06/30/2022 | 9.06% | 3.88% | 2.59% | 2.53% | 2.53% | 4.00% |

- Indicators for expectations of future inflation:
  - The Philadelphia Federal Reserve Bank Survey of Professional Forecasters 10-year outlook is 2.36% as of Q2 2023 (down from 2.80% as of Q2 2022)
  - The median 20-year inflation assumption from the 2023 Horizon Survey of Capital Market Expectations is 2.46% (nearly unchanged from 2.44% from the 2022 Horizon Survey)
  - Spread between yields on 20-year and 30-year US Treasury bonds with and without inflation indexing is 2.50% and 2.23% as of June 30, 2023, respectively
  - 2022 OASDI Trustees Report's intermediate inflation assumption is 2.40% (unchanged from 2020 report)

**We believe continued use of an inflation assumption of 2.30% is reasonable**

# Assumed Rate of Investment Return

**The investment return is a principal assumption used in any actuarial valuation and is used to discount future expected benefit payments to the valuation date in order to determine the liabilities of the plan**

**The current investment return assumption of 7.00% consists of three components:**

- Inflation[1]: 2.30%

- Real rate of return: 4.95%

- Adjustment for conservatism: (0.25%)

**VPIC's actuary, GRS, recommended maintaining the current investment return assumption of 7.00% and this recommendation was adopted by VPIC during their meeting on July 25, 2023.**

[1] The inflation assumption of 2.30% was adopted by VPIC during their meeting on July 25, 2023.

# Assumed Rate of Investment Return

**Our analysis is based on Segal Marco Advisors 2023 capital market assumptions and VPIC's current target asset allocation**

| Asset Classes | SMA 20-Year Horizon Arithmetic Real Return[1] | Target Allocation | Weighted Real Return |
|---|---|---|---|
| Domestic Equity | 6.91% | 22.78% | 1.57% |
| International Equity | 7.21% | 14.93% | 1.08% |
| Emerging Equity | 8.71% | 6.29% | 0.55% |
| Core Fixed Income | 1.61% | 19.00% | 0.31% |
| Emerging Debt | 6.71% | 2.00% | 0.07% |
| Real Estate | 3.61% | 8.00% | 0.29% |
| Commodities | 5.71% | 5.00% | 0.29% |
| Short Term | 0.71% | 2.00% | 0.01% |
| Private Credit | 6.31% | 10.00% | 0.63% |
| Private Equity | 9.96% | 10.00% | 1.00% |
| **Total** | | **100.00%** | **5.79%** |
| Adjustment to Geometric | | | (0.71%) |
| **Geometric Real Rate of Return[1]** | | | **5.08%** |

| Component | Current Rate (7.00%) |
|---|---|
| Inflation | 2.30% |
| Geometric Real Rate of Return | 5.08% |
| Total Expected Rate of Return | 7.38% |
| Adjustment[2] | (0.38%) |
| Total | 7.00% |
| Confidence Level | 56% |

**We believe continued use of an investment return assumption of 7.00% is reasonable**

[1] Reflecting assumed inflation of 2.30%
[2] Adjusting the real rate of return for adverse deviation increases the likelihood of meeting the expectation over a 20-year period. For example, the 38 basis point reduction increases the likelihood of meeting the expectation from 50% to 56%.

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# Assumed Rates of Individual Salary Increase

**In order to project future benefits, salaries are projected forward over the expected career for each active member**

**Individual member salary increase components:**

- Inflation
- Productivity
- Merit and seniority increases

**Since merit and seniority increases are unique to each retirement system, it is appropriate to base this assumption on recent experience**

- We study the merit and seniority increases (plus productivity) separately from inflation

- Between 2018 and 2020 inflation averaged 1.72%, which does not include inflation of 5.39% in 2021
  - This assumes that the effects of 2021 inflation are not yet reflected in the historical salary data over the study period

- Fiscal 2022 included 27 pay periods instead of the typical 26, which caused irregularly high salaries
  - We adjusted this year to remove the 27th pay period

# Assumed Rates of Salary Increase *(continued)*

The following table compares the actual and expected individual salary increases over the past 3 years. This table is <u>adjusted to remove actual annual inflation</u> of about 1.72% over the experience period; however, this analysis excludes participants with less than 1 year of service:

| Service | Expected Increase | Actual Increase | Proposed Increase |
|---------|-------------------|-----------------|-------------------|
| 1 – 4   | 3.22%             | 4.94%           | 3.90%             |
| 5 – 9   | 2.80%             | 3.00%           | 3.04%             |
| 10 – 14 | 2.28%             | 2.97%           | 2.60%             |
| 15 – 19 | 2.04%             | 2.49%           | 2.29%             |
| 20 – 24 | 1.82%             | 2.21%           | 2.06%             |
| 25 – 29 | 1.64%             | 2.31%           | 1.94%             |
| 30 – 34 | 1.45%             | 1.65%           | 1.60%             |
| 35 – 39 | 1.23%             | 1.86%           | 1.47%             |
| 40+     | 1.10%             | 1.65%           | 1.46%             |
| **Total** | **2.48%**       | **3.23%**       | **2.85%**         |
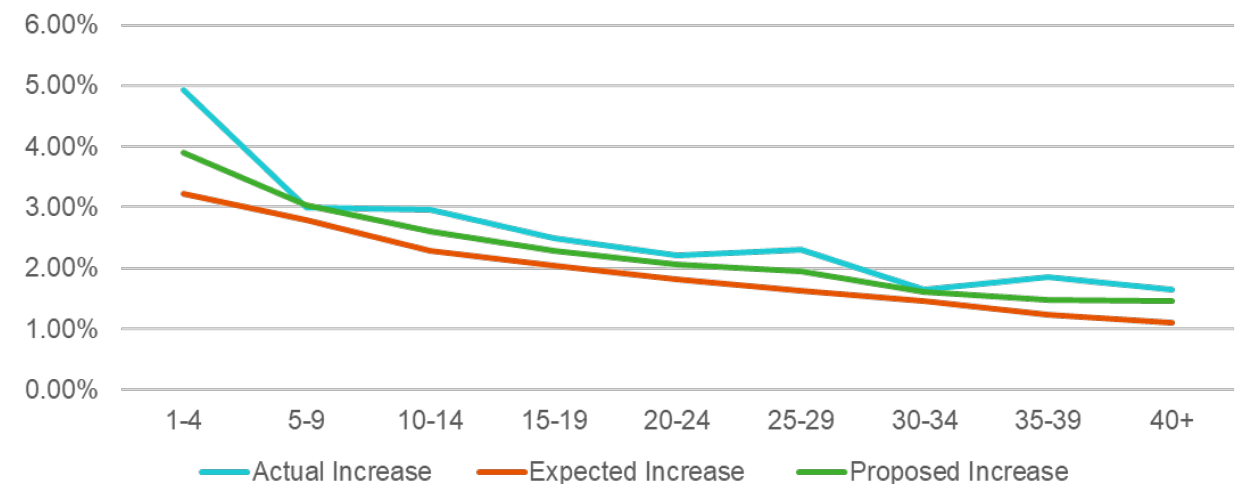


Reflecting the inflation assumption of 2.30%, the total proposed salary increase assumption will average 5.15% per year (a net increase from the current average expected rate of 4.78%)

Based on this experience, we recommend slight **increases** to the non-inflationary portion of individual salary increases for all service amounts. Productivity is included above for purposes of the salary scale analysis.

# Assumed Rate of Payroll Growth

**The payroll growth assumption is used to project covered payroll to estimate the employer normal cost for the two fiscal years following the valuation year for budgeting purposes**

**A higher payroll growth assumption is more conservative**

- A higher assumption relative to actual experience results in an otherwise larger employer normal cost

**The current payroll growth assumption of 3.50% consists of the following components:**

| | |
|---|---|
| Inflation | 2.30% |
| Productivity | 0.70% |
| Plan-specific adjustment[1] | <u>0.50%</u> |
| Total payroll growth | 3.50% |

[1] Adjustment to reflect expected and observed increases in total payroll above inflation and productivity due to factors such as active population growth, etc.

# Assumed Rate of Payroll Growth *(continued)*

## As the adopted inflation component is 2.30%, we need to examine the productivity component

**Productivity can be measured as the excess of the increase in the National Average Wage over inflation. As of 2022:**

- The 20-year average of the National Average Wage is 3.1%

- The 20-year average inflation is 2.3%

- Therefore, productivity has averaged about 0.8% over the last 20 years

**We have no reason to believe that continued use of the 0.70% productivity component is inappropriate going forward**

# Assumed Rate of Payroll Growth *(continued)*

**The following table summarizes the System's historical payroll and active population growth:**

| Year Ended June 30 | Annualized Payroll ($ in Millions) | Active Members |
|:---:|:---:|:---:|
| 2022 | $577.0 | 8,324 |
| 2017 | 504.6 | 8,620 |
| 2012 | 385.5 | 7,878 |
| 2007 | 386.9 | 8,411 |
| 2002 | 301.0 | 7,725 |
| 5-year average: | 2.7% | -0.7% |
| 10-year average: | 4.1% | 0.6% |
| 15-year average: | 2.8% | 0.0% |
| 20-year average: | 3.4% | 0.4% |

- 5-year average:
- 10-year average:
- 15-year average:
- 20-year average:

## Increases in total payroll have averaged roughly 3.4% per year since 2002

# Assumed Rate of Payroll Growth *(continued)*

**The following table summarizes the components of the current and recommended payroll growth assumption:**

| Component | Current | Recommended |
|---|---|---|
| Inflation | 2.30% | 2.30% |
| Productivity | 0.70% | 0.70% |
| Plan-specific adjustment | <u>0.50%</u> | <u>0.50%</u> |
| Total payroll growth | 3.50% | 3.50% |

We recommend no change to the 3.50% payroll growth assumption

# Assumed COLA Increases

## Cost of Living Adjustments (COLAs) are generally linked to inflation

**VSERS contains the following COLA provisions:**

- Active Group A, C, F, and G members first eligible for normal or unreduced early retirement on or after July 1, 2022, and active Group D members first appointed or elected on or after July 1, 2022[1]:
  - Group A:
    - **CPI**, capped at 5%. If **CPI** is less than 1%, then no increase[2]
  - Group C:
    - **CPI**, capped at 4%. If **CPI** is less than 1%, then no increase[2]
  - Group D:
    - First $75,000 of retirement benefits paid: **CPI**, capped at 5%. If **CPI** is less than 1%, then no increase[2]
    - Retirement benefits paid above $75,000: 50% of the lesser of (**CPI**, 5%). If **CPI** is less than 1%, then no increase[2]
  - Groups F and G:
    - **CPI**, capped at 4%. If **CPI** is less than 0%, then no increase[2]

[1] Effective for the June 30, 2022, actuarial valuation, this provision was updated to reflect Act 114, which applied different COLA constraints dependent upon group.
[2] Per statute, the COLA will be 0% in years that follow a year with negative CPI, subject to applicable offset of future increases.

# Assumed COLA Increases *(continued)*

- All other members:
  - Groups A/C/D:
    - **CPI**, capped at 5%. If **CPI** is less than 1%, then no increase[1]
  - Groups E/F – Retired on or before June 30, 2008:
    - 50% of the lesser of (**CPI**, 5%). If **CPI** is between 0%-1%, then 1% increase. If **CPI** is less than 0%, then no increase[1]
  - Groups E/F – Retired on or after July 1, 2008:
    - **CPI**, capped at 5%. If **CPI** is between 0%-1%, then 1% increase. If **CPI** is less than 0%, then no increase[1]

[1] Per statute, the COLA will be 0% in years that follow a year with negative CPI, subject to applicable offset of future increases.

# Assumed COLA Increases *(continued)*

**We studied expected future COLAs based on stochastic projections of the adopted 2.30% inflation assumption, subject to the parameters on the prior slides**

**As a result, we recommend the following COLA assumptions:**

- Active Group A, C, F, and G members first eligible for normal or unreduced early retirement on or after July 1, 2022, and active Group D members first appointed or elected on or after July 1, 2022:
  - Group A:
    - 2.25% (currently 2.40%)
  - Group C:
    - 2.10% (currently 2.15%)
  - Group D:
    - First $75,000 of retirement benefits paid: 2.25% (currently 2.40%)
    - Retirement benefits paid above $75,000: 1.10% (currently 1.15%)
  - Groups F and G:
    - 2.15% (currently 2.25%)

# Assumed COLA Increases *(continued)*

- All other members:
  - Groups A/C/D:
    - 2.25% (currently 2.40%)
  - Groups E/F – Retired on or before June 30, 2008:
    - 1.25% (currently 1.35%)
  - Groups E/F – Retired on or after July 1, 2008:
    - 2.35% (currently 2.40%)

# Administrative Expenses

**Current assumption:**

- 0.40% of projected payroll is added to normal cost

| Year Ended June 30 | Administrative Expenses[1] | Projected Payroll[1] | Percentage |
|---|---|---|---|
| 2022 | $2.352 | $578.7 | 0.406% |
| 2021 | 2.281 | 578.2 | 0.394% |
| 2020 | 2.268 | 550.5 | 0.412% |
| **Total** | **$6.901** | **$1,707.4** | **0.404%** |

Due to rounding, values shown here may not sum as expected

**Actual administrative expenses have emerged reasonably close to 0.40% of projected payroll**

**Additional staff expected to increase VSERS-related expenses[2] by approximately $270,000 per year**

- Or roughly 0.047% of $569,100,000 average projected payroll

**Therefore, we recommend increasing this assumption from 0.40% to 0.45% of projected payroll**

[1] Dollars in millions
[2] Allocated portion of expected total administrative expense increase of approximately $750,000 per year

# Overview: How Mortality Assumption Is Set

**Review past experience**

**Compare past experience ("actual") with assumptions ("expected")**

- Examine on a "benefit-weighted" basis as opposed to a "headcount-weighted" basis

**Determine appropriate standardized table as basis for new assumption**

**Assess credibility of data set and calculate weighting factor**

- Actual experience can be the assumption basis for fully-credible data
- Partially-credible data is blended with standardized table
- Typically, we assume 1,082 deaths needed in a subgroup to be considered fully-credible
  - 90% confident that results are within a range of 5% around the mean
- *Solely for mortality purposes, we included experience from July 1, 2017, through June 30, 2022 (five-year period) in order to increase the overall credibility of the data analyzed*

**The mortality analysis was adjusted for COVID-19**

- Adjustments of 96%, 90%, and 82% were applied to actual experience in 2020, 2021, and 2022, respectively, based on data from the CDC related to observed "excess mortality" (all causes) relative to expected
  - These adjustments approximate the level of mortality VSERS would have experienced in 2020, 2021, and 2022 in the absence of the pandemic

# Adjusting for Excess Mortality

Actual Retiree Deaths Relative to Expected[1], Headcount Basis – Total
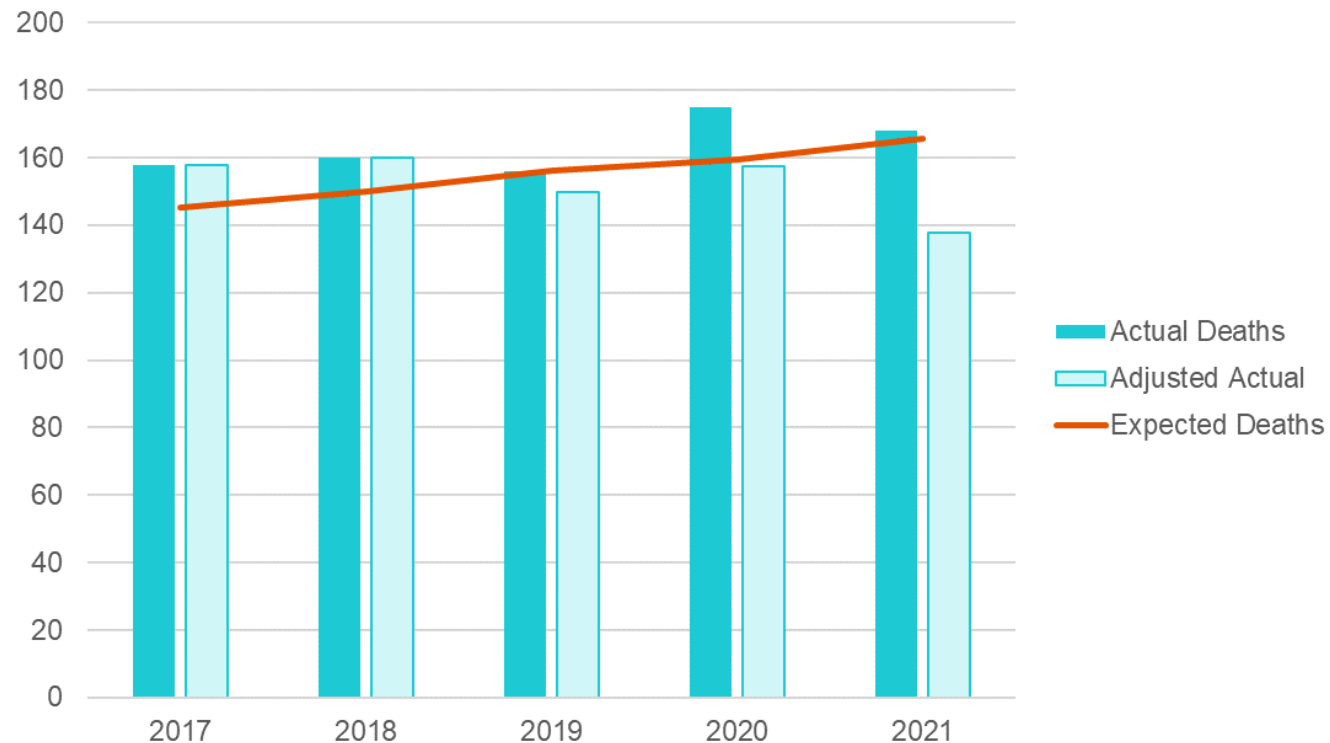
**Years where excess mortality likely exist – primarily the Plan Years beginning July 1, 2020, and July 1, 2021 in this case – can be adjusted[2] to approximate "pandemic-less" data**

- A 96% adjustment factor is applied to experience beginning July 1, 2019 to capture the partial year impact

- "Full-year" adjustment factors of 90% and 82% are applied to experience years beginning July 1, 2020, and 2021, respectively

**Then "adjusted actual" experience can be used to develop recommended adjustments to the base table under the premise that a pandemic-like event will not persist**

[1] Expected deaths for all years is estimated based on the current mortality table
[2] Adjustment factors based on data from the CDC related to observed "excess mortality" (all causes) relative to expected

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# Death After Retirement

**Our analysis uses a benefit-weighted approach, which weights the probability of death with each annuitant's pension benefit**

- This methodology takes into consideration any correlation between the health of the annuitant and the size of the benefit

**In 2019, the Society of Actuaries published a series of Pub-2010 mortality tables derived from public plan experience**

- Three broad classifications based on teachers, public safety, and general employees

- Three separate versions of each of the table classifications: Baseline, Above Median, and Below Median

- Contingent annuitant mortality studied separately from retiree mortality
  - Contingent annuitant mortality is generally worse than retiree mortality

- Separate mortality tables for "healthy" annuitants and those members retiring with a disability pension

**In order to determine which Pub-2010 table(s) should be applied, we separate the data by group, status and gender and recommended the Pub-2010 table variation that most accurately fits the data**

# Death After Retirement (*continued*)

**The current assumptions are the following:**

- Healthy Post-Retirement – Retirees:

  – Groups A/F: 109% of PubG-2010 General Healthy Retiree Amount-Weighted Table

  – Groups C/G: 40% of PubS-2010 Public Safety Retiree Amount-Weighted Above Median Table, 60% of PubS-2010 Public Safety Retiree Amount-Weighted Table

  – Group D: PubG-2010 General Healthy Retiree Amount-Weighted Above Median Table

- Healthy Post-Retirement – Beneficiaries:

  – Groups A/F: Pub-2010 Contingent Survivor Amount-Weighted Table

  – Group C/G: 40% of Pub-2010 Contingent Survivor Amount-Weighted Above Median Table, 60% of Pub-2010 Contingent Survivor Amount-Weighted Table

  – Group D: Pub-2010 Contingent Survivor Amount-Weighted Above Median Table

- Disabled Post-Retirement:

  – All Groups: PubNS-2010 Non-Safety Disabled Retiree Amount-Weighted Table

- All rates are projected generationally using the MP-2019 mortality improvement scale

# Death After Retirement (*continued*)

**Over the five-year experience period, there were fewer actual retiree deaths than expected, and there were more beneficiary and disabled deaths than expected**

**Recommend updating the current base tables, while applying adjustments based on experience where "credible" data exists. Specifically, we recommend the following:**

- Healthy Post-Retirement – Retirees:

  – Groups A/F: PubG-2010 General Healthy Retiree Amount-Weighted Table for males and females <u>with</u> credibility adjustments of 101% and 105%, respectively, of the rates for all ages

  – Group C/G: PubS-2010 Public Safety Retiree Amount-Weighted Table <u>with no</u> credibility adjustments

  – Group D: PubG-2010 General Healthy Retiree Amount-Weighted Above Median Table <u>with no</u> credibility adjustments

- Healthy Post-Retirement – Beneficiaries:

  – Groups A/F: Pub-2010 Contingent Survivor Amount-Weighted Table <u>with no</u> credibility adjustments

  – Group C/G: Pub-2010 Contingent Survivor Amount-Weighted Table <u>with no</u> credibility adjustments

  – Group D: Pub-2010 Contingent Survivor Amount-Weighted Above Median Table <u>with no</u> credibility adjustments

# Death After Retirement (*continued*)

- Disabled Post-Retirement:

  – Groups A/F/D: PubNS-2010 Non-Safety Disabled Retiree Amount-Weighted Table <u>with no</u> credibility adjustments

  – Groups C/G: PubS-2010 Safety Disabled Retiree Amount-Weighted Table <u>with no</u> credibility adjustments

- Update the mortality projection scale to MP-2021 to reflect future improvements in mortality for all groups

# Healthy Post-Retirement – Retirees Groups A/F – Male

## Actual Versus Expected Experience, Benefit-Weighted Basis – Groups A/F – Male
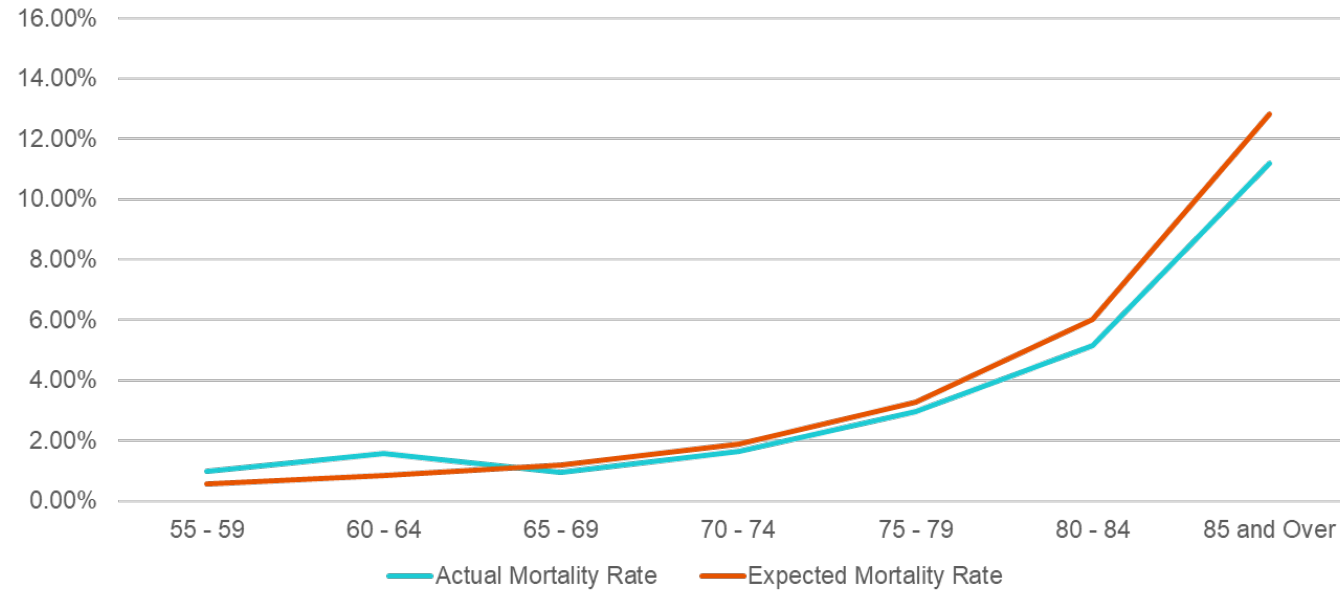


| Basis | Exposures | Actual Deaths | Expected | Actual to Expected |
|---|---|---|---|---|
| Counts | 13,868 | 396[1] | 399 | 99% |
| Benefits | $288,478[2] | $6,843[2] | $7,326[2] | 93% |

[1] 396 actual (adjusted) deaths in the observation period yields partial credibility of 61%
[2] Based on annual benefits in thousands of dollars

★ Segal

# Healthy Post-Retirement – Retirees Groups A/F – Male

Actual Versus Proposed Experience, Benefit-Weighted Basis – Groups A/F – Male
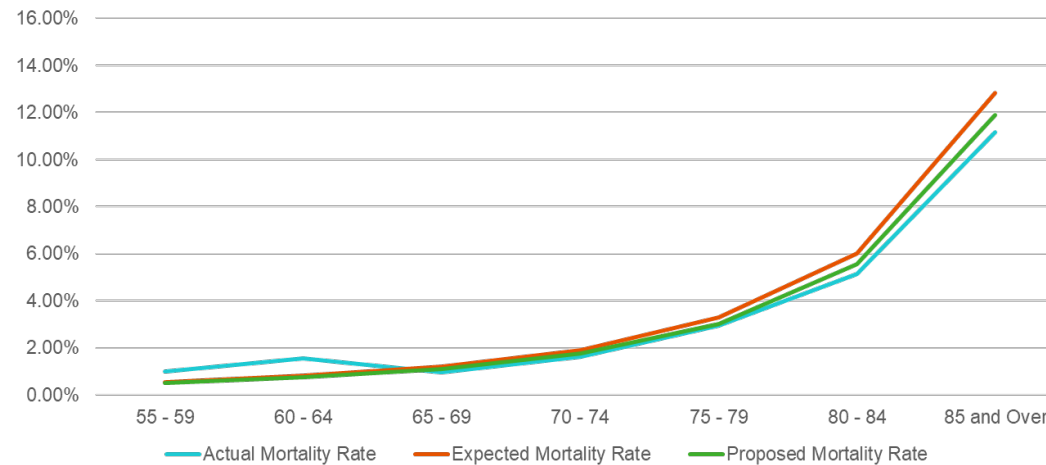


**On a benefit-weighted basis, unadjusted PubG-2010 Retiree Table (male) results in a reduction of $6,696,000 in benefits due to the proposed assumption**

- Credibility-weighted adjustment (61%) results in a reduction of $6,763,000 in benefits

**Recommend 101% of PubG-2010 Retiree Table (male), which results in $6,763,000 proposed reduction**

| Basis | Exposures | Actual Deaths | Proposed Deaths | Actual to Proposed |
|---|---|---|---|---|
| Benefits | $288,478[1] | $6,843[1] | $6,763[1] | 101% |

[1] Based on annual benefits in thousands of dollars

# Healthy Post-Retirement – Retirees Groups A/F – Female

## Actual Versus Expected Experience, Benefit-Weighted Basis – Groups A/F – Female
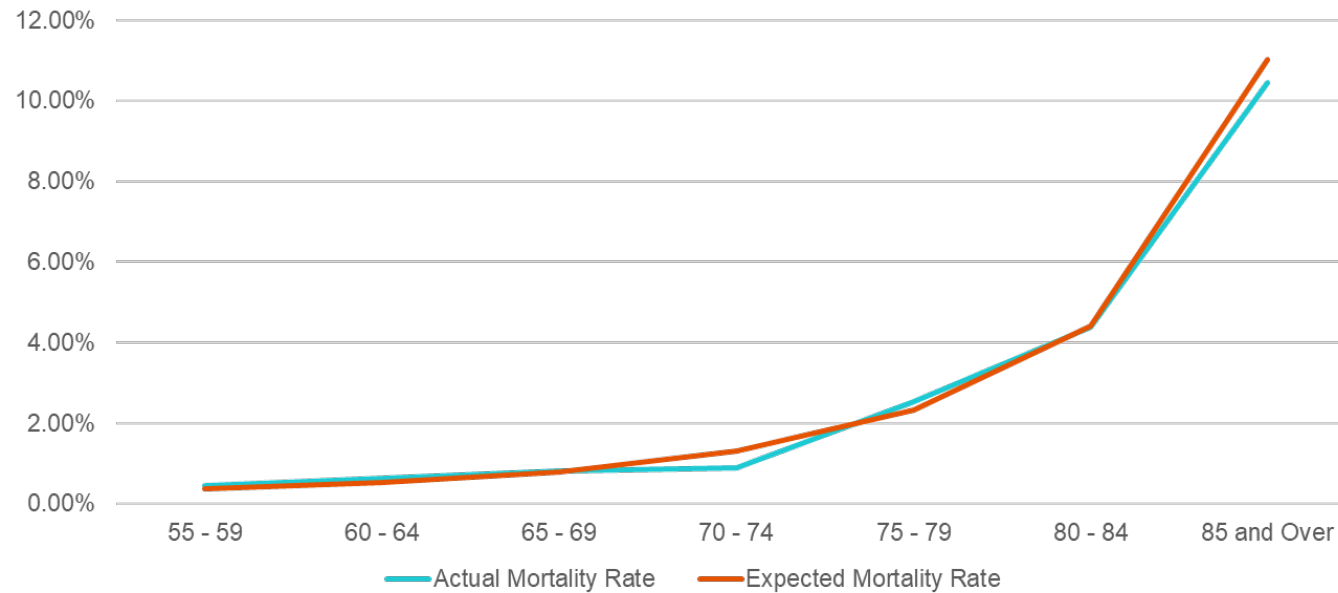


| Basis | Exposures | Actual Deaths | Expected | Actual to Expected |
|---|---|---|---|---|
| Counts | 14,632 | 333[1] | 329 | 101% |
| Benefits | $247,349[2] | $4,297[2] | $4,338[2] | 99% |

[1] 333 actual (adjusted) deaths in the observation period yields partial credibility of 56%
[2] Based on annual benefits in thousands of dollars

# Healthy Post-Retirement – Retirees Groups A/F – Female

Actual Versus Proposed Experience, Benefit-Weighted Basis – Groups A/F – Female
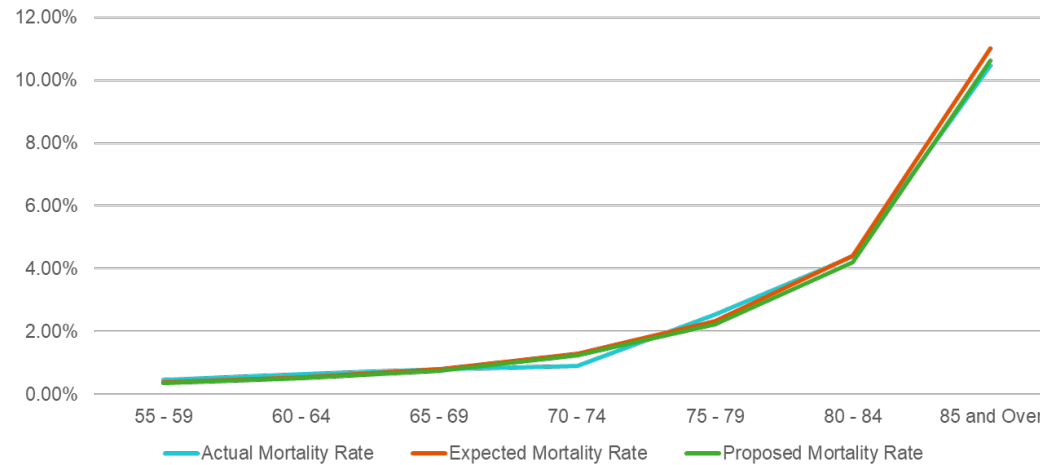


**On a benefit-weighted basis, unadjusted PubG-2010 Retiree Table (female) results in a reduction of $3,946,000 in benefits due to the proposed assumption**

- Credibility-weighted adjustment (56%) results in a reduction of $4,143,000 in benefits

**Recommend 105% of PubG-2010 Retiree Table (female), which results in $4,143,000 proposed reduction**

| Basis | Exposures | Actual Deaths | Proposed Deaths | Actual to Proposed |
|---|---|---|---|---|
| Benefits | $247,349[1] | $4,297[1] | $4,143[1] | 104% |

[1] Based on annual benefits in thousands of dollars

# Healthy Post-Retirement – Retirees Groups C/G – Unisex

## Actual Versus Expected Experience, Benefit-Weighted Basis – Groups C/G – Unisex
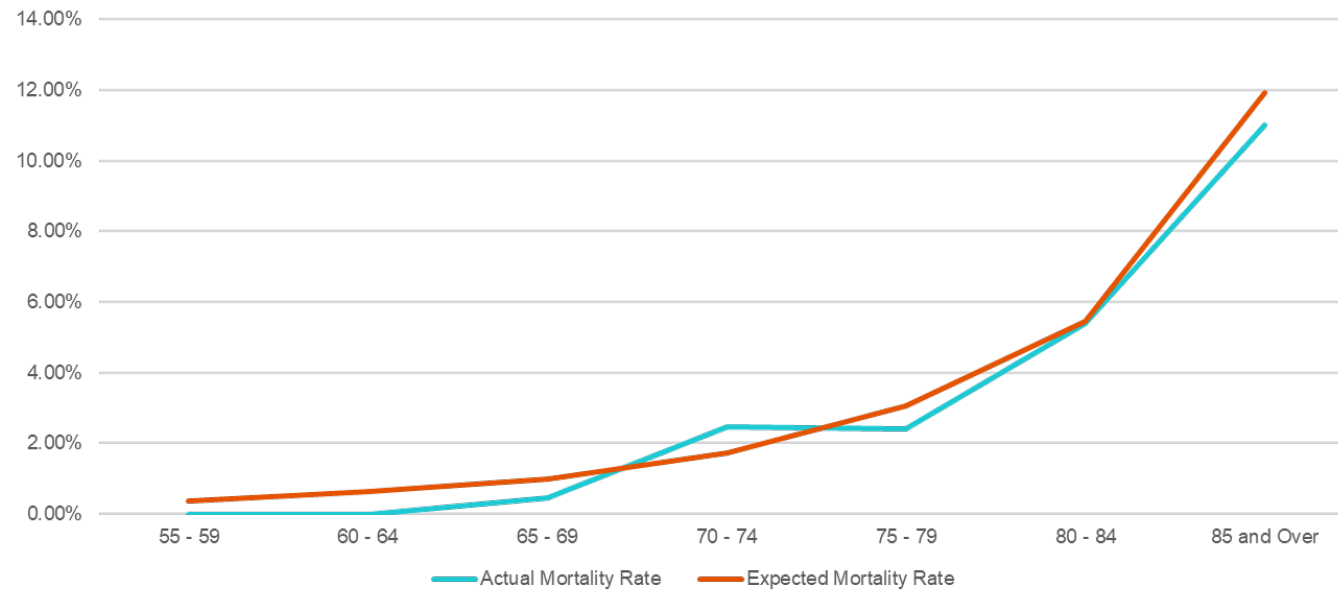


| Basis | Exposures | Actual Deaths | Expected | Actual to Expected |
|---|---|---|---|---|
| Counts | 1,795 | 24[1] | 26 | 91% |
| Benefits | $84,898[2] | $964[2] | $1,154[2] | 84% |

[1] 24 actual (adjusted) deaths in the observation period yields partial credibility of 15%
[2] Based on annual benefits in thousands of dollars

# Healthy Post-Retirement – Retirees Groups C/G – Unisex

### Actual Versus Proposed Experience, Benefit-Weighted Basis – Groups C/G – Unisex
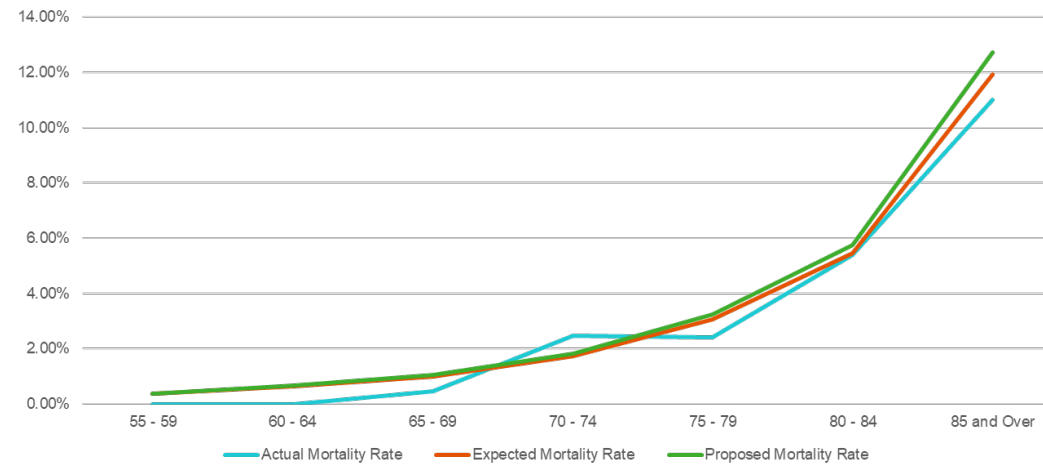


**On a benefit-weighted basis, unadjusted PubS-2010 Retiree Table results in a reduction of $1,220,000 in benefits due to the proposed assumption**

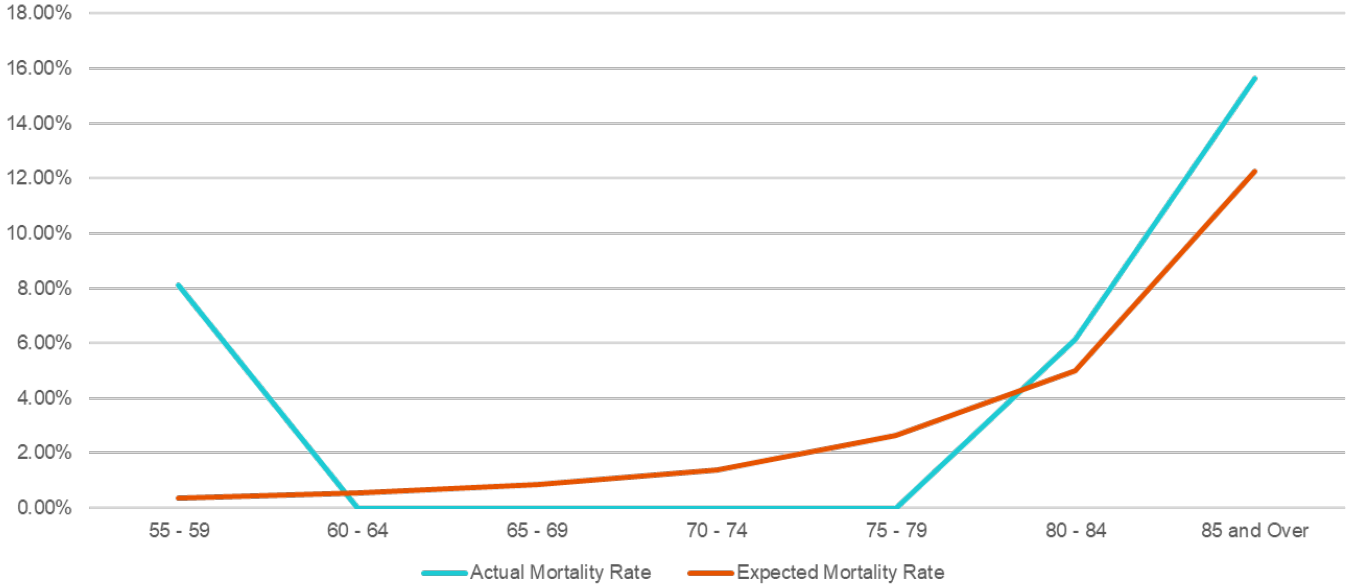- 24 actual deaths in the observation period does not yield enough partial credibility to warrant further adjustment

**Recommend unadjusted (due to limited experience) PubS-2010 Retiree Table, which results in $1,220,000 proposed reduction**

| Basis | Exposures | Actual Deaths | Proposed Deaths | Actual to Proposed |
|---|---|---|---|---|
| Benefits | $84,898[1] | $964[1] | $1,220[1] | 79% |

[1] Based on annual benefits in thousands of dollars

# Healthy Post-Retirement – Retirees Group D – Unisex

Actual Versus Expected Experience, Benefit-Weighted Basis – Group D – Unisex



| Basis | Exposures | Actual Deaths | Expected | Actual to Expected |
|---|---|---|---|---|
| Counts | 303 | 10[1] | 11 | 86% |
| Benefits | $20,642[2] | $536[2] | $646[2] | 83% |

[1] 10 actual (adjusted) deaths in the observation period yields partial credibility of 9%
[2] Based on annual benefits in thousands of dollars

# Healthy Post-Retirement – Retirees Group D – Unisex

Actual Versus Proposed Experience, Benefit-Weighted Basis – Group D – Unisex
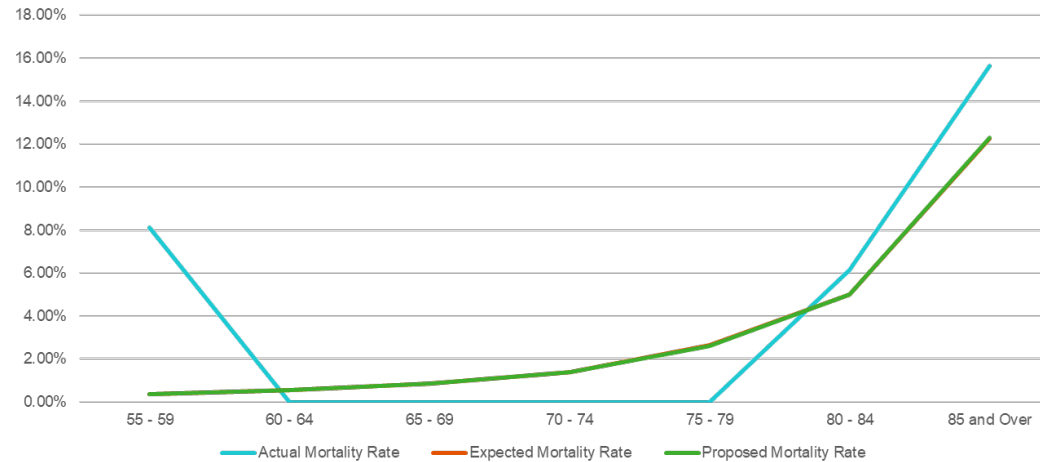


**On a benefit-weighted basis, unadjusted PubG-2010 Retiree Above-Median Table results in a reduction of $644,000 in benefits due to the proposed assumption**

- 10 actual deaths in the observation period does not yield enough partial credibility to warrant further adjustment

**Recommend unadjusted (due to limited experience) PubG-2010 Retiree Above-Median Table, which results in $644,000 proposed reduction**

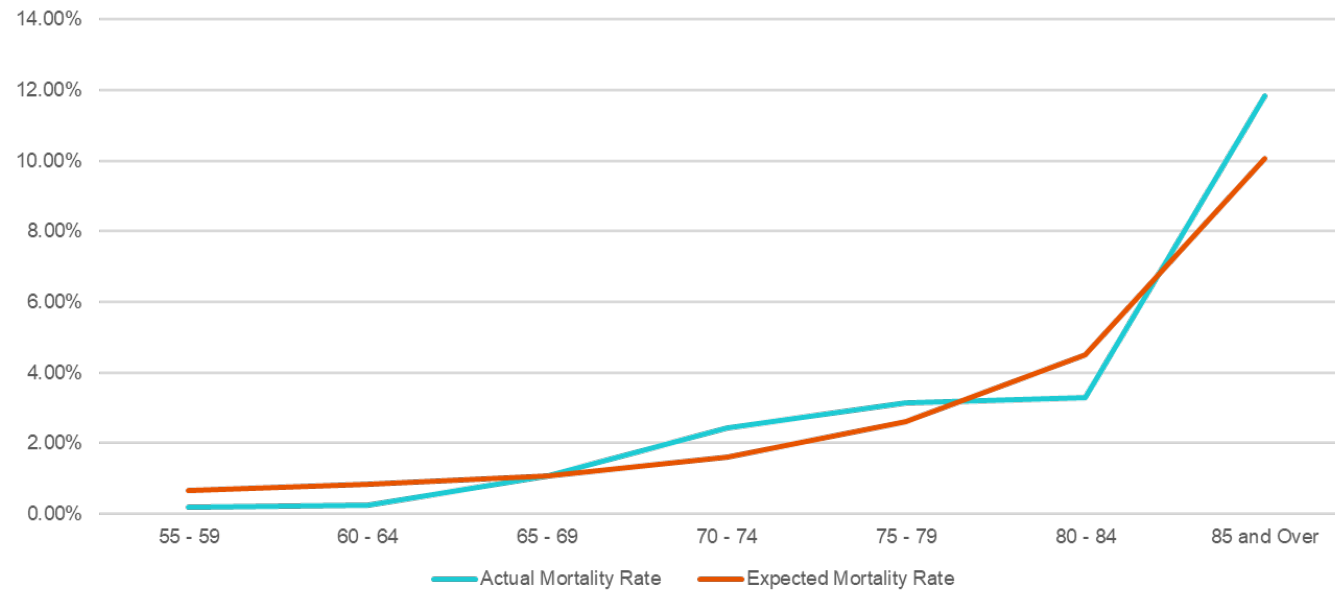| Basis | Exposures | Actual Deaths | Proposed Deaths | Actual to Proposed |
|-------|-----------|---------------|-----------------|--------------------|
| Benefits | $20,642[1] | $536[1] | $644[1] | 83% |

[1] Based on annual benefits in thousands of dollars

# Healthy Post-Retirement – Beneficiaries Groups A/F - Unisex

Actual Versus Expected Experience, Benefit-Weighted Basis – Groups A/F – Unisex



| Basis | Exposures | Actual Deaths | Expected | Actual to Expected |
|---|---|---|---|---|
| Counts | 2,819 | 115[1] | 110 | 104% |
| Benefits | $33,287[2] | $1,167[2] | $1,073[2] | 109% |

[1] 115 actual (adjusted) deaths in the observation period yields partial credibility of 33%
[2] Based on annual benefits in thousands of dollars

# Healthy Post-Retirement – Beneficiaries Groups A/F - Unisex

Actual Versus Proposed Experience, Benefit-Weighted Basis – Groups A/F – Unisex
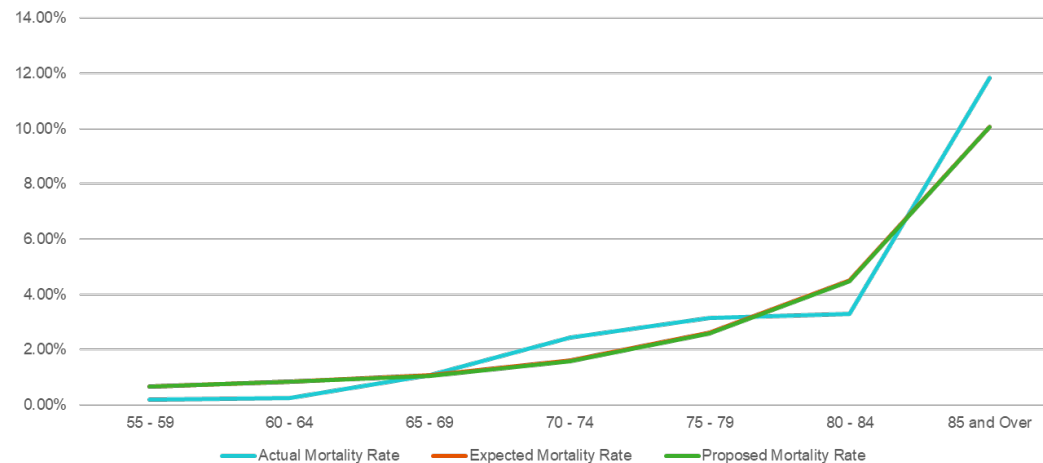


**On a benefit-weighted basis, unadjusted Pub-2010 Contingent Survivor Table results in a reduction of $1,068,000 in benefits due to the proposed assumption**

- 115 actual deaths in the observation period does not yield enough partial credibility to warrant further adjustment

**Recommend unadjusted (due to limited experience) Pub-2010 Contingent Survivor Table, which results in $1,068,000 proposed reduction**

| Basis | Exposures | Actual Deaths | Proposed Deaths | Actual to Proposed |
|---|---|---|---|---|
| Benefits | $33,287[1] | $1,167[1] | $1,068[1] | 109% |

# Healthy Post-Retirement – Beneficiaries Groups C/G - Unisex

Actual Versus Expected Experience, Benefit-Weighted Basis – Groups C/G – Unisex
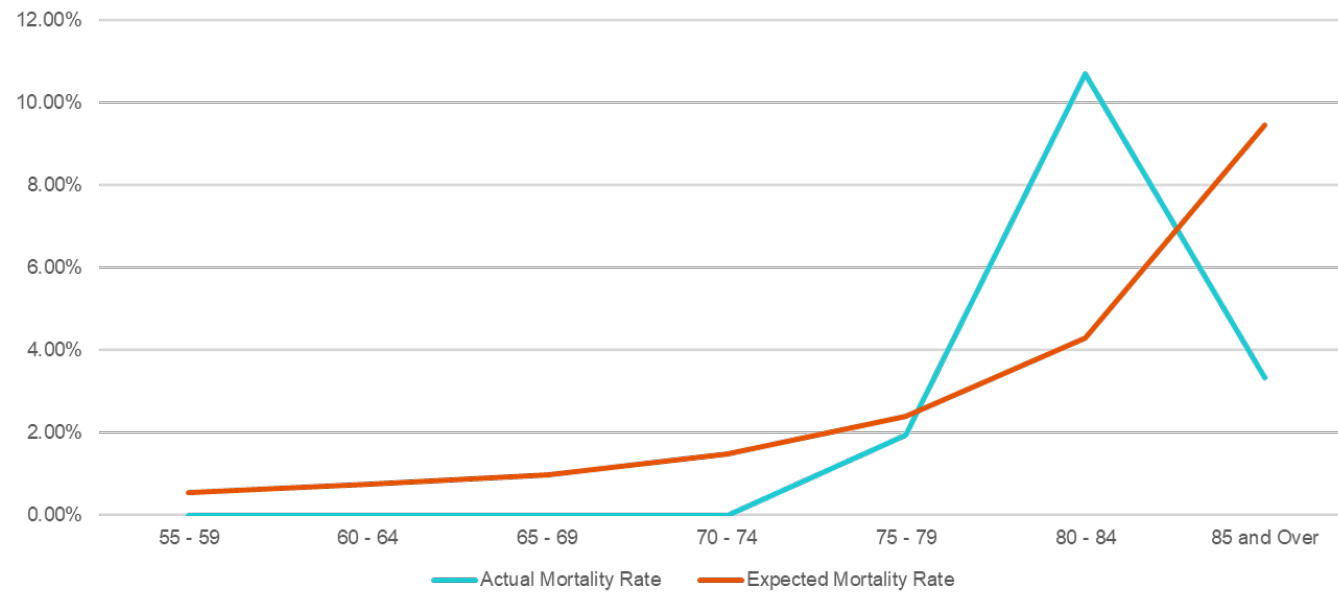


| Basis | Exposures | Actual Deaths | Expected | Actual to Expected |
|---|---|---|---|---|
| Counts | 310 | 19[1] | 11 | 166% |
| Benefits | $7,923[2] | $347[2] | $307[2] | 113% |

[1] 19 actual (adjusted) deaths in the observation period yields partial credibility of 13%
[2] Based on annual benefits in thousands of dollars

# Healthy Post-Retirement – Beneficiaries Group D - Unisex

Actual Versus Expected Experience, Benefit-Weighted Basis – Group D – Unisex
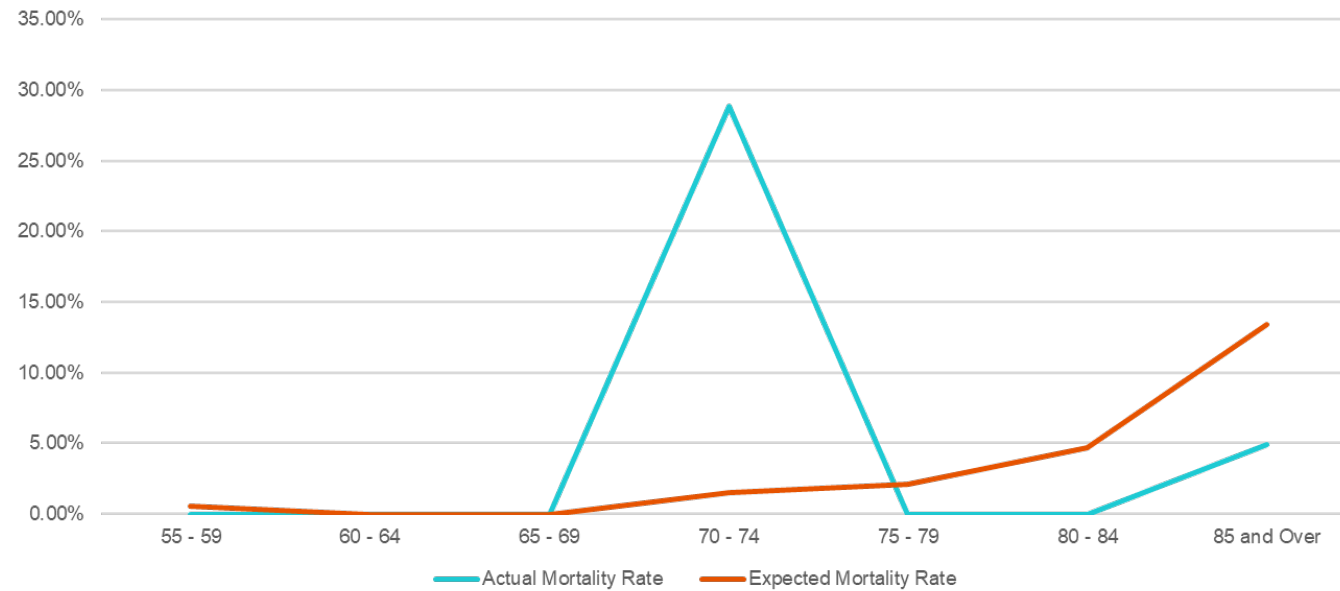


| Basis | Exposures | Actual Deaths | Expected | Actual to Expected |
|---|---|---|---|---|
| Counts | 45 | 3[1] | 4 | 67% |
| Benefits | $2,003[2] | $102[2] | $200[2] | 51% |

[1] 3 actual (adjusted) deaths in the observation period yields partial credibility of 5%
[2] Based on annual benefits in thousands of dollars

# Healthy Post-Retirement – Beneficiaries Group D - Unisex

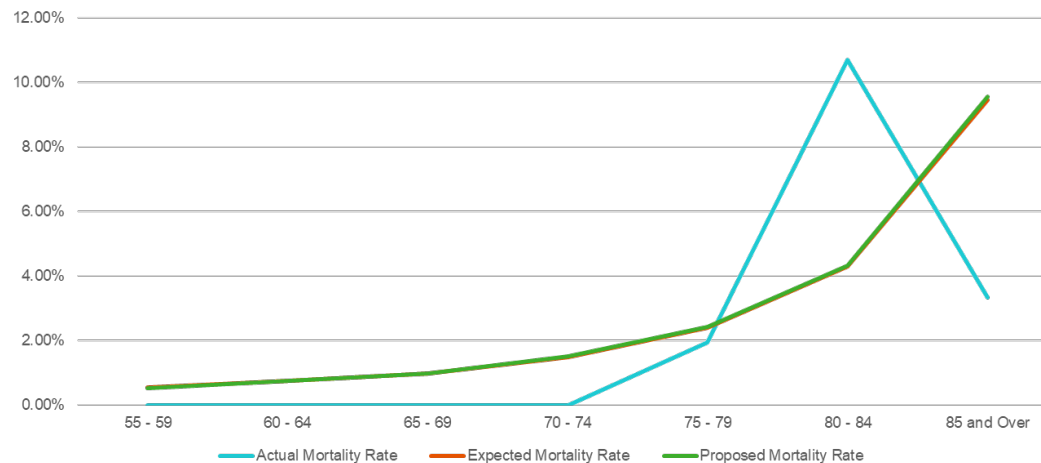Actual Versus Proposed Experience, Benefit-Weighted Basis – Group D – Unisex
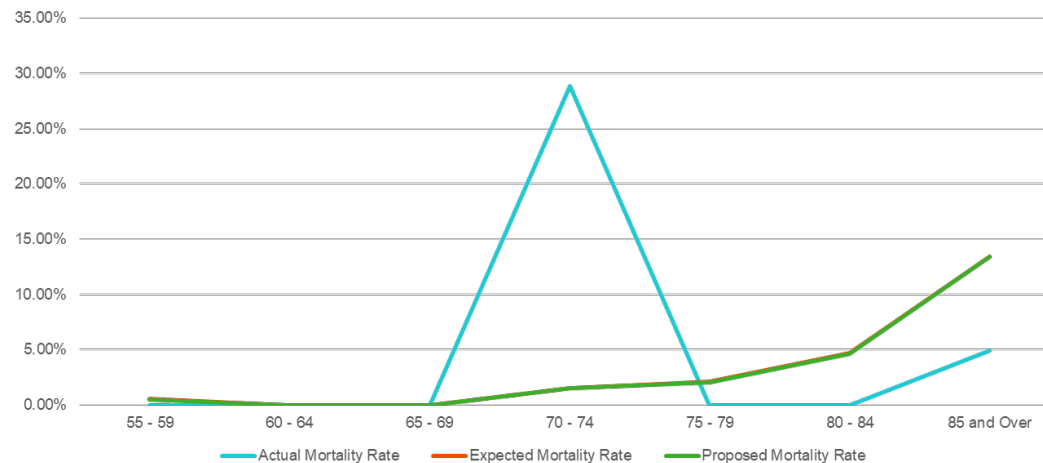


**On a benefit-weighted basis, unadjusted Pub-2010 Contingent Survivor Above Median Table results in a reduction of $200,000 in benefits due to the proposed assumption**

- 3 actual deaths in the observation period does not yield enough partial credibility to warrant further adjustment

**Recommend unadjusted (due to limited experience) Pub-2010 Contingent Survivor Above Median Table, which results in $200,000 proposed reduction**

| Basis | Exposures | Actual Deaths | Proposed Deaths | Actual to Proposed |
|---|---|---|---|---|
| Benefits | $2,003[1] | $102[1] | $200[1] | 51% |

[1] Based on annual benefits in thousands of dollars

# Disabled Post-Retirement Groups A/D/F – Unisex

The current mortality table for all disabled lives in Groups A, D, and F is the PubNS-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table.

Mortality experience for disabled annuitants in Groups A, D, and F has been greater than the current assumption

- The ratio of actual to expected deaths on a benefit-weighted basis is 131%

- Based on 79 actual deaths over the five-year study period

We recommend:

- **Maintaining the current mortality table with no credibility adjustments (the limited actual experience is insufficient to warrant making an adjustment to the published table)**

- **Updating the mortality projection scale to MP-2021**

| Gender | Exposures[1] | Actual Deaths[1] | Expected Deaths[1] | Actual to Expected | Proposed Deaths[1] | Actual to Proposed |
|---|---|---|---|---|---|---|
| Male | $10,911 | $524 | $389 | 135% | $387 | 135% |
| Female | $13,069 | $424 | $335 | 127% | $330 | 129% |

[1] Based on annual benefits in thousands of dollars

# Disabled Post-Retirement Groups C/G – Unisex

The current mortality table for all disabled lives in Groups C and G is the PubNS-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table.

Mortality experience for disabled annuitants in Groups C and G has been less than the current assumption

- The ratio of actual to expected deaths on a benefit-weighted basis is 63%

- Based on 3 actual deaths over the five-year study period

We recommend:

- **Updating to use the PubS-2010 Safety Disabled Retiree Amount-Weighted Mortality Table with no credibility adjustments (the limited actual experience is insufficient to warrant making an adjustment to the published table)**

- **Updating the mortality projection scale to MP-2021**

| Gender | Exposures[1] | Actual Deaths[1] | Expected Deaths[1] | Actual to Expected | Proposed Deaths[1] | Actual to Proposed |
|--------|-----------|---------------|-----------------|-----------------|-----------------|-----------------|
| Male | $5,679 | $105 | $159 | 66% | $74 | 142% |
| Female | $439 | $0 | $8 | 0% | $2 | 0% |

[1] Based on annual benefits in thousands of dollars

# Death While In Active Service

**Mortality rates applied to active members**

- Very few members die in active service

  – Liability associated with active death is a small percentage of the total liability

  – Plan experience is insufficient to set assumption

**The current assumptions are the following:**

- Groups A/F: 60% of PubG-2010 General Employee Amount-Weighted Above Median Table, 40% of PubG-2010 General Employee Amount-Weighted Table

- Groups C/G: PubS-2010 Public Safety Employee Amount-Weighted Table

- Group D: 70% of PubG-2010 General Employee Amount-Weighted Above Median Table, 30% of PubG-2010 General Employee Table.

- All rates are projected generationally using the MP-2019 scale

# Death While In Active Service *(continued)*

**We recommend the following:**

- Groups A/F: PubG-2010 General Employee Amount-Weighted Table <u>with no</u> credibility adjustments

- Groups C/G: PubS-2010 Public Safety Employee Amount-Weighted Table <u>with no</u> credibility adjustments

- Group D: PubG-2010 General Employee Amount-Weighted Above Median Table <u>with no</u> credibility adjustments

- Update the mortality projection scale to MP-2021

# Active Retirements

**Current rates:**

- Groups A and D: Members are assumed to retire when first eligible
- Group C[1]: Unisex rates that vary based on members' age
- Group F: Sex-distinct rates that vary based on members' age

**Eligibility criteria for retirement differs by group, age, and service. We analyzed retirement experience on a benefit-weighted basis for the following groups:**

- Groups A and D: Unisex
- Group C: Unisex
- Group F:
  - Males
  - Females

**The current active retirement rates have generated relatively large losses due to anomalous experience in recent years, likely related to "demographic aftershocks" caused by the pandemic and pension reform**

**We do not expect recent experience to be indicative of future trends**

[1] Effective July 1, 2022, the mandatory retirement age for Group C members was increased from age 55 to age 57.

# Active Retirements

**Groups A and D – Unisex:**

– There was limited experience available during the three-year experience period

**Groups C – Unisex:**

| Exposures[1] | Actual Retirements[1] | Expected Retirements[1] | Actual to Expected |
|---|---|---|---|
| $4,552 | $2,983 | $1,112 | 268% |

**Groups F – Males:**

| Exposures[1] | Actual Retirements[1] | Expected Retirements[1] | Actual to Expected |
|---|---|---|---|
| $60,970 | $9,999 | $7,780 | 129% |

**Groups F – Females:**

| Exposures[1] | Actual Retirements[1] | Expected Retirements[1] | Actual to Expected |
|---|---|---|---|
| $67,605 | $10,690 | $8,304 | 129% |

**We do not expect recent experience to be indicative of future trends and as a result we recommend no changes to the active retirement rates with the plan to reassess with the next experience study**

[1] Based on annual benefits in thousands of dollars

# Inactive Vested Retirements – Pre-NRA

**The current assumptions are as follows:**

- 20% of inactive vested members are assumed to retire from Early Retirement Age (ERA) until Normal Retirement Age (NRA)

**We have analyzed inactive vested retirement experience on a unisex, benefit-weighted basis. Experience shows that fewer inactive vested members are retiring before their NRA than expected. We recommend decreasing the pre-NRA rates to 15%.**
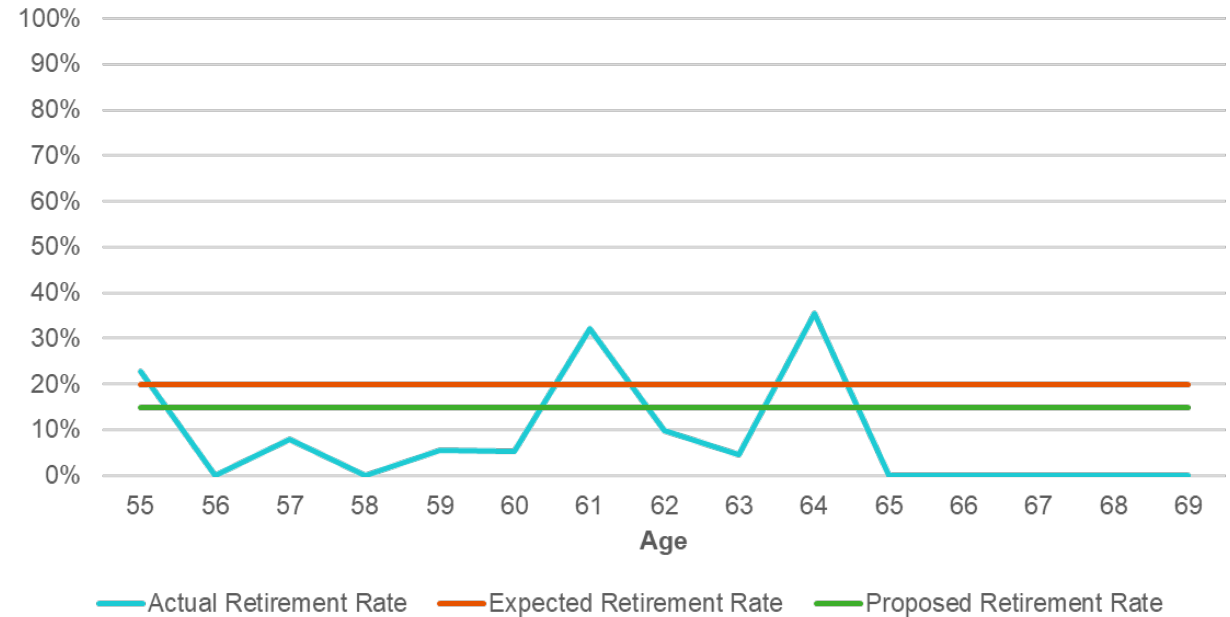


| Exposures[1] | Actual Retirements[1] | Expected Retirements[1] | Actual to Expected | Proposed Retirements[1] | Actual to Proposed |
|---|---|---|---|---|---|
| $7,022 | $957 | $1,404 | 68% | $1,053 | 91% |

[1] Based on annual benefits in thousands of dollars

# Inactive Vested Retirements – Post-NRA

**The current assumptions are as follows:**

- 100% of inactive vested members are assumed to retire after reaching their NRA

**For Inactive Vested members that have reached/surpassed their Normal Retirement Age, there was very limited experience available during the three-year experience period**

**Recommend leaving the post-NRA inactive vested retirement rate of 100% unchanged**

# Termination Before Retirement

**Current rates:**

- Groups A and D: age-based, unisex rates with higher rates assumed during the first 10 years of service
- Group C: service-based, sex-distinct rates
- Group F: age-based, unisex select and ultimate rates with higher rates assumed during the first 10 years of service

**We have analyzed termination experience on a headcount-weighted basis for the following groups:**

- Groups A and D: Unisex
- Group C:
  - Males
  - Females
- Group F: Unisex (<30 Years of Service)

**The current termination rates have generated relatively large gains due to anomalous experience in recent years, likely related to "demographic aftershocks" caused by the pandemic and pension reform**

**We do not expect recent experience to be indicative of future trends**

# Termination Before Retirement

**Groups A and D – Unisex:**

– There was limited experience available during the three-year experience period

**Groups C – Males:**

| Exposures | Actual Terminations | Expected Terminations | Actual to Expected |
|---|---|---|---|
| 1,107 | 54 | 39 | 138% |

**Groups C – Females:**

| Exposures | Actual Terminations | Expected Terminations | Actual to Expected |
|---|---|---|---|
| 153 | 6 | 12 | 51% |

**Group F – Unisex (<30 Years of Service):**

| Exposures | Actual Terminations | Expected Terminations | Actual to Expected |
|---|---|---|---|
| 17,587 | 1,311 | 1,045 | 125% |

**We do not expect recent experience to be indicative of future trends and as a result we recommend no changes to the termination rates with the plan to reassess with the next experience study**

# Disability Retirement

## Experience over the prior three years shows that fewer active members in all groups retired under a disability pension than expected

**The current disability retirement assumptions are unisex and are based on age and group. We have analyzed disability retirement experience on a benefit-weighted basis for the following Groups:**

- Groups A, D, and F

- Group C

**We recommend the following updates to the current rates related to disability retirement:**

- Groups A, D, and F: 40% decrease to the current rates

- Group C: 25% decrease to the current rates

# Disability Retirement Groups A, D, and F – Unisex

**Groups A, D, and F – Unisex:**

– Fewer disabilities than expected

**Recommend decreasing the rates uniformly by 40% for all ages**
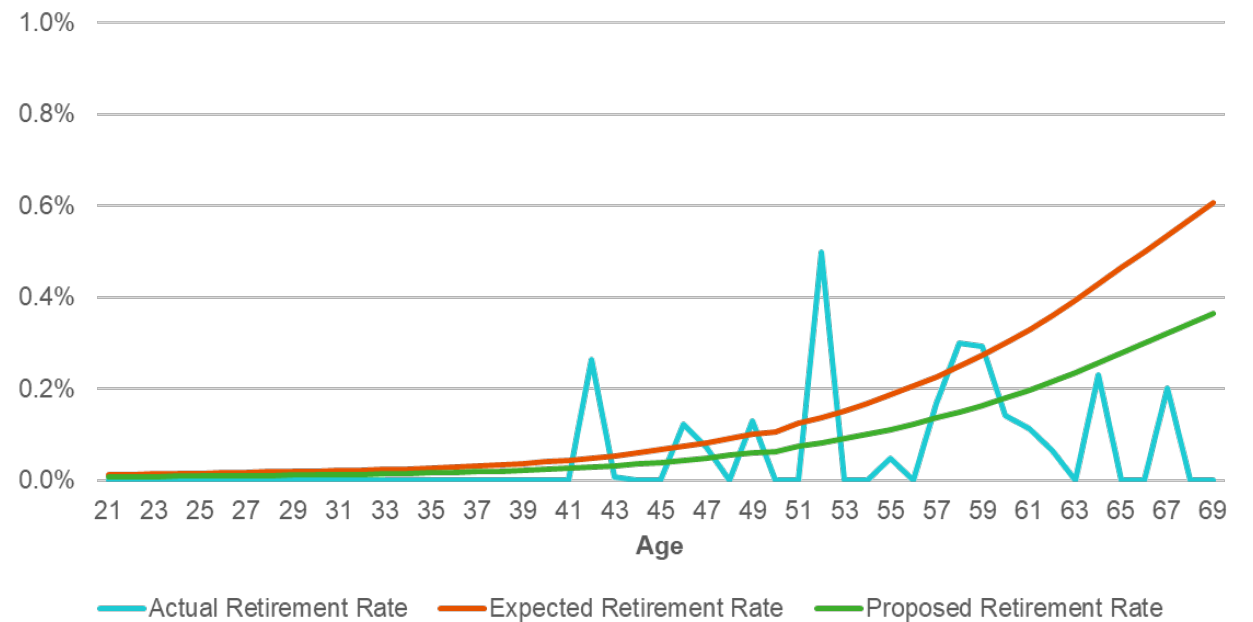


| Exposures[1] | Actual Retirements[1] | Expected Retirements[1] | Actual to Expected | Proposed Retirements[1] | Actual to Proposed |
|---|---|---|---|---|---|
| $294,250 | $253 | $585 | 43% | $351 | 72% |

[1] Based on annual benefits in thousands of dollars

# Disability Retirement Group C – Unisex

**Group C – Unisex:**

– Fewer disabilities than expected

**Recommend decreasing the rates uniformly by 25% for all ages**
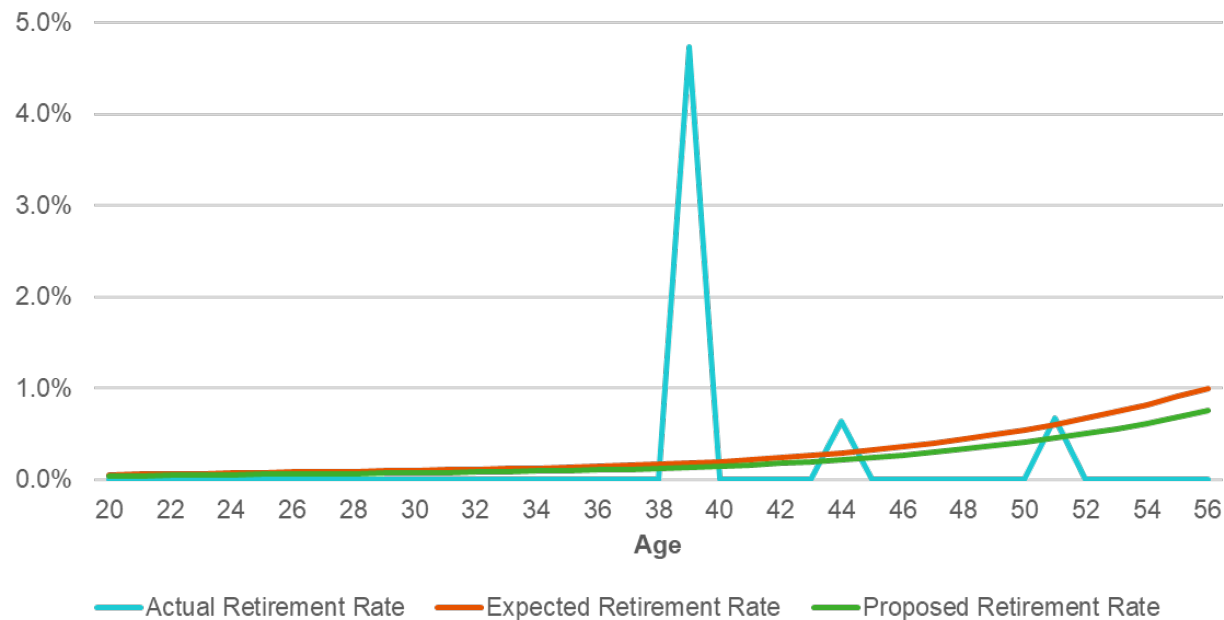


| Exposures[1] | Actual Retirements[1] | Expected Retirements[1] | Actual to Expected | Proposed Retirements[1] | Actual to Proposed |
|---|---|---|---|---|---|
| $34,866 | $78 | $121 | 64% | $91 | 85% |

[1] Based on annual benefits in thousands of dollars

# Spouse Information

**Current assumptions:**

- Percent Married

  – Groups A and D: 75.4% of male members and 64.0% of female members are married

  – Group C: 73.3% of male members and 61.0% of female members are married

  – Group F: 71.4% of male members and 63.1% of female members are married

- Male spouses are three years older than female spouses

- 100% of spouses are opposite gender

**We have limited information on marital status and spouse information**

**We reviewed actual election information from the data and the percentages are slightly lower than the current assumptions of 75.4%/64.0%, 73.3%/61.0%, and 71.4%/63.1%. However, the same assumptions are used to value pre-retirement death benefits, which is based on actual marital status at the time of death.**

**Therefore, we recommend no change to these assumptions**

# Summary of Assumption Impact

| Assumption | Description | Impact on Liability/Cost | Impact on Gain/Loss |
|---|---|---|---|
| Inflation | The rate at which price levels are rising and purchasing power is falling | The impact that inflation has on liability and cost varies by each economic assumption | The impact that inflation has on gain/loss varies by each economic assumption |
| Investment Return | Based on invested plan asset categories and assumed rates of return for each asset class | Higher assumption causes lower liability and cost | Higher than anticipated actuarial return will create actuarial gains |
| Salary Increases | The expected rate of future salary increases for employees at various ages or years from hire | Higher assumption causes higher liability and cost | Higher than anticipated salary increases to actives will create actuarial losses |
| Payroll Growth | Used to project covered payroll to estimate the employer normal cost for budgeting purposes | Higher assumption causes higher cost, but has no impact on liability | Payroll growth has no impact on gain/loss |
| COLA | An annual increase in benefits to counteract inflation | Higher assumption causes higher liability and cost | Higher than anticipated COLAs will create actuarial losses |
| Mortality | The probability of dying within one year at each age | Lower mortality increases liability and cost | Higher than anticipated mortality will create actuarial gains |
| Retirement | The age (or ages) when employees are expected to retire | Earlier assumed retirement usually increases liability and cost | If more members retired later in their careers, this could result in gains. Generally, losses result when a member retires earlier without a full actuarial reduction. Other scenarios may result in gains/losses. |
| Termination | The expected rate of termination for employees at various ages or years from hire | Greater assumed termination decreases liability and cost | Higher than anticipated terminations will likely result in actuarial gains |
| Disability | The age (or ages) when employees are expected to become disabled | Greater incidence of disability usually slightly increases liability and cost | Greater incidence of disability than anticipated will likely result in slight actuarial losses |

# Summary of Economic Assumptions

| Assumption | Current | Proposed | Impact on Actuarially Determined Contribution |
|---|---|---|---|
| Inflation[1] | 2.30% | No Change | N/A |
| Investment Return[1] | 7.00% | No Change | N/A |
| Salary Scale[2] | Merit/seniority rates (including productivity) based on years from hire plus inflation | Slight increases to the merit and seniority (and productivity) portion of individual salary increases for most ages | Slight Increase |
| Payroll Growth[2] | 3.50% | No change | N/A |
| Administrative Expenses | 0.40% of projected payroll is added to normal cost | 0.45% of projected payroll is added to normal cost | Slight Increase |

[1] The inflation and investment return assumptions were recommended by VPIC's actuary, GRS, and adopted by VPIC during their July 25, 2023, meeting.
[2] The salary scale and payroll growth assumptions reflect the inflation assumption referenced above.

# Summary of Economic Assumptions

| Assumption | Current | Proposed | Impact on Actuarially Determined Contribution |
|---|---|---|---|
| COLA[1] | Active Group A, C, F, and G members first eligible for normal or unreduced early retirement on or after July 1, 2022, and active Group D members first appointed or elected on or after July 1, 2022:<br><br>Group A:<br>&bull; 2.40%<br><br>Group C:<br>&bull; 2.15%<br><br>Group D:<br>&bull; <u>First $75,000 of retirement benefits paid</u>: 2.40%<br><br>&bull; <u>Retirement benefits paid above $75,000</u>: 1.15%<br><br>Groups F and G:<br>&bull; 2.25%<br><br>All other members:<br>Group A/C/D:<br>&bull; 2.40%<br>Groups E/F – Retired on or before June 30, 2008:<br>&bull; 1.35%<br>Groups E/F – Retired on or after July 1, 2008:<br>&bull; 2.40% | Active Group A, C, F, and G members first eligible for normal or unreduced early retirement on or after July 1, 2022, and active Group D members first appointed or elected on or after July 1, 2022:<br><br>Group A:<br>&bull; 2.25% (slight decrease)<br><br>Group C:<br>&bull; 2.10% (slight decrease)<br><br>Group D:<br>&bull; <u>First $75,000 of retirement benefits paid</u>: 2.25% (slight decrease)<br><br>&bull; <u>Retirement benefits paid above $75,000</u>: 1.10% (slight decrease)<br><br>Groups F and G:<br>&bull; 2.15% (slight decrease)<br><br>All other members:<br>Group A/C/D:<br>&bull; 2.25% (slight decrease)<br>Groups E/F – Retired on or before June 30, 2008:<br>&bull; 1.25% (slight decrease)<br>Groups E/F – Retired on or after July 1, 2008:<br>&bull; 2.35% (slight decrease) | Decrease |

[1] The COLA assumption reflects the inflation assumption referenced on the prior slide.

# Summary of Demographic Assumptions

| Assumption | Current | Proposed | Impact on Actuarially Determined Contribution |
|---|---|---|---|
| Healthy Post-Retirement Mortality - Retirees | Groups A & F: 109% of PubG-2010 General Healthy Retiree Amount-Weighted with generational projection using scale MP-2019 | Groups A & F: PubG-2010 General Healthy Retiree Amount-Weighted for males and females with credibility adjustments of 101% and 105%, respectively, with generational projection using scale MP-2021 | Slight Increase |
| | Group C: 40% of PubS-2010 Public Safety Retiree Amount-Weighted Above Median, 60% of PubS-2010 Public Safety Retiree Amount-Weighted with generational projection using scale MP-2019 | Group C: PubS-2010 Public Safety Retiree Amount-Weighted with generational projection using scale MP-2021 | |
| | Group D: PubG-2010 General Healthy Retiree Amount-Weighted Above Median with generational projection using scale MP-2019 | Group D: PubG-2010 General Healthy Retiree Amount-Weighted Above Median with generational projection using scale MP-2021 | |
| Healthy Post-Retirement Mortality - Beneficiaries | Groups A & F: Pub-2010 Contingent Survivor Amount-Weighted with generational projection using MP-2019 | Groups A & F: Pub-2010 Contingent Survivor Amount-Weighted with generational projection using MP-2021 | Slight Increase |
| | Group C: 40% of Pub-2010 Contingent Survivor Amount-Weighted Above Median, 60% of Pub-2010 Contingent Survivor Amount-Weighted with generational projection using MP-2019 | Group C: Pub-2010 Contingent Survivor Amount-Weighted with generational projection using MP-2021 | |
| | Group D: Pub-2010 Contingent Survivor Amount-Weighted Above Median with generational projection using MP-2019 | Group D: Pub-2010 Contingent Survivor Amount-Weighted Above Median with generational projection using MP-2021 | |

# Summary of Demographic Assumptions

| Assumption | Current | Proposed | Impact on Actuarially Determined Contribution |
|---|---|---|---|
| Disabled Post-Retirement Mortality | Groups A, D, and F: PubNS-2010 Non-Safety Disabled Retiree Amount-Weighted with generational projection using scale MP-2019<br><br>Group C: PubNS-2010 Non-Safety Disabled Retiree Amount-Weighted with generational projection using scale MP-2019 | Groups A, D, and F: PubNS-2010 Non-Safety Disabled Retiree Amount-Weighted with generational projection using scale MP-2021<br><br>Group C: PubS-2010 Safety Disabled Retiree Amount-Weighted with generational projection using scale MP-2021 | Slight Increase |
| Active Mortality | Groups A & F: 60% of PubG-2010 General Employee Amount-Weighted Above Median, 40% of PubG-2010 General Employee Amount-Weighted with generational projection using scale MP-2019<br><br>Group C: PubS-2010 Public Safety Employee Amount-Weighted with generational projection using scale MP-2019<br><br>Group D: 70% of PubG-2010 General Employee Amount-Weighted Above Median, 30% of PubG-2010 General Employee with generational projection using scale MP-2019 | Groups A & F: PubG-2010 General Employee Amount-Weighted with generational projection using scale MP-2021<br><br>Group C: PubS-2010 Public Safety Employee Amount-Weighted with generational projection using scale MP-2021<br><br>Group D: PubG-2010 General Employee Amount-Weighted Above Median with generational projection using scale MP-2021 | Slight Increase |

# Summary of Demographic Assumptions

| Assumption | Current | Proposed | Impact on Actuarially Determined Contribution |
|---|---|---|---|
| Active Retirement | Groups A and D: Assumed to retire when first eligible | Groups A and D: No changes | N/A |
| | Group C: Unisex age-based rates | Group C: No changes | N/A |
| | Group F: Gender distinct age-based rates | Group F: No changes | N/A |
| Inactive Retirement | 20% of members are assumed to retire from Early Retirement Age for each year until Normal Retirement Age, then 100% of members are assumed to retire at their Normal Retirement Age | Decrease the pre-Normal Retirement Age rates to 15% for each year until Normal Retirement Age | Slight Decrease |
| Termination | Groups A and D: Age-based, unisex rates with higher rates assumed during the first 10 years of service | Groups A and D: No changes | N/A |
| | Group C: Service-based, sex-distinct rates | Group C: No changes | N/A |
| | Group F: Age-based, unisex select and ultimate rates with higher rates during the first 10 years of service. | Group F: No changes | N/A |
| Disability Retirement | Groups A, D, and F: Unisex age-based rates | Groups A, D, and F: Decrease the current rates by 40% | Slight Decrease |
| | Group C: Unisex age-based rates | Group C: Decrease the current rates by 25% | Slight Decrease |

# Summary of Demographic Assumptions

| Assumption | Current | Proposed | Impact on Actuarially Determined Contribution |
|---|---|---|---|
| Spouse Information | Groups A & D: 75.4% male members and 64.0% female members are married | Groups A & D: No changes | N/A |
| | Groups C: 73.3% male members and 61.0% female members are married | Groups C: No changes | N/A |
| | Groups F: 71.4% male members and 63.1% female members are married | Groups F: No changes | N/A |
| | Male spouses are three years older than female spouses, and 100% of spouses are opposite gender | No changes | N/A |

# Cost Impact
## (Based on the June 30, 2022, Actuarial Valuation, $ in Millions)

| | Before Changes (Baseline) | Reflecting COLA | Reflecting COLA and Mortality | Reflecting COLA, Mortality, and All Other Assumptions |
|---|---|---|---|---|
| **Present Value of Future Benefits** | $4,100.6 | $4,071.3 | $4,090.0 | $4,149.0 |
| *% Change* | | -0.7% | 0.5% | 1.4% |
| *Cumulative* | | -0.7% | -0.3% | 1.2% |
| **Actuarial Accrued Liability** | $3,444.1 | $3,419.5 | $3,435.1 | $3,457.1 |
| *% Change* | | -0.7% | 0.5% | 0.6% |
| *Cumulative* | | -0.7% | -0.3% | 0.4% |
| **Total Normal Cost[1]** | $74.1 | $73.6 | $74.0 | $75.8 |
| *% Change* | | -0.7% | 0.5% | 2.4% |
| *Cumulative* | | -0.7% | -0.1% | 2.3% |
| **Funded Percentage** | 69.9% | 70.4% | 70.0% | 69.6% |
| *Delta* | | 0.5% | -0.4% | -0.4% |
| *Cumulative* | | 0.5% | 0.1% | -0.3% |
| **Actuarially Determined Contribution for FY24** | $121.9 | $119.0 | $120.9 | $125.0 |
| *% Change* | | -2.4% | 1.6% | 3.4% |
| *Cumulative* | | -2.4% | -0.8% | 2.5% |

Due to rounding, values shown here may not sum as expected

[1] Total normal cost as of July 1, 2022, adjusted for timing

# Appendix

Segal

# Assumed Rates of Salary Increase

**The following tables show the total proposed individual salary increase rates by years from hire, including the inflation assumption of 2.30%, for members in all groups:**

| Years from Hire | Proposed Total Salary Increase Rate | Years from Hire | Proposed Total Salary Increase Rate | Years from Hire | Proposed Total Salary Increase Rate |
|---|---|---|---|---|---|
| 0 | 6.38% | 15 | 4.71% | 30 | 4.02% |
| 1 | 6.38% | 16 | 4.64% | 31 | 3.93% |
| 2 | 6.38% | 17 | 4.57% | 32 | 3.85% |
| 3 | 6.14% | 18 | 4.52% | 33 | 3.83% |
| 4 | 5.91% | 19 | 4.47% | 34 | 3.81% |
| 5 | 5.67% | 20 | 4.42% | 35 | 3.80% |
| 6 | 5.44% | 21 | 4.37% | 36 | 3.78% |
| 7 | 5.20% | 22 | 4.32% | 37 | 3.76% |
| 8 | 5.15% | 23 | 4.31% | 38 | 3.76% |
| 9 | 5.09% | 24 | 4.30% | 39 | 3.76% |
| 10 | 5.04% | 25 | 4.29% | 40+ | 3.76% |
| 11 | 4.98% | 26 | 4.28% | | |
| 12 | 4.93% | 27 | 4.27% | | |
| 13 | 4.85% | 28 | 4.19% | | |
| 14 | 4.78% | 29 | 4.10% | | |

# Active Retirement

## The following tables show the proposed active retirement rates for all members in Groups A, D, and F:

### Groups A and D – Unisex

| Age | Proposed Active Retirement Rate |
|---|---|
| First Year Eligible for Retirement | 100% |

### Group F – Females

| Age | Proposed Active Retirement Rate |
|---|---|
| 40-54 | 10.00% |
| 55 | 5.00% |
| 56 | 5.00% |
| 57 | 5.00% |
| 58 | 7.50% |
| 59 | 7.50% |
| 60 | 7.50% |
| 61 | 12.50% |
| 62 | 25.00% |
| 63 | 15.00% |
| 64 | 15.00% |
| 65 | 20.00% |

### Group F – Females (continued)

| Age | Proposed Active Retirement Rate |
|---|---|
| 66 | 30.00% |
| 67 | 30.00% |
| 68 | 30.00% |
| 69 | 30.00% |
| 70+ | 100.00% |

### Group F – Males

| Age | Proposed Active Retirement Rate |
|---|---|
| 40-52 | 20.00% |
| 53 | 15.00% |
| 54 | 15.00% |
| 55 | 5.00% |
| 56 | 5.00% |
| 57 | 5.00% |
| 58 | 5.00% |
| 59 | 7.50% |

### Group F – Males (continued)

| Age | Proposed Active Retirement Rate |
|---|---|
| 60 | 7.50% |
| 61 | 15.00% |
| 62 | 25.00% |
| 63 | 17.50% |
| 64 | 20.00% |
| 65 | 22.50% |
| 66 | 25.00% |
| 67 | 25.00% |
| 68 | 25.00% |
| 69 | 25.00% |
| 70+ | 100.00% |

# Active Retirement

**The following tables show the proposed active retirement rates for all members in Group C:**

<u>**Group C – Unisex**</u>

| Age | Proposed Active Retirement Rate |
|:---:|:---:|
| 50 | 50.00% |
| 51 | 10.00% |
| 52 | 10.00% |
| 53 | 10.00% |
| 54 | 5.00% |
| 55 | 5.00% |
| 56 | 5.00% |
| 57+ | 100.00% |

[1] Effective July 1, 2022, the mandatory retirement age for Group C members was increased from age 55 to age 57.

# Inactive Retirement

**The following tables show the proposed inactive retirement rates for members in all groups:**

<u>**All Groups**</u>

| Eligibility | Proposed Inactive Retirement Rate |
|---|---|
| Early Retirement Age | 15% |
| Normal Retirement Age | 100% |

[]

# Disability Retirement – Groups A, D, and F

**The following tables show the proposed disability retirement rates for all members in Groups A, D, and F:**

| Age | Proposed Disability Retirement Rate | Age | Proposed Disability Retirement Rate | Age | Proposed Disability Retirement Rate |
|---|---|---|---|---|---|
| 20 | 0.0067% | 40 | 0.0244% | 60 | 0.1803% |
| 21 | 0.0073% | 41 | 0.0268% | 61 | 0.1973% |
| 22 | 0.0079% | 42 | 0.0295% | 62 | 0.2159% |
| 23 | 0.0084% | 43 | 0.0325% | 63 | 0.2358% |
| 24 | 0.0089% | 44 | 0.0359% | 64 | 0.2572% |
| 25 | 0.0095% | 45 | 0.0399% | 65 | 0.2784% |
| 26 | 0.0100% | 46 | 0.0442% | 66 | 0.2997% |
| 27 | 0.0104% | 47 | 0.0491% | 67 | 0.3211% |
| 28 | 0.0111% | 48 | 0.0544% | 68 | 0.3425% |
| 29 | 0.0116% | 49 | 0.0605% | 69 | 0.3637% |
| 30 | 0.0122% | 50 | 0.0633% | | |
| 31 | 0.0128% | 51 | 0.0746% | | |
| 32 | 0.0136% | 52 | 0.0826% | | |
| 33 | 0.0145% | 53 | 0.0914% | | |
| 34 | 0.0154% | 54 | 0.1012% | | |
| 35 | 0.0163% | 55 | 0.1117% | | |
| 36 | 0.0176% | 56 | 0.1233% | | |
| 37 | 0.0190% | 57 | 0.1360% | | |
| 38 | 0.0205% | 58 | 0.1496% | | |
| 39 | 0.0223% | 59 | 0.1643% | | |

# Disability Retirement – Group C

**The following tables show the proposed disability retirement rates for all members in Group C:**

| Age | Proposed Disability Retirement Rate |
|-----|-------------------------------------|
| 20 | 0.0405% |
| 21 | 0.0443% |
| 22 | 0.0476% |
| 23 | 0.0510% |
| 24 | 0.0544% |
| 25 | 0.0578% |
| 26 | 0.0608% |
| 27 | 0.0641% |
| 28 | 0.0671% |
| 29 | 0.0705% |
| 30 | 0.0743% |
| 31 | 0.0784% |
| 32 | 0.0825% |
| 33 | 0.0878% |
| 34 | 0.0930% |
| 35 | 0.0994% |
| 36 | 0.1069% |
| 37 | 0.1151% |
| 38 | 0.1249% |
| 39 | 0.1358% |

| Age | Proposed Disability Retirement Rate |
|-----|-------------------------------------|
| 40 | 0.1485% |
| 41 | 0.1631% |
| 42 | 0.1793% |
| 43 | 0.1980% |
| 44 | 0.2190% |
| 45 | 0.2426% |
| 46 | 0.2693% |
| 47 | 0.2989% |
| 48 | 0.3319% |
| 49 | 0.3683% |
| 50 | 0.4091% |
| 51 | 0.4538% |
| 52 | 0.5033% |
| 53 | 0.5573% |
| 54 | 0.6165% |
| 55 | 0.6810% |
| 56 | 0.7515% |

# Termination – Groups A and D

**The following tables show the proposed termination rates for all members in Groups A and D:**

### Groups A and D – Unisex

| Age | Proposed Termination Rate |
|---|---|
| 15-20 | 6.4510% |
| 21 | 6.0596% |
| 22 | 5.7170% |
| 23 | 5.4138% |
| 24 | 5.1527% |
| 25 | 4.9066% |
| 26 | 4.7062% |
| 27 | 4.5031% |
| 28 | 4.3056% |
| 29 | 4.1165% |
| 30 | 3.9275% |
| 31 | 3.7459% |
| 32 | 3.6280% |
| 33 | 3.5119% |
| 34 | 3.3836% |

### Groups A and D – Unisex (continued)

| Age | Proposed Termination Rate |
|---|---|
| 35 | 3.2826% |
| 36 | 3.2255% |
| 37 | 3.2021% |
| 38 | 3.1346% |
| 39 | 3.1038% |
| 40 | 3.0392% |
| 41 | 2.9878% |
| 42 | 2.9474% |
| 43 | 2.8567% |
| 44 | 2.7575% |
| 45 | 2.6920% |
| 46 | 2.6208% |
| 47 | 2.4935% |
| 48 | 2.4176% |
| 49 | 2.3353% |

### Groups A and D – Unisex (continued)

| Age | Proposed Termination Rate |
|---|---|
| 50 | 2.2464% |
| 51 | 2.1641% |
| 52 | 2.0732% |
| 53 | 1.9759% |
| 54 | 1.8935% |

# Termination – Group C

**The following tables show the proposed termination rates for male and female members in Group C:**

Groups C – Male

| Age | Proposed Termination Rate |
|-----|---------------------------|
| 0 | 10.800% |
| 1 | 6.480% |
| 2 | 5.400% |
| 3 | 3.456% |
| 4 | 3.456% |
| 5 | 3.456% |
| 6-19 | 3.240% |

Groups C – Female

| Age | Proposed Termination Rate |
|-----|---------------------------|
| 0 | 21.600% |
| 1 | 12.960% |
| 2 | 10.800% |
| 3 | 6.912% |
| 4 | 6.912% |
| 5 | 6.912% |
| 6-19 | 6.480% |

# Termination – Group F

## The following tables show the proposed termination rates and increase factors for all members in Group F:

<u>Group F – 0-9 Years of Service - Unisex</u>

| Age | Proposed Termination Rate |
|-----|---------------------------|
| 15-20 | 8.4083% |
| 21 | 7.8932% |
| 22 | 7.4538% |
| 23 | 7.0599% |
| 24 | 6.7115% |
| 25 | 6.3933% |
| 26 | 6.1358% |
| 27 | 5.8631% |
| 28 | 5.6055% |
| 29 | 5.3631% |
| 30 | 5.1207% |
| 31 | 4.8783% |
| 32 | 4.7268% |
| 33 | 4.5753% |
| 34 | 4.4087% |

<u>Group F – 0-9 Years of Service – Unisex (continued)</u>

| Age | Proposed Termination Rate |
|-----|---------------------------|
| 35 | 4.2723% |
| 36 | 4.1966% |
| 37 | 4.1663% |
| 38 | 4.0905% |
| 39 | 4.0451% |
| 40 | 3.9542% |
| 41 | 3.8936% |
| 42 | 3.8481% |
| 43 | 3.7269% |
| 44 | 3.5906% |
| 45 | 3.5148% |
| 46 | 3.4088% |
| 47 | 3.2573% |
| 48 | 3.1512% |
| 49 | 3.0452% |

<u>Group F – 0-9 Years of Service – Unisex (continued)</u>

| Age | Proposed Termination Rate |
|-----|---------------------------|
| 50 | 2.9240% |
| 51 | 2.8179% |
| 52 | 2.6967% |
| 53 | 2.5755% |
| 54 | 2.4695% |

| Service | Proposed Increase Factor |
|---------|--------------------------|
| 0 | 2.850 |
| 1 | 2.800 |
| 2 | 2.300 |
| 3 | 1.750 |
| 4 | 1.550 |
| 5 | 1.350 |
| 6 | 1.300 |
| 7 | 1.175 |
| 8 | 1.150 |
| 9 | 1.515 |

# Termination – Group F

## The following tables show the proposed termination rates for all members in group F:

**Group F – 10-29 Years of Service - Unisex**

| Age | Proposed Termination Rate |
|---|---|
| 15-20 | 5.55% |
| 21 | 5.21% |
| 22 | 4.92% |
| 23 | 4.66% |
| 24 | 4.43% |
| 25 | 4.22% |
| 26 | 4.05% |
| 27 | 3.87% |
| 28 | 3.70% |
| 29 | 3.54% |
| 30 | 3.38% |
| 31 | 3.22% |
| 32 | 3.12% |
| 33 | 3.02% |
| 34 | 2.91% |

**Group F – 10-29 Years of Service – Unisex (continued)**

| Age | Proposed Termination Rate |
|---|---|
| 35 | 2.82% |
| 36 | 2.77% |
| 37 | 2.75% |
| 38 | 2.70% |
| 39 | 2.67% |
| 40 | 2.61% |
| 41 | 2.57% |
| 42 | 2.54% |
| 43 | 2.46% |
| 44 | 2.37% |
| 45 | 2.32% |
| 46 | 2.25% |
| 47 | 2.15% |
| 48 | 2.08% |
| 49 | 2.01% |

**Group F – 10-29 Years of Service – Unisex (continued)**

| Age | Proposed Termination Rate |
|---|---|
| 50 | 1.93% |
| 51 | 1.86% |
| 52 | 1.78% |
| 53 | 1.70% |
| 54 | 1.63% |

# Disclosures

In preparing the results presented in this report, we have relied upon data provided by the State Treasurer's Office regarding the membership census data and financial information. While the scope of our engagement did not call for us to perform an audit or independent verification of this information, we have reviewed it for reasonableness. The accuracy of the results presented in this report is dependent upon the accuracy and completeness of the underlying information.

This review recommends assumptions to be used in the valuation to measure VSERS' financial condition as of a single date. Future actuarial measurements may differ significantly from the current measurements presented in this report due to other assumption sets. This report does not include an analysis of the potential range of such future measurements.

Segal valuation results and experience study analysis are based on proprietary actuarial modeling software. The actuarial valuation models generate a comprehensive set of liability and cost calculations that are presented to meet regulatory, legislative and client requirements. Deterministic cost projections are based on a proprietary forecasting model. Raw experience study analysis of actual and expected decrements are generated by a model, which is used to develop recommended assumption changes. Our Actuarial Technology and Systems unit, comprised of both actuaries and programmers, is responsible for the initial development and maintenance of these models. The models have a modular structure that allows for a high degree of accuracy, flexibility and user control. The client team programs the assumptions and the plan provisions, validates the models, and reviews test lives and results, under the supervision of the responsible actuaries.

It is important to note that this experience study analysis is based on census data and information through June 30, 2022. Due to the COVID-19 pandemic, market and demographic conditions may have changed significantly since this date. VSERS' actuarial funded status does not reflect short-term fluctuations in the market or plan demographics, but rather is based on asset and liability values on the last day of a Plan Year.