

PSERB Resolution 2026-37

Re: Five-Year Actuarial Experience Review – July 1, 2020 to
June 30, 2025 – Economic, Demographic and Mortality
Assumptions and Administrative Option Factors
August 13, 2026

RESOLVED, that the Public School Employees' Retirement Board accepts the recommendation of the Finance and Actuarial Committee and adopts the recommendations contained in the attached Five-Year Actuarial Experience Review presentation prepared by Gallagher, to be implemented in the June 30, 2026, actuarial valuation, as follows:

- Inflation assumption of 2.50%;
- Investment rate of return assumption of 7.00%;
- Premium assistance return assumption of 3.00%;
- Salary increase assumption of 4.90%;
- Payroll growth assumption of 3.00%;
- Demographic and mortality assumptions as set forth in the attached presentation; and
- Administrative Option Factors as set forth in the attached presentation.
The adopted Administrative Option Factors are to be effective July 1, 2027.

Pennsylvania Public School Employees' Retirement System Five-Year Experience Review

August 13, 2026



Gallagher

Insurance | Risk Management | Consulting

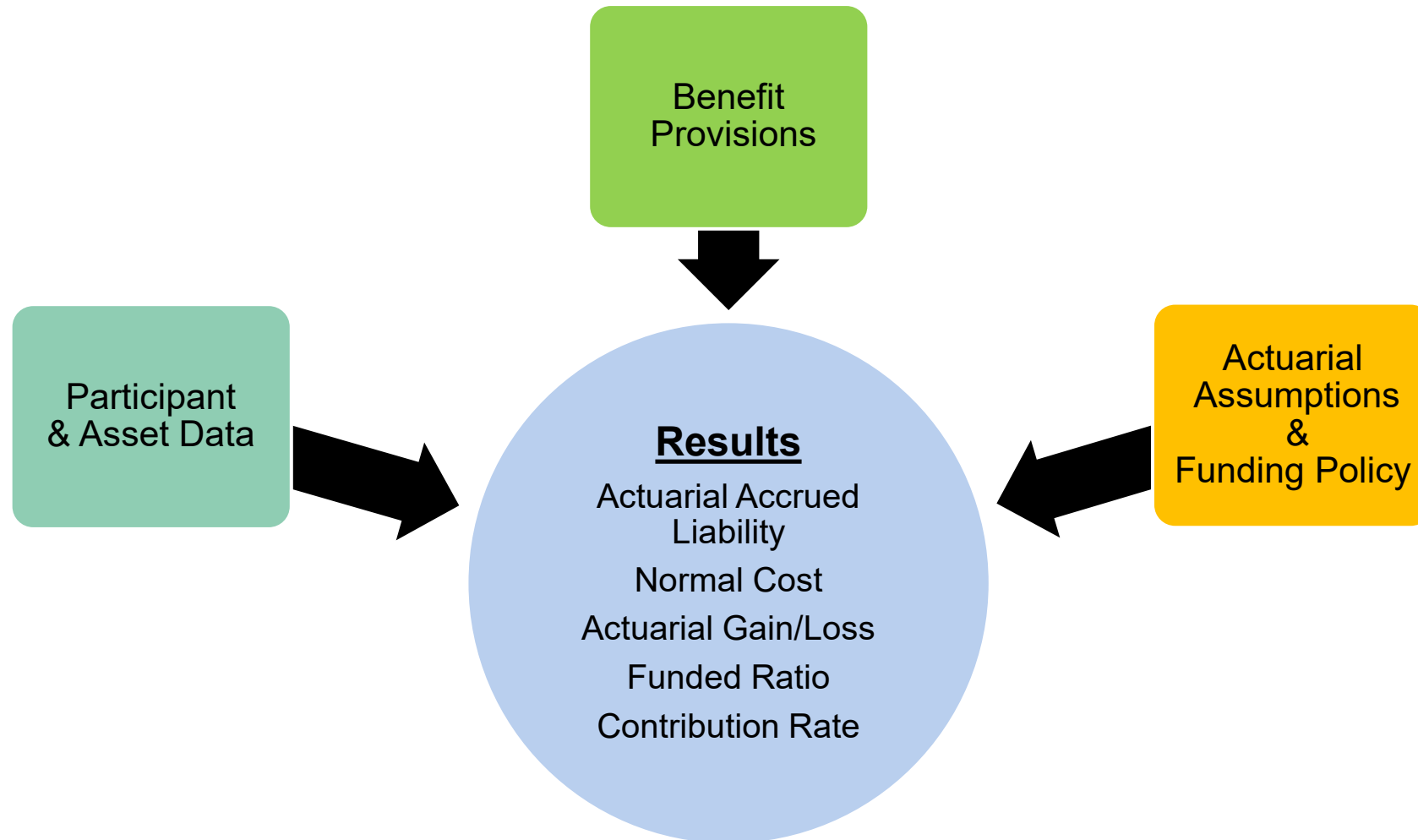
Agenda

- I. Background**
- II. Economic Assumptions**
- III. Demographic Assumptions**
- IV. Impact**
- V. Administrative Option Factors**

Background

Actuarial Valuation Process

The actuarial assumptions and methods are reviewed as part of an experience study. This experience study is conducted to determine the assumptions and methods that will serve as the basis for actuarial valuations beginning June 30, 2026. The funding policy is calculated based on the Retirement Code amended by Act 120-2010 and Act 5-2017 legislation.



Background

- Section 8502(j) of the Retirement Code provides that in every five-year period, the actuary of the Pennsylvania Public School Employees' Retirement System (Retirement System or PSERS) is to make an actuarial investigation and evaluation of the mortality, service and compensation experience of the members and beneficiaries covered under the Retirement System during the preceding five years
- Improves accuracy of results and forecasts
- Each assumption used in the valuation should represent the actuary's **best estimate of reasonable long-term expectations.**

Overview

- The experience study covers both economic and demographic assumptions.
- The current experience study covers the experience for the 5-year period July 1, 2020 to June 30, 2025.
- Determine how actual incidence of events (such as retirement, terminations, etc.) over the five-year period differs from expectations using current assumptions.
- The process is a collaborative effort, including input from the actuary, investment consultant and other stakeholders, using past experience and future expectations to develop proposed assumptions for the Board of Trustees to adopt.
- For each assumption, consideration was given to whether a headcount-weighted or liability-weighted methodology was more appropriate in determining the recommended assumption.
- The fiscal years ending June 30, 2021, and June 30, 2022, were during the COVID pandemic. Potential impacts or adjustments for those years were considered when developing recommended assumptions.
- Assumptions used in the valuations should not significantly conflict with what, in the actuary's professional judgement, are reasonable under Actuarial Standard of Practice No. 27 (ASOP 27).
 - The Board of Trustees is responsible for accepting the recommended changes in assumptions
- The cost impact is shown in this presentation as if the proposed new assumptions were used in the June 30, 2025, valuation.

Actual/Expected (A/E) Ratios

- A/E ratios are used to analyze recent demographic experience
 - A = actual experience
 - E = expected experience
- An A/E ratio of 100% suggests the assumption matches recent experience
- Depending on the assumption, an A/E ratio greater or less than 1.0000 indicates if the current assumption is “too conservative” or “not conservative enough” relative to recent experience. Using retirement rates as an example:
 - An A/E ratio for retirement rates that is greater than 1.0000 indicates that higher actual number of retirements occurred over the observation period than the current assumption for retirement rates predicted
 - In such cases, higher assumed retirement rates may be warranted
- When deciding upon proposed assumptions the credibility of the experience is considered. A large number of exposures are needed to create fully credible experience. Therefore, when proposed assumptions are developed the new A/E will usually still not be exactly 1.0000 to account for partial credibility of the experience.

Economic Assumptions

Economic Assumption Review

The economic assumption review for the five-year period July 1, 2020, through June 30, 2025, will include the following assumptions:

- Investment Return (Inflation & Real Return)
- Health Insurance Premium Assistance Return
- Salary Increase
- Payroll Growth

Things That Happen to Money

KNOWN at valuation date:

1. Market value of PSERS assets
2. Composition of PSERS of assets
 - Stocks
 - Bonds
 - Short term
 - Long term
 - International
 - Real estate
 - Alternative investments
 - Cash

ASSUMED at valuation date:

1. Future rates of investment return
2. Future rates of inflation
3. No change in asset allocation

Investment Return

Overview

- The investment return assumption represents the expected return on invested assets
- The valuation interest rate is typically set equal to the investment return assumptions and based on the risk preference of the Board of Trustees
- The valuation interest rate assumption is used to discount projected benefits for all active and inactive members to determine the plan's liabilities
 - As such, the assumption is also known as the valuation interest rate, or the discount rate
- **A change in this assumption generally has the biggest impact on the plan's liabilities**
- Factors to be considered in setting the investment return assumption:
 - The plan's investment policy and asset allocation strategy
 - Capital market assumptions in effect at the time of measurement
 - Best estimates of future long-term returns
 - Investment expenses
- Real return and inflation are used as building blocks to determine a best estimate of reasonable long-term expectations

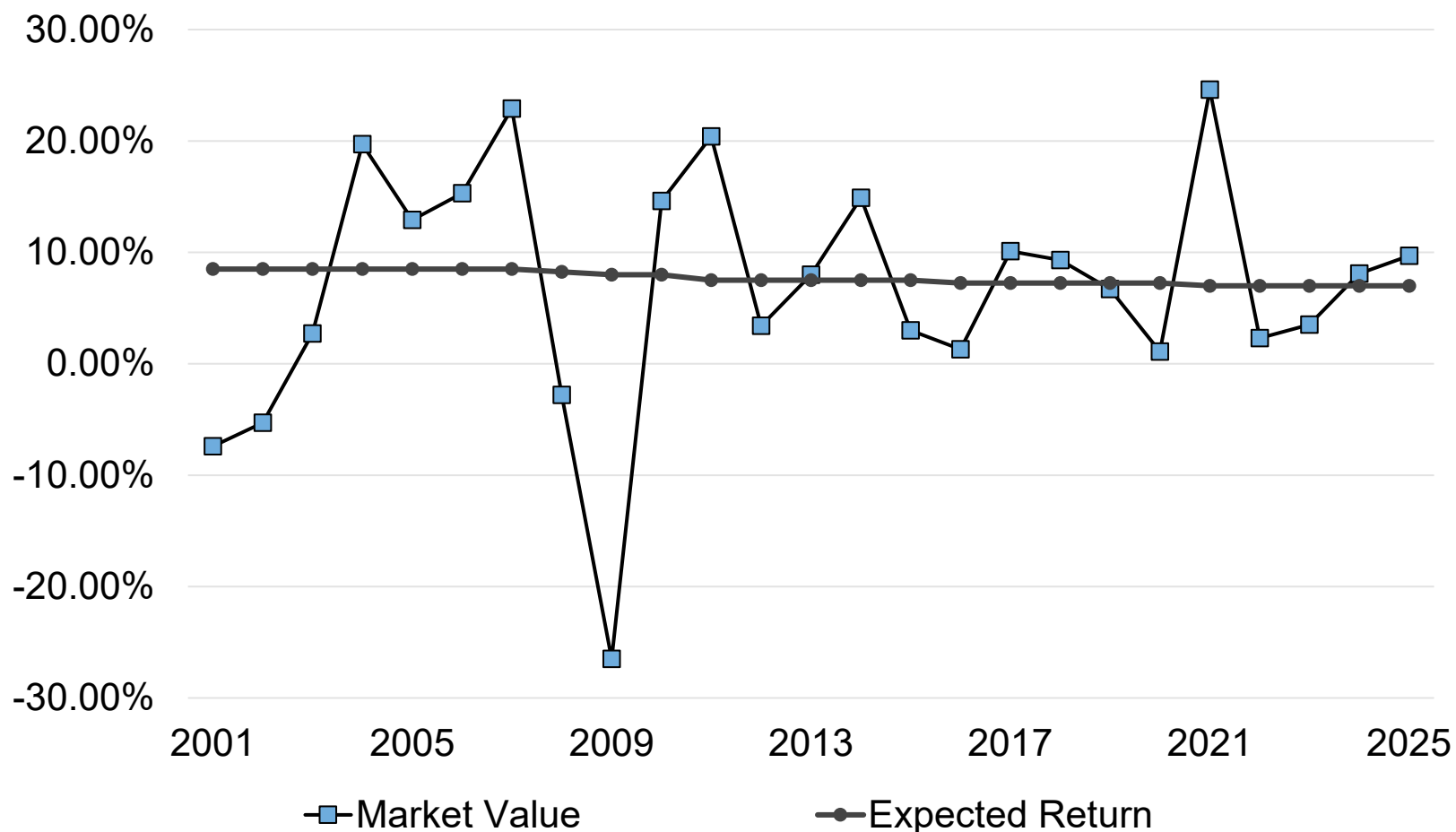
Investment Return

Inflation

- Inflation is also used in the salary increase assumption and should be internally consistent with other assumptions
- Various measures for the rate of inflation; not much published data beyond 10 years
 - NASRA April 2026 Issue Brief shows a 2.54% inflation rate average
 - 132 pension plans included in study
 - Cerity Partners 10-year return forecast in the June 2026 study is 2.70%
 - Average 10-year, 20-year and 30-year CPI-U increases of 3.40%, 2.60% and 2.60% as of May 2026
 - The higher 10-year rate reflects a higher-than-normal inflation period from 2021 to 2023
 - The Livingston Survey Philly Fed 10-year expectation is 2.30% as of June 2026
 - Gallagher GEMS model 10-year time horizon and 30-year time horizon forecast of inflation are 2.47% and 2.33%, respectively.

Investment Return

PSERS Historical Rate of Return

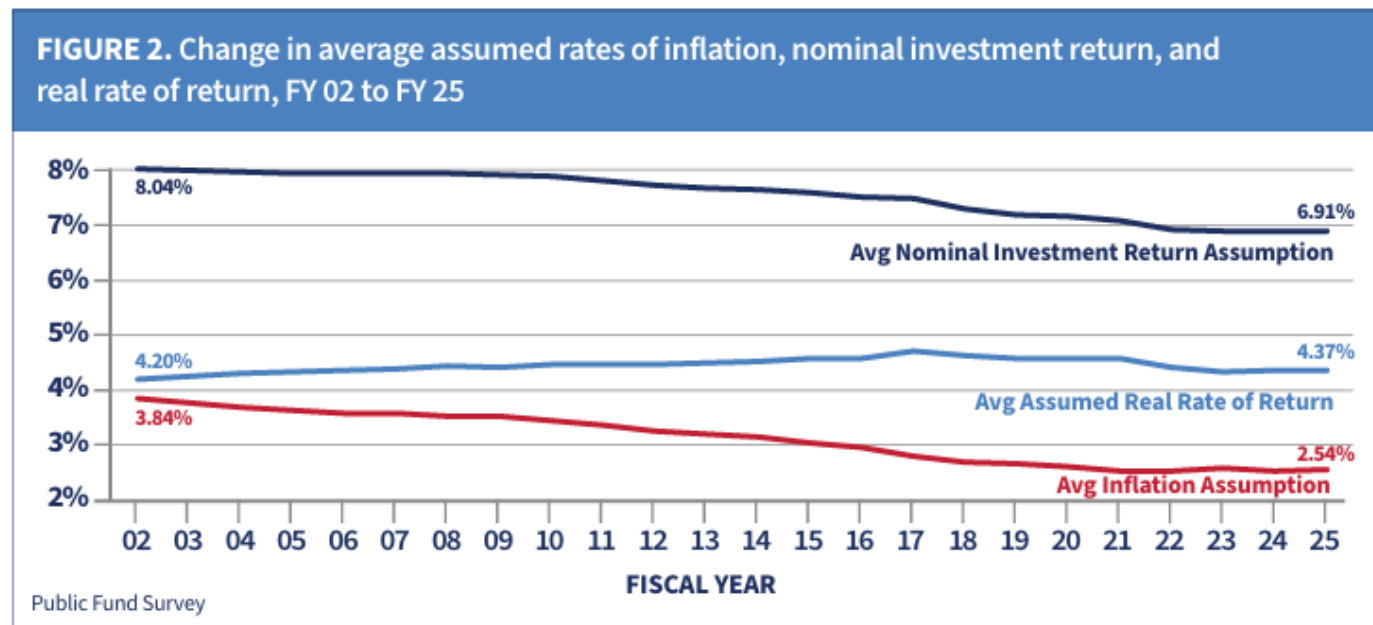


Geometric Average	MVA Return
10 – Year	7.5%
15 – Year	8.2%
20 – Year	6.9%
25 – Year	6.3%

Investment Return

NASRA Investment Return Assumptions

- When examining the NASRA Public Pension Plan Investment Return Assumptions issued April 2026, the average nominal investment return assumption was 6.91% and the median return assumption was 7.00% in fiscal year 2025.
- The chart represents the change in distribution of Public Pension Investment Return Assumptions from 2001 to present.
- The NASRA report is a great guide for plans to gauge where large public sector plan's assumptions are
- Plan's interest rate assumption should be examined based on PSERS target asset allocation and expected return



Investment Return

PSERS' 2026 return and risk expectations

30-Year CMAs	Policy Allocation	Public Markets Only	60/40 Publics with Same Privates	Global 60/40
Forecast Return	7.4	6.4	7.2	6.1
Standard Deviation	11.2	10.6	11.5	11.0
25 th Percentile ret. 1 year	0.2	-0.4	-0.2	-1.0
5 th Percentile ret. 1 year	-9.4	-9.6	-10.0	-10.4
Sharpe Ratio	0.36	0.29	0.34	0.25

10-Year CMAs	Policy Allocation	Public Markets Only	60/40 Publics with Same Privates	Global 60/40
Forecast Return	7.2	6.3	6.9	5.7
Standard Deviation	11.2	10.6	11.5	11.0
25 th Percentile ret. 1 year	0.0	-0.6	-0.6	-1.4
5 th Percentile ret. 1 year	-9.6	-9.8	-10.3	-10.8
Sharpe Ratio	0.36	0.29	0.33	0.23

Source: Cerity Partners 2026 and 2025 30 and 10-year capital market assumptions (see Appendix)

Recommendation:

No change to the investment return assumption. Current assumption is 7.00% per annum, compounded annual with 2.50% for inflation and 4.50% for the real rate of return as the components.

Gallagher's Internal GEMS Model – Q4 2025

Nominal Return Results

	Time Horizon (Years)		
Expected Returns	10	20	30
Expected Return (Geometric)	7.11%	7.44%	7.55%
Standard Deviation	11.07%	11.47%	11.49%
Percentile (Geometric)			
75th	9.30%	9.19%	9.07%
65th	8.32%	8.32%	8.38%
50th	7.04%	7.41%	7.54%
35th	5.68%	6.36%	6.66%
25th	4.77%	5.63%	5.98%

Looking at the 35th to 65th percentile and time horizon of 20 to 30 years for reasonable range of expected long-term outcomes

Health Insurance Premium Assistance Return

- The health insurance premium assistance return is used to apply interest to estimated contributions and disbursements when calculating the health care employer contribution rate
- Current assumption sets the premium assistance return equal to the investment return assumption
- Based on recent discussions with PSERS staff, the investment policy applicable to the Premium Assistance Program points to a need for a different assumed rate of return
- Premium Assistance assets are invested significantly more conservatively than pension assets, a lower return assumption is warranted
- PSERS investment policy statement for the premium assistance is to maintain liquidity by managing the portfolio such that:
 - 25% of the portfolio is convertible to cash within 24 hours
 - 75% of the portfolio is convertible to cash within 72 hours
 - 95% of the portfolio is convertible to cash within 7 calendar days
 - 100% of the portfolio is convertible to cash within 30 calendar days

Nominal Return Results*: 100% cash

Expected Returns	Time Horizon (Years)		
	10	20	30
Expected Return (Geometric)	3.06%	3.07%	3.04%
Standard Deviation	2.20%	2.27%	2.25%
Percentile (Geometric)			
75th	3.76%	3.76%	3.65%
65th	3.26%	3.33%	3.33%
50th	2.76%	2.84%	2.92%
35th	2.31%	2.44%	2.51%
25th	2.07%	2.19%	2.29%

*Gallagher's Internal GEMS Model – Q4 2025

Recommendation:

Update the premium assistance return to 3.00%.

Things That Happen to Members – Salary Increases

For illustrative purpose only

KNOWN at valuation date:

<u>Salary History</u>	
Age 45	\$ 65,000
Age 46	67,925
Age 47	70,982
Total	\$203,907
<u>Current 3-Year FAS*</u>	
$\$203,907/3 = \$67,969$	

ASSUMED at valuation date:

<u>at Retirement</u>	
Age 57	\$110,233
Age 58	115,193
Age 59	120,377
Total	\$345,803
<u>Projected 3-Year FAS*</u>	
$\$345,803/3 = \$115,268$	

*3-year Final Average Salary (FAS) for Classes TC, TD, TE and TF. Classes TG and TH have a 5-Year FAS.

Salary Increase

Historical Rate of Salary Increase

Average Service	FYE2021	FYE2022	FYE2023	FYE2024	FYE2025	Total	Total Excluding FYE2021
Under 5	5.6%	11.0%	12.2%	10.8%	10.3%	10.3%	11.0%
5 to 9	4.7%	6.0%	6.7%	6.5%	6.5%	6.1%	6.4%
10 to 14	4.1%	5.0%	5.4%	5.7%	5.8%	5.1%	5.4%
15 to 19	3.2%	4.0%	4.2%	4.5%	4.6%	4.1%	4.3%
20 to 24	2.0%	2.4%	2.6%	3.0%	3.3%	2.7%	2.8%
25 to 29	1.6%	2.0%	2.1%	2.6%	2.9%	2.3%	2.5%
30+	1.4%	2.4%	2.4%	2.7%	2.8%	2.4%	2.6%
Total	3.5%	5.0%	5.5%	5.5%	5.6%	5.0%	5.4%

- The Plan experienced some potential impact from COVID in FYE2021 with an average salary increase of 3.5% compared to 5.0% to 5.5% in all other years
 - The impact of COVID in FYE2021 shifted the total average during the 5-year experience down across all service years
- Proposing to modify the assumption to be based on service instead of age to align with teacher pay steps
 - Most public-school teacher salary schedules are primarily driven by years of service and educational attainment

Salary Increase

Recommendations

Average Service	Actual	Expected	Proposed	Current A/E	Proposed A/E
Under 5	11,260,366	10,835,915	11,067,812	103.9%	101.7%
5 to 9	10,247,986	10,177,937	10,245,348	100.7%	100.0%
10 to 14	12,328,822	12,283,633	12,322,454	100.4%	100.1%
15 to 19	15,168,984	15,164,085	15,164,971	100.0%	100.0%
20 to 24	12,126,001	12,216,423	12,171,887	99.3%	99.6%
25 to 29	6,507,010	6,547,990	6,534,459	99.4%	99.6%
30+	2,414,207	2,423,476	2,423,071	99.6%	99.6%
Total	70,053,376	69,649,459	69,930,002	100.6%	100.2%

Recommendation: Update the current assumption to be based on service. Increase rates for lower and higher service participants while lowering rates slightly for participants with approximately 20 to 30 years of service. Overall, the assumed weighted average salary increase based on the current population would change from the current assumption of 4.5% to a proposed assumption of 4.9%.

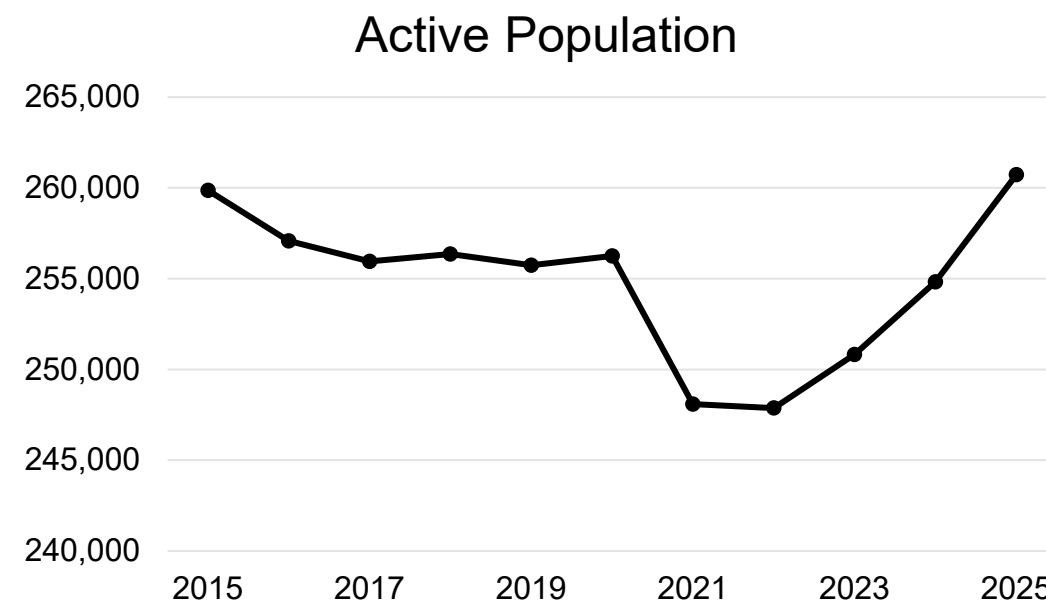
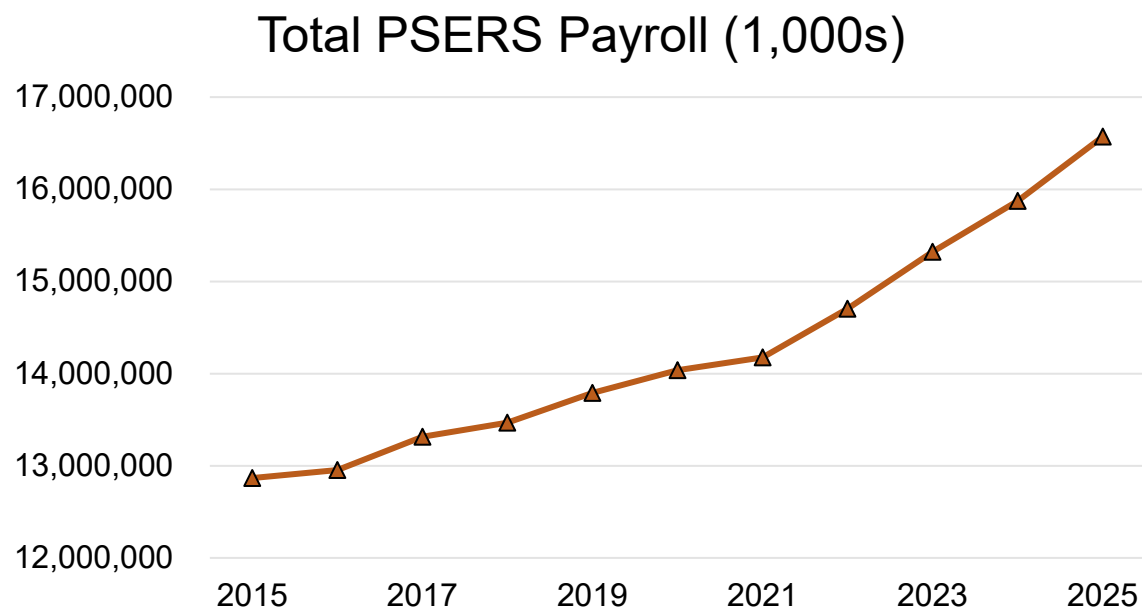
Payroll Growth

- The amortization of the Retirement System's unfunded accrued liability uses a level percentage of payroll method which produces a payment stream that is designed to increase based on the expected growth in payroll
- The payroll growth assumption does not affect plan liabilities
- The current assumption is 3.25% per annum consisting of:

$$\text{Payroll Growth} = \text{Price Inflation} + \text{Real Wage Growth} + \text{Active Population Changes}$$

- If the actual payroll used to determine employer contributions:
 - Is less than the anticipated amount based on a 3.25% payroll growth, results in under-contribution
 - Is greater than the anticipated amount based on a 3.25% payroll growth, results in over-contribution

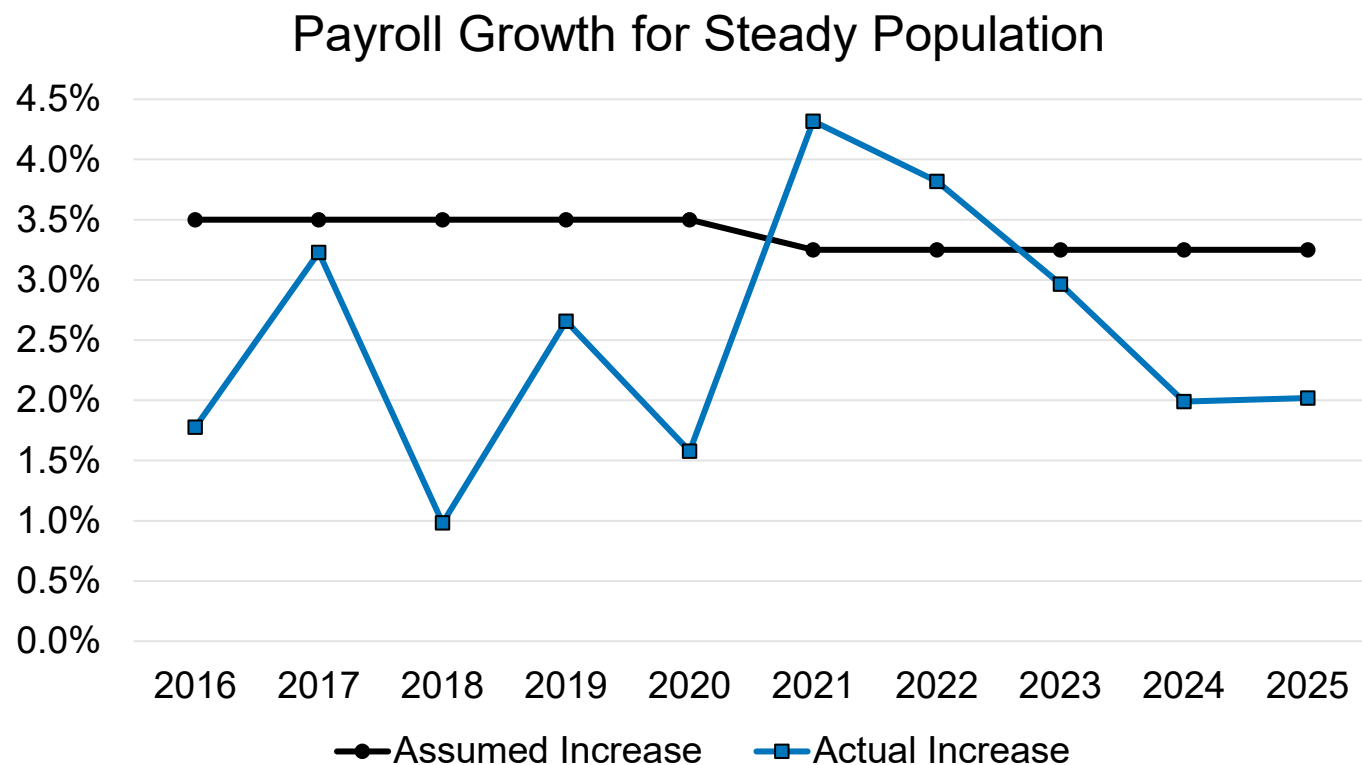
Payroll Growth (cont'd)



Five-year experience fiscal year ending 2001 – fiscal year ending 2025
(from PSERS staff)

	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025
Increase in Total Payroll	4.71%	3.39%	(0.15)%	1.82%	3.61%

Payroll Growth (cont'd)



Given the relatively stable active population over the last decade, the graph illustrates the annual payroll growth experience compared to the expected rate.

- 10-year average payroll growth: 2.5%
- 5-year average payroll growth: 3.0%
- In 8 of the last 10 years, actual payroll growth was lower than expected.

While historical experience should not be the sole determinant of future payroll growth assumptions, the observed experience, combined with the continued turnover replacing experienced employees with lower-paid employees, suggests that a lower payroll growth assumption may be warranted.

Recommendation: Decrease the payroll growth assumption from 3.25% to 3.00%, with no assumed active population growth.

Demographic Assumptions

Demographic Assumption Review

The demographic assumption review for the five-year period July 1, 2020, through June 30, 2025, will include the following assumptions:

- Mortality
- Withdrawal
- Retirement (Early and Superannuation)
- Disability
- Withdrawal Annuity Probability (Deferred or Immediate)
- Vestees Retirement Rates
- Option 4 Refund of Contributions Elections
- Optional Forms Election Probabilities at Retirement

Membership Overview

- Prior to June 30, 2011, members were either in Class T-C or T-D
- Act 120-2010 created two new classes of PSERS active members, Class T-E and Class T-F:
 - Employees who became members of PSERS between June 30, 2011, and July 1, 2019, were automatically enrolled as Class T-E members but had the option to elect membership in Class T-F within 45 days of enrollment
- Act 5-2017 created two new classes of PSERS active members, Class T-G and Class T-H:
 - Employees who become members of PSERS on or after July 1, 2019, have 90 days to elect membership as Class T-G, Class T-H or participation in the DC plan only
- Superannuation eligibility, early retirement eligibility, and vesting requirements considered for each Class when developing the final recommendation, along with the credibility of the data
 - A summary of the plan provisions can be found in the June 30, 2025, Actuarial Valuation Report dated February 28, 2026
 - Eligibility criteria can be found in the appendix of this presentation.

Membership Overview (cont'd)

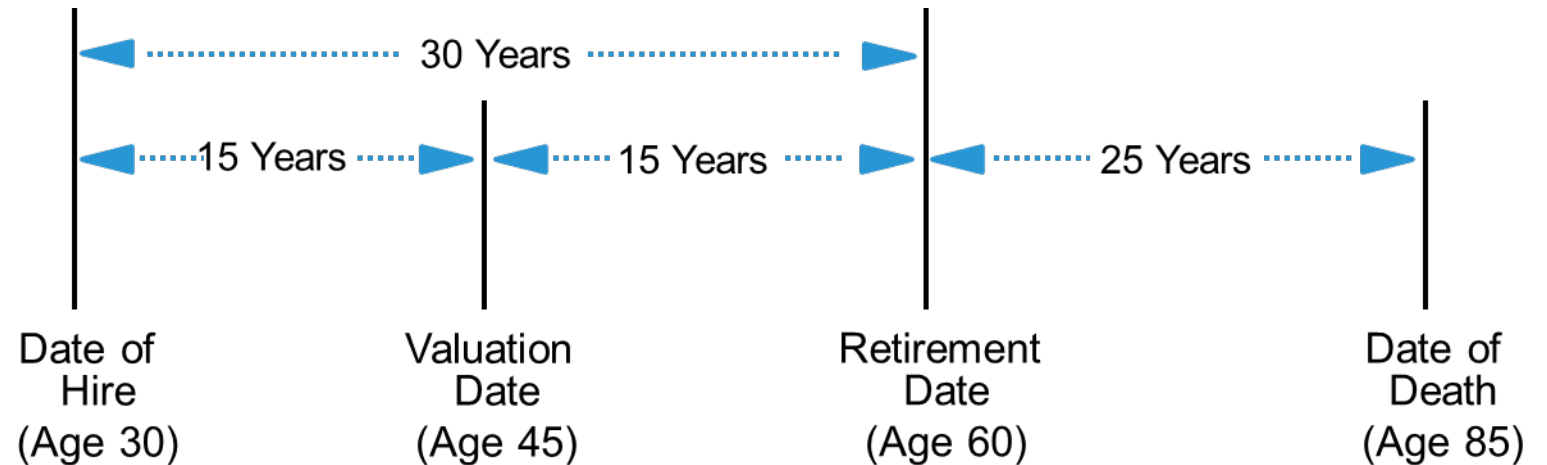
- Currently, we apply the same set of assumed probabilities used for Classes T-E and T-F members to Classes T-G and T-H members.
- As of June 30, 2025, the Class T-G and Class T-H data accumulated is insufficient to develop separate decrements for these classes.
- Where applicable, proposed assumptions for Classes T-E, T-F, T-G, and T-H are based on plan experience. When insufficient experience was available, Class T-C and Class T-D experience was used to determine the final rates with adjustments to reflect plan provisions, as appropriate.
- The Class T-G and Class T-H experience will be reviewed when the next scheduled study is prepared as of June 30, 2030, when sufficient data should be available to warrant a separate assumption in some cases.

Things That Happen to Members

Demographic Assumptions

- KNOWN at valuation date:
 - Age
 - Gender
 - Service to date
 - Membership class

- ASSUMED at valuation date:
 - Death rates
 - Disability rates
 - Withdrawal rates
 - Retirement rates
 - Form of Payment



Mortality

Base Table

- Mortality has continually improved over the last decade and is expected to improve in the future
- In January 2019, the SOA published the Pub-2010 Public Retirement Plans Mortality Tables Report
 - The current assumption is based on Pub-2010 tables
- In May 2025, the SOA published the Pub-2016 Public Retirement Plans Mortality Tables Report based on public retirement system's mortality experience during calendar years 2013-2020
- Both the Pub-2010 and Pub-2016 table included several versions of the table based on job types (Public Safety, Teachers and General Employees) and income levels (above and below median)
- The Retirement System population
 - Annual valuation data provided to Gallagher does not contain information on members' job description
 - PSERS staff communicated that current in-house data estimates 48% to 57% of Retirement System active members are teachers and/or certified staff
- **We recommend the base mortality tables be blended tables based on 50% PubT-2016 (Total Teacher dataset) and 50% PubG-2016 (Total General Employees dataset)**
 - ASOP No. 27 states that the actuary should “select a mortality assumption that is appropriate for the purpose of measurement”
 - Amount-weighted for the Retirement System's Pension valuation
 - Headcount-weighted for the Health Insurance Premium Assistance program

Mortality

Improvement Scale

- Mortality Improvement Scale
 - In general, the rates of mortality observed in America decline over time; each generation lives longer than preceding generations
 - Actuarial standards of practice recommend projecting these mortality improvements into the future
 - **Recommend adopting the SOA MP-2021 Mortality Improvement Scale in place of the Buck Modified MP-2020 Improvement Scale**
 - Over time, mortality improvement expectations reflected in the two scales have converged, reducing the need for a separately modified scale
 - The SOA MP-2021 scale provides a standard, industry-recognized basis that is now generally consistent with the mortality improvement levels reflected in the Buck-modified approach

Mortality

Additional Considerations

- Experience Credibility
 - The decision on what table to use and whether to adjust for actual Retirement System experience is based on the “exposures” and expected number of deaths
 - Credibility factor is a measurement of the reliability of the Retirement System experience as compared to the broader experience reflected in standard tables
 - In general, PSERS is large enough to generate statistically credible mortality experience
 - This enables Gallagher to adjust the probabilities found in a standard table to reflect the experience of the Retirement System, where necessary
 - Service retiree groups will have a higher degree of credibility because of sufficient Retirement System experience
 - Active member, disabled retiree, beneficiaries & survivor annuitants and vestee mortality will, generally, have less credibility due to the limited Retirement System experience
- When examining mortality, COVID was determined to have an impact on the overall experience
 - Rather than excluding FYE 2021 experience entirely, Gallagher assigned a 50% weight to the observed experience during that year. Consequently, fully credible data may result in a proposed A/E ratio differing from 100%, reflecting the partial adjustment applied to the 2021 experience.
- Separate mortality tables were created using head-count weighted information for purposes of GASB 74 & GASB 75. Additional information on those tables can be found in the appendix.

Post-Retirement Mortality: Pension

Mortality Rates – Retirees

Mortality Basis: Males	Actual Benefits Released (\$Mil)	Expected Benefits Released (\$Mil)	Ratio of Actual to Expected
Current Assumption: Blended table based on 50% PubT-2010 Retiree and 50% PubG-2010 Retiree Amount Weighted Male Tables, 99.7% adjusted, generationally projected with Buck Modified scale MP2020	\$2,134	\$2,030	105.1%
Blended table based on 50% PubT-2016 Retiree and 50% PubG-2016 Retiree Amount Weighted Male Tables, generationally projected with SOA improvement scale MP2021	\$2,134	\$2,027	105.3%
Recommendation: Blended table based on 50% PubT-2016 Retiree and 50% PubG-2016 Retiree Amount Weighted Male Tables, adjusted 102.2%, generationally projected with SOA improvement scale MP2021	\$2,134	\$2,071	103.0%

Mortality Basis: Females	Actual Benefits Released (\$Mil)	Expected Benefits Released (\$Mil)	Ratio of Actual to Expected
Current Assumption: Blended table based on 50% PubT-2010 Retiree and 50% PubG-2010 Retiree Amount Weighted Female Tables, 95.4% adjusted, generationally projected with Buck Modified scale MP2020	\$2,428	\$2,492	97.4%
Blended table based on 50% PubT-2016 Retiree and 50% PubG-2016 Retiree Amount Weighted Female Tables, generationally projected with SOA improvement scale MP2021	\$2,428	\$2,583	94.0%
Recommendation: Blended table based on 50% PubT-2016 Retiree and 50% PubG-2016 Retiree Amount Weighted Female Tables, adjusted 92.3%, generationally projected with SOA improvement scale MP2021	\$2,428	\$2,384	101.9%

- The credibility factor is 100.0% for males. During FYE2021 – FYE2025, there were 11,948 deaths
- The credibility factor is 100.0% for females. During FYE2021 – FYE2025, there were 18,966 deaths
- Due to COVID impact, a 50% weight was considered for the FYE2021 experience resulting in the recommended adjustment to the mortality table to not equal 100% actual versus expected ratio

Post-Retirement Mortality: Pension

Mortality Rates – Disability

Mortality Basis: Males	Actual Benefits Released (\$Mil)	Expected Benefits Released (\$Mil)	Ratio of Actual to Expected
Current Assumption: Pub-2010 Disability Mortality Non-Safety Amount Weighted Male Table, with a 105.4% adjustment, generationally projected with Buck Modified scale MP-2020	\$94.4	\$89.5	105.5%
Pub-2016 General Disabled Amount Weighted Male Tables, generationally projected with SOA improvement scale MP2021	\$94.4	\$65.6	143.9%
Recommendation: Pub-2016 General Disabled Amount-Weighted Male Mortality Table generationally projected with SOA improvement scale MP2021, with a 121.6% adjustment	\$94.4	\$79.8	118.4%

Mortality Basis: Females	Actual Benefits Released (\$Mil)	Expected Benefits Released (\$Mil)	Ratio of Actual to Expected
Current Assumption: Pub-2010 Disability Mortality Non-Safety Amount Weighted Female Table, with a 95.0% adjustment, generationally projected with Buck Modified scale MP-2020	\$153.6	\$150.2	102.2%
Pub-2016 General Disabled Amount Weighted Female Tables, generationally projected with SOA improvement scale MP2021	\$153.6	\$129.0	119.1%
Recommendation: Pub-2016 General Disabled Amount-Weighted Female Mortality Table generationally projected with SOA improvement scale MP2021, with a 111.3% adjustment	\$153.6	\$143.5	107.0%

- The credibility factor is 53.1% for males. During FYE2021 – FYE2025, there were 548 deaths
- The credibility factor is 67.2% for females. During FYE2021 – FYE2025, there were 1,063 deaths

Post-Retirement Mortality: Pension

Mortality Rates – Beneficiaries & Survivor Annuitants

Mortality Basis: Males	Actual Benefits Released (\$Mil)	Expected Benefits Released (\$Mil)	Ratio of Actual to Expected
Current Assumption: Pub-2010 Contingent Survivor Amount Weighted Male Table, with a 106.0% adjustment, generationally projected with Buck Modified scale MP-2020	\$72.9	\$71.1	102.5%
Pub-2016 General Contingent Survivors Amount Weighted Male Tables, generationally projected with SOA improvement scale MP2021	\$72.9	\$70.8	103.0%
Recommendation: Pub-2016 General Contingent Survivors Amount-Weighted Male Mortality Table generationally projected with SOA improvement scale MP2021, with a 101.8% adjustment	\$72.9	\$72.1	101.2%

Mortality Basis: Females	Actual Benefits Released (\$Mil)	Expected Benefits Released (\$Mil)	Ratio of Actual to Expected
Current Assumption: Pub-2010 Contingent Survivor Amount Weighted Female Table, with a 116.2% adjustment, generationally projected with Buck Modified scale MP-2020	\$170.2	\$194.6	87.4%
Pub-2016 General Contingent Survivors Amount Weighted Female Tables, generationally projected with SOA improvement scale MP2021	\$170.2	\$172.6	98.6%
Recommendation: Pub-2016 General Contingent Survivors Amount-Weighted Female Mortality Table generationally projected with SOA improvement scale MP2021, with a 99.7% adjustment	\$170.2	\$172.1	98.9%

- The credibility factor is 54.4% for males. During FYE2021 – FYE2025, there were 895 deaths
- The credibility factor is 90.7% for females. During FYE2021 – FYE2025, there were 2,577 deaths

Pre-Retirement Mortality: Pension

Mortality Rates

Mortality Basis: Males	Actual Benefits Released (\$Mil)	Expected Benefits Released (\$Mil)	Ratio of Actual to Expected
Current Assumption: Blended table based on 50% PubT-2010 Employee and PubG-2010 Employee Amount Weighted Male Tables, with a 99.0% adjustment, generationally projected with Buck Modified scale MP-2020	\$145.9	\$135.4	107.7%
Blended table based on 50% Pub-2016 General and 50% Pub-2016 Teachers Pre/Post Comm Amount-Weighted Male Mortality, generationally projected with SOA improvement scale MP2021	\$145.9	\$140.2	104.0%
Recommendation: Blended table based on 50% Pub-2016 General and 50% Pub-2016 Teachers Pre/Post Comm Amount-Weighted Male Mortality Table generationally projected with SOA improvement scale MP2021, with a 101.0% adjustment	\$145.9	\$141.6	103.0%
Mortality Basis: Females	Actual Benefits Released (\$Mil)	Expected Benefits Released (\$Mil)	Ratio of Actual to Expected
Current Assumption: Blended table based on 50% PubT-2010 Employee and PubG-2010 Employee Amount Weighted Female Tables, with an 88.6% adjustment, generationally projected with Buck Modified scale MP-2020	\$186.6	\$169.8	109.9%
Blended table based on 50% Pub-2016 General Pre/Post Comm Amount-Weighted Mortality and 50% Pub-2016 Teachers Pre/Post Comm Amount-Weighted Female Mortality, generationally projected with SOA improvement scale MP2021	\$186.6	\$195.2	95.6%
Recommendation: Blended table based on 50% Pub-2016 General and 50% Pub-2016 Teachers Pre/Post Comm Amount-Weighted Female Mortality generationally projected with SOA improvement scale MP2021, with a 97.2% adjustment	\$186.6	\$189.7	98.4%

- The credibility factor is 53.9% for males. During FYE2021 – FYE2025, there were 810 deaths
- The credibility factor is 65.3% for females. During FYE2021 – FYE2025, there were 1,137 deaths

Withdrawal Summary

Classes T-C and T-D Experience

Non-Vested Withdrawals: With less than 5 years of Service

	<u>Actual Separations</u>	<u>Current</u>	<u>Proposed</u>	<u>Exposed</u>	<u>Current A/E</u>	<u>Proposed A/E</u>
Male Total	930	883	907	5,756	105%	103%
Female Total	1,630	1,605	1,620	12,051	102%	101%

Vested Withdrawals: With 5-10 years of Service

	<u>Actual Separations</u>	<u>Current</u>	<u>Proposed</u>	<u>Exposed</u>	<u>Current A/E</u>	<u>Proposed A/E</u>
Male Total	488	280	356	5,990	174%	137%
Female Total	2,008	1,414	1,743	25,435	142%	115%

Vested Withdrawals: With at least 10 years of Service

	<u>Actual Separations</u>	<u>Current</u>	<u>Proposed</u>	<u>Exposed</u>	<u>Current A/E</u>	<u>Proposed A/E</u>
Male Total	3,462	3,148	3,346	144,598	110%	103%
Female Total	12,908	10,874	12,502	392,371	119%	103%

Observations/Comments: Actual withdrawals for T-C and T-D were higher than expected over the five-year observation period. Because most of the exposures were concentrated among members with more than 10 years of service, the resulting experience is considered sufficiently credible to support the proposed assumption changes when developing the 10 years of service or greater assumption. Due to the population being closed, the assumptions for those with less than 10 years of service do not have as significant an impact on the System.

Recommendation: Recommend increasing withdrawal rates due to higher-than-expected withdrawals that occurred.

Withdrawal Summary

Classes T-E/T-F and T-G/T-H Experience

Non-Vested Withdrawals: Less than 4 years (TE/TF and TG/TH)

	<u>Actual Separations</u>	<u>Current</u>	<u>Proposed</u>	<u>Exposed</u>	<u>Current A/E</u>	<u>Proposed A/E</u>
Male Total	14,650	11,129	14,264	79,973	132%	103%
Female Total	29,674	22,952	29,420	181,420	129%	101%

Non-Vested Withdrawals: With 4-10 years of Service (TE/TF only)

	<u>Actual Separations</u>	<u>Current</u>	<u>Proposed</u>	<u>Exposed</u>	<u>Current A/E</u>	<u>Proposed A/E</u>
Male Total	3,065	6,146	3,188	49,612	50%	96%
Female Total	11,397	18,253	11,398	157,174	62%	100%

Vested Withdrawals: With at least 10 years of Service (TE/TF only)

	<u>Actual Separations</u>	<u>Current</u>	<u>Proposed</u>	<u>Exposed</u>	<u>Current A/E</u>	<u>Proposed A/E</u>
Male Total	420	245	341	11,008	171%	123%
Female Total	1,261	817	1,132	28,927	154%	111%

Observations/Comments: The prior experience study contained limited withdrawal data for T-E and T-F. With an additional five years of experience now available for these newer classes, sufficient data was accumulated to evaluate withdrawal behavior separately from T-C and T-D. Experience indicated that participants with less than four years of service had significantly higher withdrawal rates than participants with four to ten years of service. As a result, the withdrawal assumptions were modified to better reflect the observed T-E and T-F experience. Classes T-G and T-H have limited experience and were thus included in the analysis with Classes T-E and T-F for withdrawals with less than 4 years of service.

Recommendations: Recommend increasing withdrawal rates for those with less than 4 years of service and those with at least 10 years of service due to higher-than-expected withdrawals that occurred. Recommend decreasing withdrawal rates for those 4-10 years of service due to lower-than-expected withdrawals that occurred.

Retirement Summary

Classes T-C/T-D and T-E/T-F Experience

Classes T-C and T-D: Early Retirement

	<u>Actual Separations</u>	<u>Current</u>	<u>Proposed</u>	<u>Exposed</u>	<u>Current A/E</u>	<u>Proposed A/E</u>
Male Total	2,200	2,351	2,261	14,700	94%	97%
Female Total	4,666	4,798	4,683	29,010	97%	100%

Classes T-C and T-D: Normal Retirement (Superannuation)

	<u>Actual Separations</u>	<u>Current</u>	<u>Proposed</u>	<u>Exposed</u>	<u>Current A/E</u>	<u>Proposed A/E</u>
Male Total	5,432	5,697	5,595	21,809	95%	97%
Female Total	16,586	16,621	16,697	63,259	100%	99%

Classes T-E and T-F: Normal Retirement (Superannuation)

	<u>Actual Separations</u>	<u>Current</u>	<u>Proposed</u>	<u>Exposed</u>	<u>Current A/E</u>	<u>Proposed A/E</u>
Male Total	1,248	1,179	1,296	6,307	106%	96%
Female Total	1,450	1,544	1,569	7,128	94%	92%

Observations/Comments: Classes T-C and T-D are the only groups with adequate experience for early retirement. In general, actual early retirement experience was lower than expected. Superannuation experience for T-C/T-D was lower than expected for males, while for females it closely matched the expected assumptions overall. Superannuation experience for T-E/T-F was higher than expected for males and lower than expected for females.

Recommendations: Recommend decreasing early retirement rates, male T-C/T-D and female T-E/T-F superannuation rates due to lower-than-expected retirements that occurred. Recommend increasing superannuation rates for male T-E/T-F due to higher-than-expected retirements.

Disability Retirement

With at least 5 years of service – Classes TC/TD and TE/TF

	<u>Actual</u> <u>Separations</u>	<u>Current</u>	<u>Proposed</u>	<u>Exposed</u>	<u>Current A/E</u>	<u>Proposed A/E</u>
Male Total	267	428	334	244,080	62%	80%
Female Total	579	961	709	676,876	60%	82%

Observations: Actual disability retirements were lower than expected over the five-year observation period. In general, we saw a larger difference in actual vs expected for members below age 45 and over age 65.

Recommendation: Recommend lowering disability rates due to lower-than-expected disability retirements that occurred.

Withdrawing Member Benefit Commencement

- Members may elect to commence benefit immediately upon vested withdrawal from the Retirement System and receive a reduced annuity
- Current valuation assumption: 50% of members are assumed to commence payment immediately and 50% are assumed to defer payment to superannuation age
- The following experience was observed
 - Class T-C and Class T-D: 39% commenced immediately and 61% deferred payment
 - Class T-E and Class T-F: 36% commenced immediately and 64% deferred payment
 - Class T-G and T-H experienced limited to no data

Recommendation:

Update the withdrawing member benefit commencement to 40% of members are assumed to commence payment immediately and 60% are assumed to defer payment to superannuation age.

Vested Retirement Rates

- Currently, vested retirements are assumed to occur at superannuation age
- Gallagher reviewed recent experience to evaluate the percentage of vested terminated members who commence benefits prior to reaching superannuation age
- Based on the observed experience, we recommend establishing an assumption for vested retirements occurring before superannuation age

Age	Actual	Proposed	Exposed
Under 55	1,459	1,434	81,952
55-60	1,312	1,219	30,478
61	1,839	1,753	5,009
Subtotal Under 62	4,610	4,406	117,439

Recommendation: Establish vested retirement rates of 1.75% for participants under age 55 and 4.0% for participants ages 55 through the year preceding superannuation. Assume a 35% retirement rate one year prior to superannuation and a 100% retirement rate at and after superannuation age. Superannuation age is 62 for T-C and T-D, 65 for T-E and T-F, and 67 for T-G and T-H.

Optional Forms of Benefit Payment at Retirement

- Members, upon retirement, may elect to receive the Maximum Single Life Annuity (MSLA), or one of the following annuity payment options that is actuarially equivalent to the MSLA:
 - Option 1 - Guarantee of total payments equal to maximum single life annuity reserve
 - Option 2 - 100% Joint and Survivor annuity
 - Option 3 - 50% Joint and Survivor annuity
 - Option 4 - Some other form of annuity payment that is actuarially equivalent to the MSLA (subject to the Retirement System's Code restrictions)
- Current assumption of males are 3 years older than females
 - Data experience showed the average male is closer to 2 years older than females over the last five years

	Current Assumption	Experience	Proposed
MSLA	45%	53.1%	50%
Option 1	25%	18.9%	20%
Option 2	20%	18.8%	20%
Option 3	10%	7.9%	10%
Option 4	0%	1.3%	0%

Recommendation:

Update the optional form election probabilities for retiring active members to the proposed assumptions in the table.

Update the age difference between male and female for joint and survivor annuity elections to males being two years older than females.

Optional Forms of Benefit Payment at Retirement:

Option 4 – Withdrawal of Accumulated Deductions at Retirement

- Members may elect to receive a lump sum that is less than or equal to the member's accumulated deductions at retirement. In addition, the member receives a reduced annuity.
- The Retirement System's factors for calculating the offset due to a withdrawal are based on:
 - For Classes T-C and T-D: 4.00% interest rate
 - Presents an additional liability to the Retirement System's annual valuation which, currently, uses a 7.00% investment return.
 - For Classes T-E, T-F, T-G and T-H: the current rate of investment return assumption used for the annual valuation
- PSERS staff communicated that in-house data shows:
 - 74% of recent Class T-C and Class T-D retirements elect to receive a partial or full withdrawal of the member's accumulated deductions
 - 60% of recent Class T-E and Class T-F retirements elect to receive a partial or full withdrawal of the member's accumulated deductions
 - However, the last 3 years were consistently around 50% indicating potential COVID impact in the FYE2021 and FYE2022
 - Limited information was available for Class T-G and Class T-H retirements

Recommendation: No change to the Option 4 – Refund of Contributions Elections assumption. Current assumption is 75% of Class T-C and T-D and 50% of Class T-E, Class T-F, Class T-G, and Class T-H members are assumed to elect a refund of contributions and reduced annuity.

Cost Impact

Cost Impact

Item (\$Millions)	June 30, 2025 Actuarial Valuation			
	Unfunded Accrued Liability ¹	Funded Ratio ¹	Normal Cost Rate	Employer Pension Rate ²
Before Changes	\$ 40,910	66.6%	5.21%	32.52%
Changes ³				
1. Demographic Assumptions (excludes mortality)	\$ (805)	0.4%	(0.16)%	(0.50)%
2. Mortality Assumption	\$ 49	0.0%	0.04%	0.06%
3. Economic Assumptions	\$ (273)	0.1%	0.22%	0.41%
After Reflecting Changes	\$ 39,881	67.1%	5.31%	32.49%

¹Actuarial value of assets basis

²Employer Pension rate is based on the fiscal year 2027 covered payroll of \$16,862,000,000 and does not include the Act 5 DC contribution and Premium Assistance*

³The cost effect of each proposed assumption is subject to change depending on the sequence of recognized assumption

*The change in health insurance premium assistance return would increase the employer health care contribution rate from 0.56% to 0.59%

Administrative Option Factors

Optional Forms of Payment Actuarial Equivalence

- Member benefits are determined using actuarial equivalent calculations
- Actuarial equivalent benefits are determined based on a statutorily specified interest rate of 4.00% or the Retirement Systems current investment return assumption depending on the member's Class
- Actuarial equivalence incorporates mortality with the interest to calculate an equivalent benefit for optional forms
- Current mortality basis is 25%/75% blend of the Board-approved male and female base mortality tables from the last experience study, generationally projected to 2025 with the Buck Modified MP-2020 improvement scale
- The 2025 valuation data reflected a gender breakdown of 28% male and 72% female members across active, vestees, and in-pay populations (excluding beneficiaries)

Recommendation:

Update the mortality basis to a 25%/75% blend of the Board-approved male and female base mortality tables to be used for actuarial valuations beginning June 30, 2026, generationally projected to 2030 with the SOA MP-2021 improvement scale.

Appendix

Disclosures

The information contained herein is developed for the Board of Trustees and Staff of the Pennsylvania Public School Employees' Retirement System (Retirement System or PSERS) by Gallagher using actuarial principles and techniques in accordance with all applicable Actuarial Standards of Practice (ASOPs). The purpose of this document is to provide key results of the June 30, 2025 five-year experience study for discussion at the Board meeting attended by the actuaries. Interested parties may request additional information and explanation from Gallagher around key results prior to the June 30, 2025 Experience Study Report being issued in the Fall of 2026. Interested parties may refer to the full June 30, 2025 Experience Study Report for a detailed explanation regarding data, assumptions, methods, Retirement System provisions, and ASOP disclosures that underlie the results once published. In the interim, interested parties may refer to the full Actuary's Report on the June 30, 2025 actuarial valuation for a detailed explanation regarding assumptions, methods, Retirement System provisions, and certain risks that underlie the valuation.

Use of this presentation for any other purpose than as stated may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the presentation for that purpose. No third-party recipient of Gallagher's work product should rely upon Gallagher's work product absent involvement of Gallagher or without our approval.

Where presented, references to "funded ratio" and "unfunded accrued liability" are to measurements made on the basis of the actuarial value of assets. It should be noted that the same measurements made using the market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratios presented are appropriate for evaluating the need for and level of future contributions but provide no indication of the funded status of the Retirement System if the Retirement System were to settle (i.e., purchase annuities to cover) a portion or all of its liabilities.

Disclosures (cont'd)

Future actuarial measurements may differ significantly from current measurements due to Retirement System experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in Retirement System provisions or applicable law. An analysis of the potential range of future results is beyond the scope of this valuation.

Actuarial Standard of Practice No. 56 (ASOP 56) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Gallagher uses:

Third-party software in the performance of annual actuarial valuations and projections to calculate the liabilities associated with the provisions of the Retirement System using data and assumptions as of the measurement date under the funding methods specified in this report. An internally developed model that applies applicable funding methods and policies to the liabilities derived from the output of the third-party software and other inputs, such as Retirement System assets and contributions, to generate many of the exhibits found in this report.

Gallagher has an extensive review process whereby the results of the liability calculations are checked using detailed sample output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other outputs and the internal model are similarly reviewed in detail and at a high level for accuracy, reasonability and consistency with prior results. Gallagher also reviews the third-party model when significant changes are made to the software or model. The review is performed by experts within the company who are familiar with applicable funding methods as well as the manner in which the model generates its output. If significant changes are made to the internal model, extra checking and review are completed.

David L. Driscoll, Maria E. Simmers, and Matthew Staback are Fellows of the Society of Actuaries and Members of the American Academy of Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. We are available to answer any questions on the material contained herein, or to provide explanations or further details as may be appropriate.

Actuarial Standards of Practice

- Actuarial Standard of Practice No. 27 (ASOP 27) requires that all assumptions are reasonable in the actuary's professional judgement.
 - An assumption is considered reasonable if it is not anticipated to result in significant cumulative gains or losses over time
 - The economic assumptions should be internally consistent with each other
 - Each assumption should be evaluated considering its materiality on the valuation results
 - Typically, a range of reasonableness applies for each assumption
 - Past experience should be considered, but not given undue influence if future expectations differ
 - It is important to account for a plan sponsor's expectations for future years that may differ from past experience

Actuarial Standards of Practice (cont'd)

- Actuarial Standard of Practice No. 51 (ASOP 51) requires the actuary to identify risks that, in their professional judgment, may reasonably be anticipated to significantly affect the plan's future financial condition
- The more significant risk factors affecting future funded ratios and contribution rates of the plan are:
 - Investment Risk – the risk that future investment returns will be different than the assumed rate
 - Contribution Risk – the risk that the actuarially determined contribution is not deposited to the trust each year
 - Longevity Risk – the potential that mortality rates of participants and beneficiaries will be different than assumed
 - Salary Increase Risk – the potential that salaries will be different than expected
 - Declining work force – the potential that future employer contribution rates will differ from those expected
- The Plan's full ASOP 51 disclosure can be found in the June 30, 2025 Actuarial Valuation Report dated February 28, 2026
- Annual experience review, as well as performing experience study every five years to assess whether the assumptions being used in the annual actuarial valuations should be changed to better match future experience, assists in managing these risk factors

Investment Return

Cerity Partners Capital Market Assumptions

PSERS' 2026 return and risk expectations

Liquidity Grouping	Asset Class	Policy Allocation	Public Markets Only	60/40 Publics with Same Privates	Global 60/40
Liquid Assets	Global Public Equity	32	45.7	42	60
	Core Fixed Income	8	11.4	28	40
	US Long Treasury	8	11.4	-	-
	High Yield Corp. Credit	4	5.7	-	-
	US TIPS	7	10.0	-	-
	Commodities	4	5.7	-	-
	REITs	2	2.9	-	-
	Public Infrastructure	5	7.1	-	-
	Total Liquid	70	100	70	100
Private Market Assets	Private Equity	12	-	12	-
	Private Credit	7	-	7	-
	Private Real Estate	6	-	6	-
	Private Infrastructure	5	-	5	-
	Total Private Markets	30	-	30	-

30-Year CMAs	Policy Allocation	Public Markets Only	60/40 Publics with Same Privates	Global 60/40
Forecast Return	7.4	6.4	7.2	6.1
Standard Deviation	11.2	10.6	11.5	11.0
25 th Percentile ret. 1 year	0.2	-0.4	-0.2	-1.0
5 th Percentile ret. 1 year	-9.4	-9.6	-10.0	-10.4
Sharpe Ratio	0.36	0.29	0.34	0.25

10-Year CMAs	Policy Allocation	Public Markets Only	60/40 Publics with Same Privates	Global 60/40
Forecast Return	7.2	6.3	6.9	5.7
Standard Deviation	11.2	10.6	11.5	11.0
25 th Percentile ret. 1 year	0.0	-0.6	-0.6	-1.4
5 th Percentile ret. 1 year	-9.6	-9.8	-10.3	-10.8
Sharpe Ratio	0.36	0.29	0.33	0.23

Source: Cerity Partners 2026 and 2025 30 and 10-year capital market assumptions (see Appendix)

In June 2026 study, Cerity Partners projected 10-year and 30-year return under policy allocation, public markets only, 60/40 publics with same privates, and global 60/40.

Reference the “2026 Capital Market Assumptions and Liquidity Study” by Cerity Partners for full details.

Investment Return

Cerity Partners Capital Market Assumptions (cont'd)

PSERS' 2025 return and risk expectations

30-Year CMAs		Policy Allocation	Public Markets Only	60/40 Publics with Same Privates	Global 60/40
Forecast Return		7.3	6.2	7.0	5.9
Standard Deviation		11.6	10.6	11.8	10.9
25 th Percentile ret. 1 year		-0.2	-0.6	-0.6	-1.1
5 th Percentile ret. 1 year		-10.1	-9.7	-10.6	-10.5
Sharpe Ratio		0.34	0.27	0.32	0.24
10-Year CMAs		Policy Allocation	Public Markets Only	60/40 Publics with Same Privates	Global 60/40
Forecast Return		7.1	6.1	6.8	5.6
Standard Deviation		11.6	10.6	11.8	10.9
25 th Percentile ret. 1 year		-0.3	-0.8	-0.8	-1.5
5 th Percentile ret. 1 year		-10.2	-9.9	-10.8	-10.8
Sharpe Ratio		0.34	0.26	0.30	0.21

In June 2026 study, Cerity Partners projected 10-year and 30-year return under policy allocation, public markets only, 60/40 publics with same privates, and global 60/40.

Reference the “2026 Capital Market Assumptions and Liquidity Study” by Cerity Partners for full details.

Source: Cerity Partners 2026 and 2025 30 and 10-year capital market assumptions (see Appendix)

Investment Return

Cerity Partners Capital Market Assumptions (cont'd)

Important Notes

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In June 2026 study, Cerity Partners projected 10-year and 30-year return under policy allocation, public markets only, 60/40 publics with same privates, and global 60/40.

Reference the “2026 Capital Market Assumptions and Liquidity Study” by Cerity Partners for full details.

Investment Return

Gallagher's Capital Market Model

- Gallagher's capital market assumptions are derived from the General Economy and Market Simulator ("GEMS") developed by Conning & Company
 - Gallagher determines a set of capital market assumptions based on the GEMS modeling of the key economic variables and the asset class returns that result from a factor model that forecasts future values for all asset classes in the model
- GEMS Model
 - Incorporates historical data to develop the factor model
 - Calibrates to current economic and market conditions
 - Models the general economy and capital markets
 - Asset class means, volatilities, and correlations are determined dynamically to reflect the change over time
 - Asset class return distributions will vary depending on the time horizon modeled
- Returns modeled are benchmark returns and results don't include reductions for fees and/or expenses

Investment Return

Gallagher's Internal GEMS Model – Q4 2025

Inflation Results

Expected Returns	Time Horizon (Years)		
	10	20	30
Expected Inflation (Geometric)	2.47%	2.42%	2.33%
Standard Deviation	3.10%	3.17%	3.16%
Percentile (Geometric)			
75th	3.61%	3.43%	3.16%
65th	2.93%	2.88%	2.77%
50th	2.14%	2.17%	2.16%
35th	1.37%	1.56%	1.64%
25th	0.95%	1.17%	1.29%



Real Return Results

Expected Returns	Time Horizon (Years)		
	10	20	30
Expected Return (Geometric)	4.61%	4.98%	5.18%
Standard Deviation	10.82%	11.22%	11.26%
Percentile (Geometric)			
75th	6.73%	6.63%	6.62%
65th	5.81%	6.04%	6.06%
50th	4.66%	5.15%	5.35%
35th	3.51%	4.27%	4.53%
25th	2.57%	3.50%	3.89%

Nominal Return Results

Expected Returns	Time Horizon (Years)		
	10	20	30
Expected Return (Geometric)	7.11%	7.44%	7.55%
Standard Deviation	11.07%	11.47%	11.49%
Percentile (Geometric)			
75th	9.30%	9.19%	9.07%
65th	8.32%	8.32%	8.38%
50th	7.04%	7.41%	7.54%
35th	5.68%	6.36%	6.66%
25th	4.77%	5.63%	5.98%



Looking at the 35th to 65th percentile and time horizon of 20 to 30 years for reasonable range of expected long-term outcomes

Recommendation:

No change to the investment return assumption. Current assumption is 7.00% per annum, compounded annual with 2.50% for inflation and 4.50% for the real rate of return as the components.

Post-Retirement Mortality: Premium Assistance

Mortality Rates – Retirees

Mortality Basis: Males	Actual Number of Deaths	Expected Number of Deaths	Ratio of Actual to Expected
Current Assumption: Blended table based on 50% PubT-2010 Retiree and 50% PubG-2010 Retiree Headcount Weighted Male Tables, with a 91.7% adjustment, generationally projected with Buck Modified scale MP-2020	11,948	9,771	122.3%
Blended table based on 50% PubT-2016 Retiree and 50% PubG-2016 Retiree Headcount Weighted Male Tables, generationally projected with SOA scale MP-2021	11,948	10,790	110.7%
Recommendation: Blended table based on 50% PubT-2016 Retiree and 50% PubG-2016 Retiree Headcount Weighted Male Tables, adjusted 107.7%, generationally projected with SOA scale MP-2021	11,948	11,621	102.8%

Mortality Basis: Females	Actual Number of Deaths	Expected Number of Deaths	Ratio of Actual to Expected
Current Assumption: Blended table based on 50% PubT-2010 Retiree and 50% PubG-2010 Retiree Headcount Weighted Female Tables, with a 92.7% adjustment, generationally projected with Buck Modified scale MP-2020	18,966	16,589	114.3%
Blended table based on 50% PubT-2016 Retiree and 50% PubG-2016 Retiree Headcount Weighted Female Tables, generationally projected with SOA scale MP-2021	18,966	18,384	103.2%
Recommendation: Blended table based on 50% PubT-2016 Retiree and 50% PubG-2016 Retiree Headcount Weighted Female Tables, adjusted 101.2%, generationally projected with SOA scale MP-2021	18,966	18,604	101.9%

- The credibility factor is 100.0% for males and females
- Due to COVID impact, a 50% weight was considered for the FYE2021 experience resulting in the recommended adjustment to the mortality table to not equal 100% actual versus expected ratio

Post-Retirement Mortality: Premium Assistance

Mortality Rates – Disability

Mortality Basis: Males	Actual Number of Deaths	Expected Number of Deaths	Ratio of Actual to Expected
Current Assumption: Pub-2010 Disability Mortality Non-Safety Headcount Weighted Male Table, with a 100.8% adjustment, generationally projected with Buck Modified scale MP-2020	548	475	115.3%
Pub-2016 General Disabled Headcount-Weighted Male Mortality Table generationally projected with SOA scale MP-2021	548	410	133.6%
Recommendation: Pub-2016 General Disabled Headcount-Weighted Male Mortality Table generationally projected with SOA scale MP-2021, with a 119.3% adjustment	548	489	112.0%

Mortality Basis: Females	Actual Number of Deaths	Expected Number of Deaths	Ratio of Actual to Expected
Current Assumption: Pub-2010 Disability Mortality Non-Safety Headcount Weighted Female Table, with a 95.4% adjustment, generationally projected with Buck Modified scale MP-2020.	1,063	941	113.0%
Pub-2016 General Disabled Headcount-Weighted Female Mortality Table generationally projected with SOA scale MP-2021	1,063	864	123.1%
Recommendation: Pub-2016 General Disabled Headcount-Weighted Female Mortality Table generationally projected with SOA scale MP-2021, with a 117.7% adjustment.	1,063	1,017	104.6%

- The credibility factor is 66.3% for males and 92.6% for females
- Due to COVID impact, a 50% weight was considered for the FYE2021 experience resulting in the recommended adjustment to the mortality table to not equal 100% actual versus expected ratio

Pre-Retirement Mortality: Premium Assistance

Mortality Rates

Mortality Basis: Males	Actual Number of Deaths	Expected Number of Deaths	Ratio of Actual to Expected
Current Assumption: Blended table based on 50% PubT-2010 Retiree and 50% PubG-2010 Retiree Headcount Weighted Male Tables, with a 97.0% adjustment, generationally projected with Buck Modified scale MP-2020.	810	598	135.4%
Blended table based on 50% PubT-2016 Pre-Commencement and 50% PubG-2016 Pre-Commencement Headcount Weighted Male Tables, generationally projected with SOA scale MP-2021	810	696	116.4%
Recommendation: Blended table based on 50% PubT-2016 Pre-Commencement and 50% PubG-2016 Pre-Commencement Headcount Weighted Male Tables, with a 112.4% adjustment, generationally projected with SOA scale MP-2021	810	782	103.6%

Mortality Basis: Females	Actual Number of Deaths	Expected Number of Deaths	Ratio of Actual to Expected
Current Assumption: Blended table based on 50% PubT-2010 Retiree and 50% PubG-2010 Retiree Headcount Weighted Female Tables, with an 85.5% adjustment, generationally projected with Buck Modified scale MP-2020.	1,137	845	134.6%
Blended table based on 50% PubT-2016 Pre-Commencement and 50% PubG-2016 Pre-Commencement Headcount Weighted Female Tables, generationally projected with SOA scale MP-2021	1,137	1,033	110.0%
Recommendation: Blended table based on 50% PubT-2016 Pre-Commencement and 50% PubG-2016 Pre-Commencement Headcount Weighted Female Tables, with a 110.4% adjustment, generationally projected with SOA scale MP-2021	1,137	1,141	99.7%

- The credibility factor is 81.6% for males and 97.5% for females
- Due to COVID impact, a 50% weight was considered for the FYE2021 experience resulting in the recommended adjustment to the mortality table to not equal 100% actual versus expected ratio

Retirement Eligibility Requirements

- Early Retirement
 - Age 55 with 25 Years
 - Age 57 with 25 Years for Class T-G only
- Superannuation Retirement
 - Classes T-C and T-D
 - Age 62
 - Age 60 with 30 years
 - 35 years
 - Classes T-E and T-F
 - Age 65 with 3 years
 - Any combination of age and service that totals 92 with at least 35 years of service
 - Classes T-G and T-H
 - Age 67 with 3 years
 - For Class T-G only, any combination of age and service that totals 97 with at least 35 years of service

Withdrawal & Disability Eligibility Requirements

- Withdrawal
 - Members enrolled prior to enactment of Act 120 (Classes T-C and T-D)
 - Non-Vested with less than 5 years
 - Vested with at least 5 years but less than 10 years
 - Vested with at least 10 years
 - Members enrolled after enactment of Act 120 (Classes T-E and T-F) and Act 5 (Classes T-G and T-H)
 - Non-Vested with less than 10 years
 - Vested with at least 10 years
- Disability with at least 5 years

Early Retirement

Classes T-C and T-D Experience - Male

Age 55 with at Least 25 Years Service, but Not Eligible for Superannuation Immediate Retirement with 3% per annum Early Retirement Reduction from Superannuation						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
55	439	521	471	3,595	84%	93%
56	390	453	416	3,127	86%	94%
57	376	385	380	2,658	98%	99%
58	315	308	312	2,125	102%	101%
59	376	375	375	1,736	100%	100%
60	108	113	111	782	96%	97%
61	196	196	196	677	100%	100%
Total	2,200	2,351	2,261	14,700	94%	97%

Recommendation: Recommend decreasing overall early retirement rates due to lower-than-expected retirements across most ages.

Early Retirement

Classes T-C and T-D Experience - Female

Age 55 with at Least 25 Years Service, but Not Eligible for Superannuation Immediate Retirement with 3% per annum Early Retirement Reduction from Superannuation						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
55	827	961	855	6,625	86%	97%
56	766	832	775	5,740	92%	99%
57	781	730	773	4,864	107%	101%
58	623	598	618	3,986	104%	101%
59	781	733	758	3,543	107%	103%
60	298	311	304	2,070	96%	98%
61	590	633	600	2,182	93%	98%
Total	4,666	4,798	4,683	29,010	97%	100%

Recommendation: Recommend decreasing overall early retirement rates due to lower-than-expected retirements across most ages.

Normal Retirement (Superannuation)

Classes T-C and T-D Experience - Male

Age 62, Age 60 with 30 Years, or 35 Years						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
Under 62	863	844	854	2,973	102%	101%
62	787	1,251	852	3,476	63%	92%
63	508	608	536	2,897	84%	95%
64	675	566	644	2,574	119%	105%
65	579	473	555	2,055	122%	104%
66	508	355	464	1,545	143%	109%
67	280	222	255	1,109	126%	110%
68	227	186	214	931	122%	106%
69	200	150	173	752	133%	116%
70	117	121	121	605	97%	97%
71	131	102	112	509	128%	117%
72	70	78	74	390	90%	95%
73	68	74	71	371	92%	96%
74	94	82	86	329	115%	109%
75	55	63	61	253	87%	90%
76	50	53	51	214	94%	98%
77	55	48	50	194	115%	110%
78	38	38	39	154	100%	97%
79	33	32	32	127	103%	103%
Subtotal Under 80	5,338	5,346	5,244	21,458	100%	102%
80	94	351	351	351	27%	27%
Total All Ages	5,432	5,697	5,595	21,809	95%	97%

Recommendation: Recommend decreasing overall superannuation rates due to lower-than-expected retirements across most ages.

Normal Retirement (Superannuation)

Classes T-C and T-D Experience - Female

Age 62, Age 60 with 30 Years, or 35 Years						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
Under 62	1,600	1,523	1,560	5,089	105%	103%
62	2,866	3,938	2,858	12,704	73%	100%
63	1,909	2,119	1,907	10,596	90%	100%
64	2,675	2,278	2,665	9,111	117%	100%
65	2,238	1,918	2,227	6,851	117%	100%
66	1,656	1,302	1,640	4,823	127%	101%
67	897	750	880	3,259	120%	102%
68	621	539	613	2,451	115%	101%
69	513	440	479	1,915	117%	107%
70	364	329	358	1,431	111%	102%
71	256	217	239	1,086	118%	107%
72	212	170	187	851	125%	113%
73	169	138	152	690	122%	111%
74	119	135	119	541	88%	100%
75	100	109	100	434	92%	100%
76	74	82	75	327	90%	99%
77	67	67	67	266	100%	100%
78	59	51	53	203	116%	111%
79	42	38	40	153	111%	105%
Subtotal Under 80	16,437	16,143	16,219	62,781	102%	101%
80	149	478	478	478	31%	31%
Total All Ages	16,586	16,621	16,697	63,259	100%	99%

Recommendation: Recommend increasing overall superannuation rates due to higher-than-expected retirements across most ages.

Normal Retirement (Superannuation)

Classes T-E and T-F Experience - Male

Age 65 with 3 years, Rule of 92 with at least 35 years						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
65	243	162	203	992	150%	120%
66	175	130	158	796	135%	111%
67	138	110	130	674	125%	106%
68	111	94	107	577	118%	104%
69	92	85	89	523	108%	103%
70	88	77	83	475	114%	106%
71	68	67	67	408	101%	101%
72	68	60	63	371	113%	108%
73	55	52	54	319	106%	102%
74	38	45	43	277	84%	88%
75	35	37	35	224	95%	100%
76	28	29	27	176	97%	104%
77	27	22	23	135	123%	117%
78	22	17	18	106	129%	122%
79	22	12	16	74	183%	138%
Subtotal Under 80	1,210	999	1,116	6,127	121%	108%
80	38	180	180	180	21%	21%
Total All Ages	1,248	1,179	1,296	6,307	106%	96%

Recommendation: Recommend increasing overall superannuation rates due to higher-than-expected retirements across most ages.

Normal Retirement (Superannuation)

Classes T-E and T-F Experience - Female

Age 65 with 3 years, Rule of 92 with at least 35 years						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
65	333	270	308	1,387	123%	108%
66	254	210	232	1,077	121%	109%
67	147	161	153	826	91%	96%
68	121	130	125	666	93%	97%
69	98	110	104	562	89%	94%
70	96	94	95	482	102%	101%
71	80	83	82	426	96%	98%
72	57	69	62	354	83%	92%
73	46	62	52	317	74%	88%
74	55	51	52	264	108%	106%
75	30	33	31	169	91%	97%
76	24	26	25	134	92%	96%
77	24	21	22	109	114%	109%
78	16	17	17	88	94%	94%
79	25	14	16	74	179%	156%
Subtotal Under 80	1,406	1,351	1,376	6,935	104%	102%
80	44	193	193	193	23%	23%
Total All Ages	1,450	1,544	1,569	7,128	94%	92%

Recommendation: Recommend increasing overall superannuation rates due to higher-than-expected retirements across most ages.

Non-Vested Withdrawals

Classes T-C and T-D Experience - Male

With less than 5 Years of Service						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
Under 33	21	18	19	118	117%	111%
35	128	116	121	767	110%	106%
40	127	170	159	1,058	75%	80%
45	166	154	159	1,017	108%	104%
50	235	209	221	1,326	112%	106%
55	122	115	117	740	106%	104%
60	131	101	111	730	130%	118%
Total	930	883	907	5,756	105%	103%

Recommendation: Recommend increasing overall withdrawal rates due to higher-than-expected withdrawals across most ages.

Non-Vested Withdrawals

Classes T-C and T-D Experience - Female

With less than 5 Years of Service						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
Under 33	18	22	21	146	82%	86%
35	184	225	208	1,535	82%	88%
40	297	325	310	2,525	91%	96%
45	335	326	331	2,541	103%	101%
50	374	353	365	2,701	106%	102%
55	230	192	210	1,428	120%	110%
60	192	162	175	1,175	119%	110%
Total	1,630	1,605	1,620	12,051	102%	101%

Recommendation: Recommend increasing overall withdrawal rates due to higher-than-expected withdrawals across most ages.

Vested Withdrawals

Classes T-C and T-D Experience - Male

With at Least 5 Years of Service but Less Than 10 Years of Service Can Elect Immediate Retirement or Deferred Retirement						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
Under 33	14	10	10	251	140%	140%
35	83	53	62	1,418	157%	134%
40	79	56	63	1,265	141%	125%
45	83	49	59	957	169%	141%
50	86	48	66	961	179%	130%
55	68	29	44	584	234%	155%
60	75	35	52	554	214%	144%
Total	488	280	356	5,990	174%	137%

Recommendation: Recommend increasing overall withdrawal rates due to higher-than-expected withdrawals across most ages.

Vested Withdrawals

Classes T-C and T-D Experience - Female

With at Least 5 Years of Service but Less Than 10 Years of Service Can Elect Immediate Retirement or Deferred Retirement						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
Under 33	32	31	31	518	103%	103%
35	296	253	275	4,463	117%	108%
40	311	237	277	4,600	131%	112%
45	328	237	287	4,508	138%	114%
50	435	294	382	5,599	148%	114%
55	299	170	238	3,195	176%	126%
60	307	192	253	2,552	160%	121%
Total	2,008	1,414	1,743	25,435	142%	115%

Recommendation: Recommend increasing overall withdrawal rates due to higher-than-expected withdrawals across most ages.

Vested Withdrawals

Classes T-C and T-D Experience - Male

With at Least 10 Years of Service Can Elect Immediate Retirement or Deferred Retirement						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
Under 33	20	12	19	423	167%	105%
35	237	178	211	11,212	133%	112%
40	480	409	458	28,787	117%	105%
45	509	499	506	35,395	102%	101%
50	766	851	778	45,004	90%	98%
55	685	529	654	14,573	129%	105%
60	765	670	720	9,204	114%	106%
Total	3,462	3,148	3,346	144,598	110%	103%

Recommendation: Recommend increasing overall withdrawal rates due to higher-than-expected withdrawals across most ages.

Vested Withdrawals

Classes T-C and T-D Experience - Female

With at Least 10 Years of Service Can Elect Immediate Retirement or Deferred Retirement						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
Under 33	26	25	25	646	104%	104%
35	1,045	899	1,014	31,779	116%	103%
40	1,534	1,275	1,481	76,351	120%	104%
45	1,333	1,304	1,328	81,479	102%	100%
50	2,374	2,235	2,353	107,435	106%	101%
55	2,594	1,876	2,501	51,246	138%	104%
60	4,002	3,260	3,800	43,435	123%	105%
Total	12,908	10,874	12,502	392,371	119%	103%

Recommendation: Recommend increasing overall withdrawal rates due to higher-than-expected withdrawals across most ages.

Non-Vested Withdrawals

Classes T-E/T-F and T-G/T-H Combined Experience – Male

With less than 4 Years of Service						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
20	1,186	1,025	1,176	3,953	116%	101%
25	3,204	2,764	3,208	16,242	116%	100%
30	2,308	1,401	2,304	12,453	165%	100%
35	1,457	1,080	1,430	8,935	135%	102%
40	1,164	955	1,126	7,265	122%	103%
45	1,253	1,015	1,226	7,321	123%	102%
50	1,251	987	1,228	7,222	127%	102%
55	1,070	775	1,026	6,511	138%	104%
60	816	568	762	5,077	144%	107%
65	578	373	508	3,330	155%	114%
70	363	186	270	1,664	195%	134%
Total	14,650	11,129	14,264	79,973	132%	103%

Recommendation: Recommend increasing overall withdrawal rates due to higher-than-expected withdrawals across most ages.

Non-Vested Withdrawals

Classes T-E/T-F and T-G/T-H Combined Experience – Female

With less than 4 Years of Service						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
20	1,730	1,413	1,723	5,144	122%	100%
25	6,850	6,227	6,852	42,827	110%	100%
30	4,915	3,326	4,912	28,473	148%	100%
35	3,637	2,710	3,609	21,873	134%	101%
40	3,301	2,565	3,281	22,243	129%	101%
45	2,826	2,164	2,806	19,692	131%	101%
50	2,226	1,667	2,215	15,547	134%	100%
55	1,652	1,211	1,633	11,261	136%	101%
60	1,291	952	1,269	8,190	136%	102%
65	824	485	751	4,174	170%	110%
70	422	232	369	1,996	182%	114%
Total	29,674	22,952	29,420	181,420	129%	101%

Recommendation: Recommend increasing overall withdrawal rates due to higher-than-expected withdrawals across most ages.

Non-Vested Withdrawals

Classes T-E and T-F Experience – Male

With at Least 4 Years of Service but Less Than 10 Years of Service						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
Under 28	251	430	269	2,503	58%	93%
30	743	1,472	775	13,086	50%	96%
35	503	1,208	529	9,993	42%	95%
40	327	756	342	5,754	43%	96%
45	219	572	230	4,126	38%	95%
50	252	519	262	3,797	49%	96%
55	264	514	269	4,318	51%	98%
60	322	494	334	4,419	65%	96%
65	184	181	178	1,616	102%	103%
Total	3,065	6,146	3,188	49,612	50%	96%

Recommendation: Recommend decreasing overall withdrawal rates due to lower-than-expected withdrawals across most ages.

Non-Vested Withdrawals

Classes T-E and T-F Experience – Female

With at Least 4 Years of Service but Less Than 10 Years of Service						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
Under 28	508	803	522	5,499	63%	97%
30	2,953	4,863	2,952	41,637	61%	100%
35	1,984	3,559	1,985	28,726	56%	100%
40	1,273	2,079	1,273	18,030	61%	100%
45	1,233	1,945	1,234	17,701	63%	100%
50	1,250	1,959	1,250	18,273	64%	100%
55	1,046	1,580	1,051	14,701	66%	100%
60	775	1,143	782	9,833	68%	99%
65	375	322	349	2,774	116%	107%
Total	11,397	18,253	11,398	157,174	62%	100%

Recommendation: Recommend decreasing overall withdrawal rates due to lower-than-expected withdrawals across most ages.

Vested Withdrawals

Classes T-E and T-F Experience – Male

With at least 10 Years of Service						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
Under 33	29	17	28	603	171%	104%
35	113	67	87	4,095	169%	130%
40	48	29	35	2,050	166%	137%
45	42	16	30	1,159	263%	140%
50	29	16	20	834	181%	145%
55	30	31	34	958	97%	88%
60	63	50	55	961	126%	115%
65	66	19	52	348	347%	127%
Total	420	245	341	11,008	171%	123%

Recommendation: Recommend increasing overall withdrawal rates due to higher-than-expected withdrawals across most ages.

Vested Withdrawals

Classes T-E and T-F Experience – Female

With at least 10 Years of Service						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
Under 33	59	47	53	1,215	126%	111%
35	474	324	436	11,441	146%	109%
40	152	72	128	4,307	211%	119%
45	110	47	93	2,909	234%	118%
50	121	64	103	3,100	189%	117%
55	140	105	131	3,186	133%	107%
60	138	123	135	2,188	112%	102%
65	67	35	53	581	191%	126%
Total	1,261	817	1,132	28,927	154%	111%

Recommendation: Recommend increasing overall withdrawal rates due to higher-than-expected withdrawals across most ages.

Disability Retirement - Male

With at Least 5 Years of Service						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
Under 33	0	1	1	14,168	0%	0%
35	4	10	8	25,686	40%	50%
40	11	22	15	37,184	50%	73%
45	29	45	37	41,103	64%	78%
50	64	98	77	42,529	65%	83%
55	92	137	108	37,109	67%	85%
60	56	95	72	25,714	59%	78%
65	11	20	16	20,587	55%	69%
Total	267	428	334	244,080	62%	80%

Recommendation: Recommend lowering over disability rates due to lower-than-expected disability retirements that occurred.

Disability Retirement - Female

With at Least 5 Years of Service						
Central Age	Actual Separations	Expected Separations		Exposed	Actual / Expected	
		Current	Proposed		Current	Proposed
Under 33	2	8	4	41,710	25%	50%
35	9	22	15	73,601	41%	60%
40	24	60	30	100,502	40%	80%
45	56	114	73	103,781	49%	77%
50	129	201	157	111,852	64%	82%
55	200	313	238	108,073	64%	84%
60	145	205	171	85,423	71%	85%
65	14	38	21	51,934	37%	67%
Total	579	961	709	676,876	60%	82%

Recommendation: Recommend lowering overall disability rates due to lower-than-expected disability retirements that occurred.

Additional Information

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