

Sonoma County Employees'
Retirement Association

Actuarial Experience Study

**Analysis of Actuarial Experience During the Period
January 1, 2021 through December 31, 2023**

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October 17, 2024

Board of Retirement
Sonoma County Employees' Retirement Association
433 Aviation Boulevard, Suite 100
Santa Rosa, CA 95403

Re: Review of Actuarial Assumptions for the December 31, 2024 Actuarial Valuation

Dear Members of the Board:

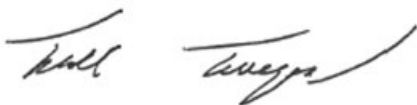
We are pleased to submit this report of our review of the actuarial experience for the Sonoma County Employees' Retirement Association (SCERA). This study utilizes the census data for the period January 1, 2021 through December 31, 2023 as well as prior periods for some assumptions, examines other relevant inputs, and provides the proposed actuarial assumptions, both economic and demographic, to be used in the December 31, 2024 valuation.

The actuarial calculations were completed under the supervision of Andy Yeung, ASA, MAAA, FCA, Enrolled Actuary. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

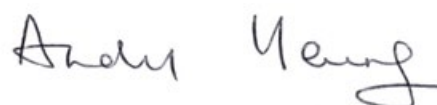
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We look forward to reviewing this report with you and answering any questions you may have.

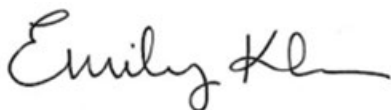
Sincerely,

A handwritten signature in dark ink, appearing to read "Todd Tauzer".

Todd Tauzer, FSA, MAAA, FCA, CERA
Senior Vice President and Actuary

A handwritten signature in dark ink, appearing to read "Andy Yeung".

Andy Yeung, ASA, MAAA, FCA, EA
Vice President and Actuary

A handwritten signature in dark ink, appearing to read "Emily Klare".

Emily Klare, ASA, MAAA, EA
Senior Actuary

OH/jl

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Section 1: Introduction, Summary and Recommendations

To project the cost and liabilities of the Retirement Association, assumptions are made about all future events that could affect the amount and timing of the benefits to be paid and the assets to be accumulated. Each year actual experience is compared against the projected experience, and to the extent there are differences, the future contribution requirement is adjusted.

If assumptions are modified, contribution requirements are adjusted to take into account a change in the projected experience in all future years. There is a great difference in both philosophy and cost impact between recognizing the actuarial deviations as they occur annually and changing the actuarial assumptions. Taking into account one year's gains or losses without making a change in the assumptions means that year's experience is treated as temporary and that, over the long run, experience will return to what was originally assumed. For example, the actuarial assumptions used in the most recent valuation did not include any possible short-term or long-term impacts on mortality of the covered population that emerged due to COVID-19.¹ Changing assumptions reflects a basic change in thinking about the future, and has a much greater effect on the current contribution requirements than recognizing gains or losses as they occur.

The use of realistic actuarial assumptions is important in maintaining adequate funding, while paying the promised benefit amounts to participants already retired and to those near retirement. The actuarial assumptions used do not determine the "actual cost" of the plan. The actual cost is determined solely by the benefits and administrative expenses paid out, offset by investment income received. However, it is desirable to estimate as closely as possible what the actual cost will be so as to permit an orderly method for setting aside contributions today to provide benefits in the future, and to maintain equity among generations of participants and taxpayers.

This study was undertaken in order to review the economic and demographic actuarial assumptions and to compare the actual experience with that expected under the current assumptions during the three-year experience period from January 1, 2021 through December 31, 2023. The study was performed in accordance with 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." These Standards of Practice provide guidance for the selection of the various actuarial assumptions utilized in a pension plan actuarial valuation. Based on the study's results and expected future experience, we are recommending various changes in the current actuarial assumptions.

We are recommending changes in the assumptions for merit and promotion salary increases, pre-retirement mortality, post-retirement healthy and disabled life mortality, beneficiary mortality, disability (non-service connected and service connected), termination (refunds and deferred vested retirements), retirement from active employment, retirement age for deferred vested

¹ An analysis of the ongoing impact of the COVID-19 pandemic is beyond the scope of the current experience study.

Section 1: Introduction, Summary and Recommendations

members, percent of future deferred vested General members expected to be covered by a reciprocal system, reciprocal salary increases and cashouts.

Our recommendations for the major actuarial assumption categories are as follows:

Pg #	Actuarial Assumption Category	Recommendation
12	Inflation: Future increases in the Consumer Price Index (CPI), which drives investment returns and active member salary increases.	Maintain the inflation assumption at 2.50% per annum as discussed in <i>Section 3(A)</i> .
15	Investment return: The estimated average net rate of return on current and future assets of the Association as of the valuation date. This rate is used to discount liabilities.	Maintain the investment return assumption at 6.75% per annum as discussed in <i>Section 3(B)</i> .
25	<p>Salary increases: Increases in the salary of a member between the date of the valuation to the date of separation from active service. This assumption has three components:</p> <ul style="list-style-type: none"> • Inflationary salary increases • Real “across-the-board” salary increases • Merit and promotion increases <p>Payroll growth: Used to amortize the UAAL in determining the UAAL contribution rate.</p>	<p>Maintain the inflationary salary increase assumption at 2.50% and maintain the real “across-the-board” salary increase assumption at 0.50%.</p> <p>Adjust the merit and promotion rates of salary increase as developed in <i>Section 3(C)</i> to reflect past experience. This includes introducing separate rates of merit and promotion salary increases for Plan A and Plan B members.</p> <p>The recommended total rates of salary increase anticipate higher increases than the current assumptions for General and about the same level of increases as the current assumptions for Safety members.</p> <p>Maintain the payroll growth assumption (combined inflationary and real “across-the-board” salary increases) at 3.00%.</p> <p>Monitor the number of active Safety members to determine if the 3.00% annual payroll growth assumption used to amortize the UAAL contribution rate would need to be reduced in future experience studies.</p>

Section 1: Introduction, Summary and Recommendations

Pg #	Actuarial Assumption Category	Recommendation
35	Mortality rates - healthy: The probability of dying at each age for non-disabled members. Mortality rates are used to anticipate life expectancies.	<p>Healthy retirees</p> <p><i>Current base table for General members:</i></p> <p>Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table with rates increased by 5% for females</p> <p><i>Recommended base table for General members:</i></p> <p>Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table with rates decreased by 5% for males and increased by 5% for females</p> <p><i>Current and recommended base table for Safety members:</i></p> <p>Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table</p> <p>Beneficiaries</p> <p><i>Current base table for all beneficiaries:</i></p> <p>Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table with rates increased by 5% for males and females</p> <p><i>Recommended base table for beneficiaries in pay status at the valuation:</i></p> <p>Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table with rates increased by 5% for males and females</p> <p><i>Recommended base table for beneficiaries not in pay status at the valuation:</i></p> <p>For the purposes of the actuarial valuation (for funding and financial reporting), when calculating the liability for the continuance to a beneficiary of a surviving member we recommend that the General Healthy Retiree mortality tables be used for beneficiary mortality both before and after the expected death of the General or Safety member.</p> <p>Pre-retirement mortality</p> <p><i>Current and recommended base table for General members:</i></p> <p>Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table with rates decreased by 5% for males</p> <p><i>Current and recommended base table for Safety members:</i></p> <p>Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table with rates decreased by 5% for males</p>

Section 1: Introduction, Summary and Recommendations

Pg #	Actuarial Assumption Category	Recommendation
		Mortality projection <i>Current projection:</i> All current tables are projected generationally with the two-dimensional mortality improvement scale MP-2020. <i>Recommended projection:</i> All recommended tables are projected generationally with the two-dimensional mortality improvement scale MP-2021 . This is the most recent projection scale, as an updated projection scale was not published in 2022 nor 2023. Mortality for member contribution rates, optional forms and reserves: Adjust the mortality rates to those developed in <i>Section 4(A)</i> for member contribution rates. A discussion of mortality rates for optional forms and reserves is also provided in <i>Section 4(A)</i> .
45	Mortality rates - disabled: The probability of dying at each age for disabled members. Mortality rates are used to project life expectancies.	Disabled retirees <i>Current and recommended base table for General members:</i> Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table with rates decreased by 5% for males and decreased by 10% for females <i>Current and recommended base table for Safety members:</i> Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table with rates decreased by 5% for females Mortality projection <i>Current projection:</i> All current tables are projected generationally with the two-dimensional mortality improvement scale MP-2020. <i>Recommended projection:</i> All recommended tables are projected generationally with the two-dimensional mortality improvement scale MP-2021 . This is the most recent projection scale, as an updated projection scale was not published in 2022 nor 2023.
49	Disability incidence rates: The probability of becoming disabled at each age.	Adjust the disability rates to those developed in <i>Section 4(C)</i> to reflect slightly lower incidence of disability overall for General and higher incidence of disability overall for Safety members. Monitor disability experience for Safety members to determine if higher assumptions are required in future experience studies.
54	Termination rates: The probability of leaving employment at each age and receiving either a refund of member contributions or a deferred vested retirement benefit.	Adjust the withdrawal and vested termination rates to those developed in <i>Section 4(D)</i> to reflect very minor adjustments to the incidence of withdrawal for General and Safety members and higher incidence of vested termination for General and Safety members.

Section 1: Introduction, Summary and Recommendations

Pg #	Actuarial Assumption Category	Recommendation
64	Retirement rates: The probability of retirement at each age at which participants are eligible to retire. Includes retirement age for deferred vested members.	<p>For active members, adjust the current retirement rates to those developed in <i>Section 4(E)</i>.</p> <p>For deferred vested members that work for a reciprocal employer, maintain the assumed retirement age at 60 for General members and 55 for Safety members.</p> <p>For deferred vested members that do not work for a reciprocal employer, maintain the assumed retirement age of 58 for General members and reduce the assumed retirement age from 52 to 51 for Safety members.</p>
74	Cashouts: Additional pay elements that are expected to be received during the member's final average earnings period.	Remove the cashout assumption for General Plan A Sonoma Valley Fire District members, and decrease the current cashout assumptions for General Plan A Court and Safety Plan A Sonoma Valley Fire District members to those developed in <i>Section (4)(F)</i> .
76	Miscellaneous assumptions including: <ul style="list-style-type: none"> • Reciprocity • Future benefit accruals • Unknown data for members • Form of payment • Percent with eligible survivor • Eligible survivor age and gender 	<p>Maintain the current proportion of future deferred vested members expected to be covered by a reciprocal system at 25% for General members and reduce the assumption from 35% to 30% for Safety members. In addition, increase the reciprocal salary increase assumption from 3.55% to 3.75% for General members and maintain the assumption at 4.00% for Safety members.</p> <p>Maintain the current future benefit accrual assumption, adjust the assumption for members with unknown gender, and maintain the form of payment assumptions as outlined in <i>Section 4(G)</i>.</p> <p>For active and deferred vested members, decrease the current percent with eligible survivor assumption from 70% to 65% for males and maintain at 55% for females. Maintain the spouse age difference assumption that male retirees are three years older than their spouses and that female retirees are two years younger than their spouses.</p>
79	Change in methodology	Implement a technical change in the calculation of an active member's entry age for use in applying the actuarial cost method.

We have estimated the impact of the recommended assumption changes (as well as the technical change) as if they were applied to the December 31, 2023 actuarial valuation. The table below provides an overview of the impact on key results, while more details can be found in *Section 5*. Note that the employer and member contribution rates for the Safety membership group will increase more than shown below, primarily due to changes in the disability assumptions. The contribution impact by membership group and plan are provided in *Section 5*.

Section 1: Introduction, Summary and Recommendations

Cost Impact of All Recommended Assumptions Based on December 31, 2023 Actuarial Valuation

Valuation Result	Total Estimated Impact
Actuarial accrued liability	Increase of \$13.8 million
Funded ratio	Decrease of 0.34%
Average employer contribution rate	Increase of 0.61% of payroll
Average member contribution rate	Increase of 0.29% of payroll

Section 2 provides some background on the basic principles and methodology used for the experience study and for the review of the economic and demographic actuarial assumptions. A detailed discussion of each assumption and reasons for the proposed changes are found in *Section 3* for the economic assumptions and *Section 4* for the demographic assumptions. The cost impact of the proposed changes is detailed in *Section 5*.

Section 2: Background and Methodology

In this report, we analyzed both economic and demographic (“non-economic”) assumptions. The primary economic assumptions reviewed are inflation, investment return, and salary increases. Demographic assumptions include the probabilities of certain events occurring in the population of members, referred to as “decrements,” e.g., termination from service, disability retirement, service retirement, and death before and after retirement. In addition to decrements, other demographic assumptions reviewed in this study include the percent of members assumed to go on to work for a reciprocal system, reciprocal salary increases, percentage of members with an eligible spouse or domestic partner, spousal age difference and cashouts.

Economic assumptions

Economic assumptions consist of:

- **Inflation:** Increases in the price of goods and services. The inflation assumption reflects the basic return that investors expect from securities markets. It also reflects the expected basic salary increase for active employees.
- **Investment return:** Expected long-term rate of return on the Association’s investments after accounting for certain investment expenses and all administrative expenses. This assumption has a significant impact on contribution rates.
- **Salary increases:** In addition to inflationary increases, it is assumed that salaries will also grow by real “across-the-board” pay increases in excess of price inflation. It is also assumed that employees will receive raises above these average increases as they advance in their careers, which are commonly referred to as merit and promotion increases. Payments to amortize any Unfunded Actuarial Accrued Liability (UAAL) are assumed to increase each year by the price inflation rate plus any real “across-the-board” pay increases that are assumed.

The setting of these economic assumptions is described in *Section 3*.

Demographic assumptions

In order to determine the probability of an event occurring, we examine the “decrements” and “exposures” of that event. For example, taking termination from service, we compare the number of employees who actually terminate in a certain age and/or service category (i.e., the number of “decrements”) with those who could have terminated (i.e., the number of “exposures”). So if there were 500 active employees in the 20-24 age group at the beginning of the year and 50 of them left during the year, we would say the probability of termination in that age group is $50 \div 500$ or 10%.

The reliability of the resulting probability is highly dependent on both the number of decrements and the number of exposures. For example, if there are only a few people in a high age category at the beginning of the year (number of exposures), we would not lend as much credibility to the probability of termination developed for that age category, especially if it is out

Section 2: Background and Methodology

of line with the pattern shown for the other age groups. Similarly, if we are considering the death decrement, there may be a large number of exposures in the age 20-24 category, but very few decrements (actual deaths); therefore, we would not be able to rely heavily on the probability developed for that category.

One reason we use several years of experience for such a study is to have more exposures and decrements, and therefore more statistical reliability. Another reason for using several years of data is to smooth out fluctuations that may occur from one year to the next. However, we also calculate the rates on a year-to-year basis to check for any trend that may be developing in the later years.

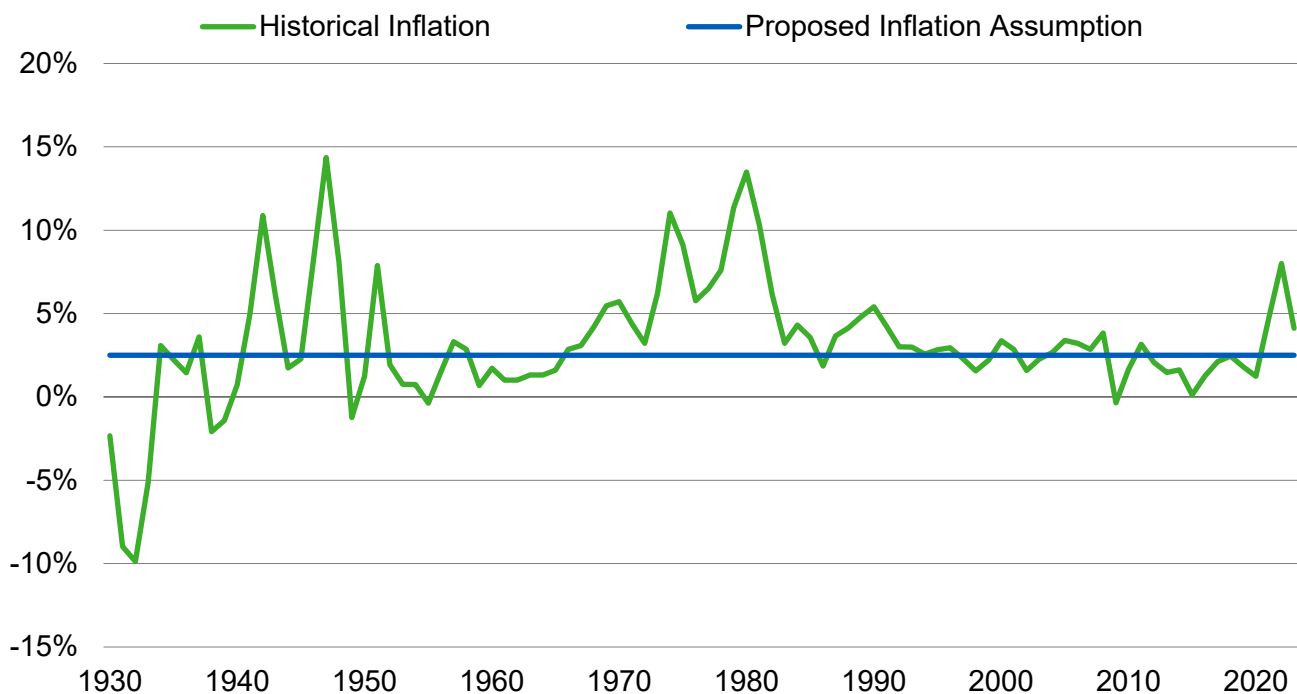
Section 3: Economic Assumptions

A. Inflation

Unless an investment grows at least as fast as prices increase, investors will experience a reduction in the inflation-adjusted value of their investment. There may be times when “riskless” investments return more or less than inflation, but over the long term, investment market forces will generally require an issuer of fixed income securities to maintain a minimum return which protects investors from inflation.

The inflation assumption is long term in nature, so our analysis begins with a review of historical information. Following is a graph showing historical inflation rates and a comparison with the inflation assumption of 2.50% that we recommend in this report.

Historical Consumer Price Index — 1930 to 2023¹
(U.S. City Average — All Urban Consumers)



There was a spike in inflation that started in the second quarter of 2021 and continued into 2022. However, the rate of inflation, while still elevated, has leveled off and started to decline since the Federal Reserve began to increase interest rates starting around the second quarter of 2022. Recently, the Federal Reserve has started to reduce interest rates as inflation has continued to fall in line with their expectations. In particular, the change in the CPI from August 2023 to August 2024 was 2.5%.

¹ Source: Bureau of Labor Statistics – Based on CPI for All Items in U.S. city average, all urban consumers, not seasonally adjusted (Series ID: CUUR0000SA0).

Section 3: Economic Assumptions

Based on information found in the Public Plans Database, which is produced in partnership with the National Association of State Retirement Administrators (NASRA), the median inflation assumption used by 176¹ large public retirement funds in their 2023 fiscal year valuations was 2.50%. In California, CalSTRS and five² 1937 Act CERL systems currently use an inflation assumption of 2.75%, the other 15 1937 Act CERL systems use an inflation assumption of 2.50%³ (including SCERA) and CalPERS uses an inflation assumption of 2.30%.

SCERA's investment consultant, Aon Hewitt (Aon), anticipates an annual inflation rate of 2.30% over a 30-year horizon, while the average inflation assumption provided by Aon and five other investment advisory firms retained by Segal's California public sector clients, as well as Segal's investment advisory division (Segal Marco Advisors),⁴ was 2.50%. Note that, in general, investment consultants use a time horizon for this assumption that is shorter than the time horizon we use for the actuarial valuation.⁵

To find a forecast of inflation based on a longer time horizon, we referred to the Social Security Administration's (SSA) 2024 report on the financial status of the Social Security program.⁶ The projected average increase in the Consumer Price Index (CPI) over the next 75 years under the intermediate cost assumptions used in that report was 2.40%. The SSA report also includes alternative projections using lower and higher inflation assumptions of 1.80% and 3.00%, respectively.

We also compared the yields on the thirty-year inflation indexed U.S. Treasury bonds to comparable traditional U.S. Treasury bonds.⁷ This "break-even rate" is commonly regarded as a market-based gauge of future inflation expectations. As of June 2024, the difference in yields is about 2.27% which provides a measure of market expectations of inflation. It is worth noting that even during the peak of the recent inflation spike this break-even rate exceeded 2.50% in only a single month, April 2022. This measure of market expectation for long-term inflation can be quite volatile, which is illustrated in the table below.

¹ Among 228 large public retirement funds, the 2023 fiscal year inflation assumption was not available for 52 of the public retirement funds in the survey data as of September 2024.

² We note that none of these five 1937 Act CERL Systems are served by Segal.

³ Eight of these 1937 Act CERL systems use a 2.50% inflation assumption with a 2.75% COLA assumption.

⁴ We note that this is the first time we have included inflation and real rate of return assumptions used by Segal Marco Advisors in our review of economic assumptions for SCERA.

⁵ The time horizon used by the six investment consultants included in our review, with the exception of one investment consultant that uses a 1-year horizon, generally ranges from 20 years to 30 years, with Aon using a 30-year horizon.

⁶ Source: "Social Security Administration: The 2024 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds."

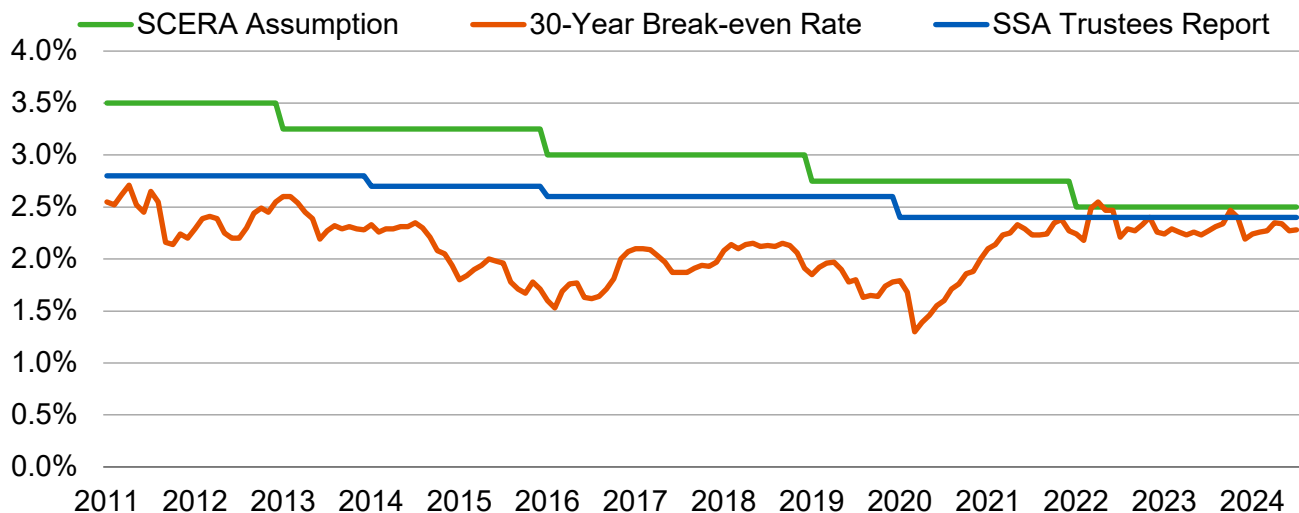
⁷ Source: Board of Governors of the Federal Reserve System.

Section 3: Economic Assumptions

Observation Month	Difference in Yields	Observation Month	Difference in Yields
January 2022	2.24%	April 2023	2.23%
February 2022	2.18%	May 2023	2.26%
March 2022	2.49%	June 2023	2.23%
April 2022	2.55%	July 2023	2.27%
May 2022	2.47%	August 2023	2.31%
June 2022	2.47%	September 2023	2.34%
July 2022	2.21%	October 2023	2.47%
August 2022	2.29%	November 2023	2.40%
September 2022	2.27%	December 2023	2.19%
October 2022	2.33%	January 2024	2.24%
November 2022	2.40%	February 2024	2.26%
December 2022	2.26%	March 2024	2.27%
January 2023	2.24%	April 2024	2.35%
February 2023	2.29%	May 2024	2.34%
March 2023	2.26%	June 2024	2.27%

The following graph shows SCERA's historical and current proposed inflation assumptions compared to the two other metrics just discussed, going back to 2011. In effect, this compares SCERA's assumption to two separate independent forecasts, one based on market observations and one developed by economists at the SSA. The graph shows that over the observed period, SCERA's assumption has been higher but consistently moving towards these other forecasts and seems to be in a stable place at this point in time.

Historical Inflation Forecasts



The setting of the inflation assumption using the information outlined above is a somewhat subjective process, and Segal does not apply a specific weight to each of the metrics in determining our recommended inflation assumption. Based on a consideration of all the above metrics, beginning in 2021 we have been recommending the same 2.50% inflation assumption in our experience studies for our California public retirement system clients.

Based on all of the above information, we recommend maintaining the annual inflation assumption at 2.50%.

Section 3: Economic Assumptions

B. Investment return

The investment return assumption is comprised of two primary components, inflation and real rate of investment return, with adjustments for certain expenses and risk.

Real rate of investment return

This component represents the portfolio's incremental investment market returns over inflation. Generally, when an investor takes on greater investment risk, the return on the investment is expected to also be greater, at least in the long run¹. This additional risk and return is expected to vary by asset class and empirical data supports that expectation. For that reason, the real rate of return assumptions are developed by asset class. Therefore, the real rate of return assumption for a retirement plan's portfolio will vary with the Board's asset allocation among asset classes.

The Association's current target asset allocation and the assumed real rate of return assumptions by asset class are shown in the following table. The first column of real rate of return assumptions are determined by reducing Aon's total or "nominal" 30-year return assumptions as of March 31, 2024 by their assumed 2.30% inflation rate. The second column of returns (except for certain asset classes as noted in the table) represents the average of a sample of real rate of return assumptions. The sample includes the expected annual real rate of return provided to us by Aon and five other investment advisory firms retained by Segal's public sector clients, as well as Segal's investment advisory division (Segal Marco Advisors). We believe these averages are a reasonable consensus forecast of long-term future market returns in excess of inflation.²

¹ However, an argument can also be made that taking on more risk in the portfolio could justify a greater risk margin in the actuarial assumption used, to help manage that risk.

² Note that, just as for the inflation assumption, in general the time horizon used by the investment consultants in determining the real rate of return assumption is generally shorter than the time horizon encompassed by the actuarial valuation.

Section 3: Economic Assumptions

SCERA'S Target Asset Allocation and Assumed Arithmetic Net Real Rate of Return Assumptions by Asset Class and for the Portfolio

Asset Class	Percentage of Portfolio	Aon's Assumed Net Real Rate of Return ¹	Average Assumed Net Real Rate of Return from a Sample of Consultants to Segal's California Public Sector Clients ²
U.S. Large-Cap Equity	16.87%	6.09%	5.75%
U.S. Small-Cap Equity	4.63%	7.95%	6.57%
Non-U.S. Developed Equity	15.39%	6.34%	6.44%
Emerging Market Equity	6.11%	7.13%	8.30%
Global Equity	16.00%	6.45%	6.57%
Core Bonds	12.00%	2.89%	2.37%
Bank Loan	3.00%	4.38%	4.50%
Real Estate	10.00%	4.67%	4.56%
Infrastructure	8.00%	6.13%	6.13% ³
Farmland	8.00%	4.39%	4.39% ³
Total	100.00%	5.63%	5.54%

Generally, the above are representative of “indexed” returns for securities that are publicly traded, returns net of fees for securities that are non-publicly traded and do not include any additional returns (“alpha”) from active management. Consideration of returns without alpha is consistent with the Actuarial Standard of Practice No. 27, Section 3.8.3.d,⁴ which states:

“Investment Manager Performance - Anticipating superior (or inferior) investment manager performance may be unduly optimistic (or pessimistic). The actuary should not assume that superior or inferior returns will be achieved, net of investment expenses, from an active investment management strategy compared to a passive investment management strategy unless the actuary believes, based on relevant supporting data, that such superior or inferior returns represent a reasonable expectation over the measurement period.”

¹ The rates shown have been estimated by Segal by taking Aon's nominal arithmetic returns and reducing by Aon's assumed 2.30% inflation rate to develop the assumed real rate of return shown. These return assumptions are net of any applicable investment management expenses.

² These are based on the projected arithmetic returns provided by Aon and five other investment advisory firms serving Segal's public sector retirement clients in California, as well as Segal's investment advisory division. These return assumptions are net of any applicable investment management expenses.

³ For these asset classes, Aon's assumption is applied in lieu of the average because there is a larger disparity in returns for these asset classes among the firms surveyed and using Aon's assumption should more closely reflect the underlying investments made specifically for SCERA.

⁴ The relevant section under the most recently revised ASOP No. 27 is Section 3.7.3 d. and will be effective January 1, 2025.

Section 3: Economic Assumptions

The following are some observations about the returns provided above:

1. The investment consultants to our California public sector clients, as well as Segal's investment advisory division, have each provided us with their expected real rates of return for each asset class, over various future periods of time. However, in general, the returns available from investment consultants are projected over time periods that are shorter than the durations of a retirement plan's liabilities.
2. As discussed in the next section, the real rates of return provided this year by the investment consultants reflect a change in how investment expenses are reported.
3. Using a sample average of expected real rate of returns allows SCERA's investment return assumption to reflect a broader range of capital market information and should help reduce year to year volatility in the investment return assumption.
4. We recommend that the 5.54% portfolio net real rate of return be used in the determination of SCERA's investment return assumption, but with some caution. This return is 0.43% higher than the 5.11% **gross** return that was used three years ago in the review of the recommended investment return assumption for the December 31, 2021 valuation. This is even before we consider the approximately 0.50% in investment management expense that, as discussed in the next section, will no longer be subtracted from this year's 5.54% net real rate of return.
5. The 0.43% increase in the portfolio real rate of return since 2021 is due to changes in the real rate of return assumptions provided to us by the investment advisory firms (+0.35% under the 2021 asset allocation), changes in SCERA's target asset allocation (+0.19%) and the interaction effect between these changes (-0.11%). We believe the increase in the real rates of return provided to us by the investment advisory firms may be in part due to the very low returns earned in the 2021-2022 plan year, as well as the increase in the federal funds rate starting in 2022 (even though recently they have started to decrease), and so should be used with caution in selecting a long-term investment return assumption.

Association expenses

For funding purposes, the real rate of return assumption for the portfolio needs to be adjusted for investment expenses expected to be paid from investment income. Current practice for SCERA also adjusts for expected administrative expenses. In prior experience studies, we adjusted the **gross** real rate of return developed using the target asset allocation by the investment expenses expected to be paid by SCERA.

However, as prevailing practice by investment advisory firms is to provide us with the real rates of return **net** of expected investment expenses, especially for active portfolio management, we now need to make adjustments only for investment consulting fees, custodian fees and other miscellaneous investment expenses excluding investment manager fees.

The following table provides these investment and administrative expenses in relation to the actuarial value of assets for the six years ending December 31, 2023.

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Investment and Administrative Expenses as a Percentage of Actuarial Value of Assets (\$ in '000s)

Year Ending December 31	Actuarial Value of Assets ¹	Investment Expenses ^{2,3}	Administrative Expenses	Investment and Administrative Expenses
2018	\$2,557,299	\$2,851	\$3,583	0.25%
2019	2,667,345	2,304	3,546	0.22%
2020	2,811,292	1,968	3,032	0.18%
2021	2,981,688	2,144	3,055	0.17%
2022	3,215,505	2,488	3,521	0.19%
2023	3,311,174	1,962	4,171	0.19%

Investment and Administrative Expenses Averages and Assumptions

Averaging Period and Assumption	Investment and Administrative Expenses
Three-year average (2021 – 2023)	0.18%
Six-year average (2018 – 2023)	0.20%
Current assumption (including investment management fees)	0.70%
Proposed assumption (excluding investment management fees)	0.20%

Based on the above experience, we recommend reducing the investment and administrative expense component of the investment return assumption from 0.70% to 0.20%.

Note related to investment expenses paid to active managers – As cited above, under Section 3.8.3.d of ASOP No. 27, the effect of an active investment management strategy should be considered “net of investment expenses...unless the actuary believes, based on relevant data, that such superior or inferior returns represent a reasonable expectation over the measurement period.”

We have not performed a detailed analysis to measure how much of the investment expenses paid to active managers might have been offset by additional returns (“alpha”) earned by that active management. For this study, we will continue to use the current approach that any “alpha” that may be identified would be treated as an increase in the risk adjustment and corresponding confidence level that are discussed in the next section. However, as discussed above, the real return assumptions provided by the investment advisory firms assume that active management will generate additional returns to cover the expense of such management, an assumption that is consistent with ASOP No. 27.

¹ As of beginning of plan year.

² Equals the sum of investment consulting fees, custodian fees and other miscellaneous investment expenses. Excludes investment manager fees.

³ Net of securities lending expenses. Because we do not assume any additional net return for this program, we effectively assume that any securities lending expenses will be offset by related income.

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Model change

The 5.54% expected real rate of return developed earlier in this report was based on expected arithmetic average returns. A retirement system using an expected arithmetic average return as the discount rate in a funding valuation is expected on average to have no surplus or asset shortfall relative to its expected obligations assuming all other actuarial assumptions are met in the future.¹ That is the basis used in Segal's previous experience studies for SCERA.

Beginning with this study, in addition to no longer including an explicit adjustment for investment management fees, we are converting the portfolio's expected arithmetic average return to an expected geometric average return. A retirement system using an expected geometric average return as the discount rate in a funding valuation will, over long periods of time, have an equal likelihood of having a surplus or asset shortfall relative to its expected obligations assuming all actuarial assumptions are met in the future.² For any given asset portfolio, the expected geometric average return will be less than the expected arithmetic average return.³

Risk adjustment

The real rate of return assumption for the portfolio is adjusted to reflect the potential risk of shortfalls in the return assumptions. SCERA's asset allocation determines this portfolio risk, since risk levels are driven by the variability of returns for the various asset classes and the correlation of returns among those asset classes. This portfolio risk is incorporated into the real rate of return assumption through a risk adjustment.

The purpose of the risk adjustment (as measured by the corresponding confidence level) is to increase the likelihood of achieving the actuarial investment return assumption in the long term.⁴ This is consistent with our experience that retirement plan fiduciaries would generally prefer that returns exceed the assumed rate more often than not.

Under either the arithmetic or geometric model, the confidence level associated with a particular risk adjustment represents a relative likelihood that future investment earnings would equal or exceed the assumed earnings over a 15-year period. The 15-year time horizon represents an approximation of the "duration" of the fund's liabilities, where the duration of a liability represents the sensitivity of that liability to interest rate variations.

For comparison purposes we first consider how the model used in previous experience studies for SCERA would look if used in this year's study. Three years ago, the Board adopted an investment return assumption of 6.75%. Under the model used in that experience study, that return implied a risk adjustment of 0.16%, corresponding to a 15-year confidence level of 52%, based on an annual portfolio return standard deviation of 12.44% provided by Aon in 2021.

If we use the same 52% 15-year confidence level from our last study to set this year's risk adjustment, along with the same methodology, and the current annual portfolio return standard deviation of 11.49% provided by Aon, the corresponding risk adjustment would be 0.15% (the

¹ The mathematical terminology for this is that the mean (or average) surplus or asset shortfall is expected to be zero.

² The mathematical terminology for this is that over time the median surplus or asset shortfall is expected to be zero.

³ This is because the expected geometric average return reflects expected median outcomes, while the expected arithmetic average return reflects expected average or mean outcomes. Expected median outcomes are lower than expected average outcomes because they are less affected by the possibility of extraordinary ("outlier") favorable outcomes.

⁴ This type of risk adjustment is referred to in the Actuarial Standards of Practice as a "margin for adverse deviation."

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slightly lower standard deviation allows for a slightly lower risk adjustment). Together with the other investment return components (including for this comparison updated expected arithmetic average returns and the same expense adjustment as used in the prior study), this would result in an investment return assumption of 7.19%, which is higher than the current assumption of 6.75%. This result leaves room for a potentially larger risk adjustment and confidence level in this year's study.

Based on the general practice of using one-quarter percentage point increments for economic assumptions, we evaluated the effect on the confidence level of other alternative investment return assumptions. We also considered that, as discussed above, the increase in the real rates of return provided by the investment consultants may reflect the very low returns earned in the 2021-2022 plan year, as well as the increase in the federal funds rate starting in 2022 (even though recently they have started to decrease), and so could be overly optimistic for use in selecting a long-term investment return assumption. For that reason, for this comparison value we evaluated a net investment return assumption of 6.75% which, together with the other investment return components, would produce a risk adjustment of 0.59% which corresponds to a confidence level of 57% under the model and expense adjustment used in prior studies. We believe this increase in confidence level is appropriate given the concerns stated.

As noted above, beginning with this study, in addition to no longer including an explicit adjustment for investment management fees, we are converting the portfolio's expected arithmetic average return to an expected geometric average return. For any given asset portfolio, the expected geometric average return will be less than the expected arithmetic average return. The difference depends on the variability of the portfolio as measured by its standard deviation. The annual portfolio standard deviation provided by Aon is 11.94%, which produces a conversion factor to the expected return of 0.67%. This results in an expected geometric average real return of 4.87% (the expected arithmetic average real return of 5.54% reduced by 0.67%).

Together with the other investment return components (now excluding investment management expenses) and **prior to any risk adjustment**, this would result in a median expected (or geometric average return) assumption of 7.17%, which is higher than the current assumption of 6.75%. In applying this model to SCERA for the first time, we again evaluated a net investment return assumption of 6.75% which, together with the other investment return components, would produce a risk adjustment of 0.42% and a corresponding confidence level of 55%.

Recommended investment return assumption

The following table summarizes the components of the recommended investment return assumption developed in the previous discussion. For comparison purposes, we have also included similar values from the last study as well as the comparison values discussed above that apply the prior study's model to this year's information.

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Assumption Component	December 31, 2024 Recommended ¹ Value	December 31, 2024 Comparison ² Values	December 31, 2021 Adopted ² Value
Inflation	2.50%	2.50%	2.50%
Portfolio expected arithmetic real rate of return	5.54%	5.54%	5.11%
Adjustment to expected geometric real rate of return	(0.67)%	N/A	N/A
Expense adjustment	(0.20)%	(0.70)% ³	(0.70)%
Risk adjustment	(0.42)%	(0.59)%	(0.16)%
Total	6.75%	6.75%	6.75%
Confidence level	55%	57%	52%

Based on this analysis, we recommend maintaining the investment return assumption at 6.75% per annum.

The table below shows SCERA's recommended investment return assumption and the corresponding risk adjustment and confidence level compared to the similar values for prior studies.

Historical Investment Return Assumptions, Risk Adjustments and Confidence Levels based on Assumptions Adopted by the Board

Years Ending December 31	Investment Return	Risk Adjustment	Corresponding Confidence Level
2010 - 2011	7.75%	0.41%	54%
2012 - 2014	7.50%	0.13%	51%
2015 - 2017	7.25%	0.12%	51%
2018 - 2020	7.00%	0.28%	53%
2021 - 2023	6.75%	0.16%	52%
2024 (Comparison)	6.75%	0.59%	57%
2024 (Recommended)	6.75%	0.42%	55%

As we have discussed in prior experience studies, the risk adjustment model and associated confidence level is most useful as a means for comparing how SCERA has positioned itself relative to risk over periods of time.⁴ The use of either a 57% or 55% confidence level should be considered in context with other factors, including:

- As noted above, the confidence level is more of a relative measure than an absolute measure, and so can be reevaluated and reset for future comparisons. This is particularly true

¹ Based on expected geometric average returns.

² Based on expected arithmetic average returns.

³ For purposes of these comparison values, we have assumed the same investment expenses as in the previous study, which included investment management fees.

⁴ In particular, it would not be appropriate to use this type of risk adjustment as a measure of determining an investment return rate that is "risk-free."

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when comparing confidence levels developed using different models, as we are doing in this transitional year from one model to another.

- The confidence level is based on the standard deviation of the portfolio that is determined and provided to us by Aon. The standard deviation is a statistical measure of the future volatility of the portfolio and so is itself based on assumptions about future portfolio volatility and can be considered somewhat of a “soft” number.
- We have not taken into account any additional returns (“alpha”) that might be earned on active management. This means that if active management generates enough alpha to cover its related expenses, this would increase returns. This aspect of Segal’s model is further evaluated below.
- As with any model, the results of the risk adjustment model should be evaluated for reasonableness and consistency. This is discussed in the later section on “Comparing with other public retirement systems”.

Comparison with alternative model used to review investment return assumption

In previous studies, we have consistently reviewed investment return assumptions based on our old model that incorporates expected arithmetic real returns for the different asset classes and for the entire portfolio as one component of that model.¹ The use of “forward looking expected arithmetic returns” is one of the approaches discussed for use in the Selection of Economic Assumptions for measuring Pension Obligations under Actuarial Standards of Practice (ASOP) No. 27.

Besides using forward looking expected arithmetic returns, ASOP No. 27 also discusses setting investment return assumptions using an alternative “forward looking expected geometric returns” approach, which is the model we have used in this study.² Even though as noted earlier expected geometric returns are lower than expected arithmetic returns, public retirement systems that have set investment return assumptions using this geometric approach have in practice adopted investment return assumptions that are comparable to those adopted by the Board for SCERA under the arithmetic approach. This is because under the model used by those retirement systems and by Segal in this report, the investment return assumption is **not** reduced to anticipate future investment management expenses. However, for SCERA, these two changes do not completely offset each other because the future investment management expenses are relatively low, while the standard deviation used to convert from an expected arithmetic return to a median geometric return is relatively high. That is why, as shown earlier, the same 6.75% assumption does not have the same confidence level under the two models (comparison values and recommended value).

In the interest of still having an alternative model for comparison, we evaluated the recommended 6.75% assumption based on the expected geometric return for the entire portfolio gross of investment management expenses, but using a fully stochastic approach and

¹ Again, as discussed earlier in this section, if a retirement system uses the expected arithmetic average return as the discount rate in the funding valuation, that retirement system is expected to have no surplus or asset shortfall relative to its expected obligations assuming all actuarial assumptions are met in the future.

² As also noted earlier in slightly different terms, if a retirement system uses the expected geometric average return as the discount rate in the funding valuation, that retirement system is expected to have an asset value that generally converges to the median accumulated value as the time horizon lengthens assuming all actuarial assumptions are met in the future.

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a different source for capital market assumptions. Under this alternative model, over a 15-year period, there is a 57% likelihood that future average geometric returns will meet or exceed 6.75%¹ developed using the capital market assumptions compiled by Horizon Actuarial Services based on their most recent survey published in August 2024. This 57% likelihood of achieving a 6.75% return is slightly lower than the corresponding likelihood of 58% (for achieving a 6.75% return) that we observed in this comparison during the assumption review in 2021.

Comparing with other public retirement systems

One final test of the recommended investment return assumption is to compare it against those used by other public retirement systems, both in California and nationwide.

We note that an investment return of 6.75% or lower is becoming more common among California public sector retirement systems. Of the twenty 1937 Act CERL systems, one uses a 7.25% investment assumption, six use 7.00%, nine use 6.75%, three use 6.50%, and one uses 6.25%. Furthermore, CalSTRS currently uses a 7.00% investment return assumption and CalPERS uses a 6.80% investment return assumption, while the San Jose and San Diego City retirement systems use investment return assumptions of 6.625% and 6.50%, respectively.

The following table compares SCERA's recommended investment return assumption against those of the 207² large public retirement funds in their 2023 fiscal year valuations based on information found in the Public Plans Database, which is produced in partnership with NASRA:

**SCERA's Investment Return vs.
Public Plans Database³ Investment Return Assumptions**

Assumption	SCERA	Public Plan Data Low	Public Plan Data Median	Public Plan Data High
Net investment return	6.75%	4.31%	7.00%	8.25%

The detailed survey results show that over 80% of the systems have an investment return assumption in the range of 6.75% to 7.50%. Also, over half of the systems have reduced their investment return assumption from 2017 to 2023. State systems outside of California tend to change their economic assumptions less frequently and so may lag behind emerging practices in this area.

Other considerations

It should be noted that the 6.75% recommended investment return assumption has been developed without taking into account the impact of any future action that may be taken by the Board to provide any ad-hoc COLA benefits using excess earnings. If such ad-hoc COLA benefits were to be provided in the future, we are available to assist the Board in studying the

¹ We performed this stochastic simulation using the capital market assumptions included in the 2024 survey prepared by Horizon Actuarial Services. That simulation was performed using 10,000 trial outcomes of future market returns, using assumptions from 20-year arithmetic returns, standard deviations and correlation matrix that were found in the 2024 survey that included responses from 26 investment advisors.

² Among 228 large public retirement funds, the 2023 fiscal year investment return assumption was not available for 11 of the public retirement funds in the Public Plans Database as of September 2024.

³ Public Plans Data website – Produced in partnership with the National Association of State Retirement Administrators (NASRA).

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impact of those actions on the investment return assumption using other models (such as additional stochastic projections).

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C. Salary increases

Salary increases impact plan costs in two ways:

1. Increasing members' benefits (since benefits are a function of the members' highest average pay) and future normal cost collections; and
2. Increasing total active member payroll which in turn generates lower UAAL contribution rates as a percent of payroll.

These two impacts are discussed separately below.

As an employee progresses through his or her career, increases in pay are expected to come from three sources:

1. **Inflation:** Unless pay grows at least as fast as consumer prices grow, employees will experience a reduction in their standard of living. There may be times when pay increases lag or exceed inflation, but over the long term, labor market forces may require an employer to maintain its employees' standards of living.

As discussed earlier in this report, we recommend maintaining the annual inflation assumption at 2.50%. This inflation component is used as part of the salary increase assumption.

2. **Real “across-the-board” pay increases:** These increases are typically termed productivity increases since they are considered to be derived from the ability of an organization or an economy to produce goods and services in a more efficient manner. As that occurs, at least some portion of the value of these improvements can provide a source for pay increases. These increases are typically assumed to extend to all employees “across the board.” The State and Local Government Workers Employment Cost Index produced by the Department of Labor provides evidence that real “across-the-board” pay increases have averaged about 0.0% – 0.3% annually during the last ten to twenty years.

We also referred to the annual report on the financial status of the Social Security program published in May 2024. In that report, real “across-the-board” pay increases are forecast to be 1.14% per year under the intermediate assumptions.

The real pay increase assumption is generally considered a more “macroeconomic” assumption that is not necessarily based on individual plan experience. However, recent salary experience with public systems in California as well as anecdotal discussions with plans and plan sponsors indicate lower future real wage growth expectations for public sector employees. We note that for SCERA's active members, the actual average inflation plus “across-the-board” increase (i.e., wage inflation) over the three-year period ending December 31, 2023 was 3.23%, which is lower than the change in CPI of 4.16% during that same period, largely as a result of the inflation spike previously discussed.

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Valuation Date	Actual Average Wage Inflation ¹	Actual Annual-to-Annual Change in CPI ²
December 31, 2019	(0.43%)	3.31%
December 31, 2020	4.74%	1.72%
December 31, 2021	2.53%	3.21%
December 31, 2022	2.69%	5.60%
December 31, 2023	4.46%	3.67%
Five-year average	2.80%	3.50%

Based on all of the above information, we recommend maintaining the real “across-the-board” salary increase assumption at 0.50%. This means that the combined inflation and “across-the-board” salary increase assumption will remain at 3.00%.

3. **Merit and promotion increases:** As the name implies, these increases come from an employee’s career advancement. This form of pay increase differs from the previous two, since it is specific to the individual. For SCERA, we continue to recommend service-specific merit and promotion increase assumptions.

The annual merit and promotion increases are determined by measuring the actual increases received by members over the experience period, net of the inflationary and real “across-the-board” pay increases. This is accomplished by:

- Measuring each continuing member’s actual salary increase over each year of the experience period on a salary-weighted basis, with higher weights assigned to experience from members with larger salaries;
- Excluding any members with increases of more than 50% or decreases of more than 10% during any particular year;
- Categorizing these increases into groups by years of service;
- Removing the wage inflation component from these increases (assumed to be equal to the increase in the members’ average salary during the year, calculated separately for General and Safety members);
- Averaging these annual increases over the experience period; and
- Modifying current assumptions to reflect some portion of these measured increases reflective of their “credibility.”

To be consistent with the other economic assumptions, these merit and promotion assumptions should be used in combination with the total 3.00% assumed inflation and real “across-the-board” increases recommended in this study.

Merit and promotion increases are measured separately for General and Safety members. Note that beginning with this experience study, we are also recommending separate merit and promotion increase assumptions for Plan A and Plan B members.

Due to the high variability of the actual salary increases, we have analyzed this assumption using data for the past six years. We believe that when the experience from the current and

¹ Reflects the increase in average salary for members at the beginning of the year versus those at the end of the year. It does not reflect the average salary increases received by members who worked the full year.

² Based on the change in the Annual CPI index for the San Francisco-Oakland-Hayward Area compared to the prior year.

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prior study is combined, it provides a more reasonable representation of potential future merit and promotion salary increases over the long term.

The following table shows the General Plan A members' actual average merit and promotion increases by years of service over the three-year period from January 1, 2021 through December 31, 2023. As mentioned above, we have also included the actual average increases based on the past six years (January 1, 2018 through December 31, 2023) for General Plan A and Plan B members. These actual increases were reduced by the actual average inflation plus "across-the-board" increase (i.e., wage inflation, estimated as the increase in average salaries) for each year during the experience period (3.22% on average for the most recent three-year period and 3.06% for the most recent six-year period). The current and proposed assumptions are also shown.

General Plan A — Merit and Promotion Salary Increase Rates

Years of Service	Current Assumption	Actual Average (Last 3 Years: Plan A)	Actual Average (Last 6 Years: Plan A & Plan B)	Proposed Assumption
Less than 1	5.00%	3.74%	3.74%	5.00%
1 – 2	5.50%	10.36%	5.91%	5.50%
2 – 3	4.50%	7.46%	4.66%	4.50%
3 – 4	3.50%	N/A	3.69%	3.50%
4 – 5	2.50%	2.04%	2.69%	2.50%
5 – 6	2.00%	1.15%	2.09%	2.00%
6 – 7	1.50%	3.21%	1.96%	1.50%
7 – 8	1.25%	2.13%	1.63%	1.75%
8 – 9	1.25%	1.94%	2.08%	1.70%
9 – 10	1.25%	2.01%	1.79%	1.60%
10 – 11	1.00%	1.54%	1.42%	1.40%
11 – 12	1.00%	1.80%	1.38%	1.35%
12 – 13	0.75%	1.89%	1.45%	1.30%
13 – 14	0.75%	1.69%	1.30%	1.25%
14 – 15	0.75%	2.06%	1.30%	1.15%
15 and over	0.55%	1.43%	0.96%	0.75%

For General Plan A members with less than seven years of service, we recommend no changes to the current merit and promotion salary increases. This is because at those years of service, there is relatively limited experience available for General Plan A members since most of the members with fewer than seven years of service have entered Plan B. For General Plan A members with more than seven years of service, we recommend the above adjustments to the merit and promotion salary increases, based on General Plan A and Plan B experience.

The following table shows similar information for General Plan B members, with the exception that the actual average merit and promotion increases by years of service over the three-year period from January 1, 2021 through December 31, 2023 are shown for Plan B only.

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General Plan B — Merit and Promotion Salary Increase Rates

Years of Service	Current Assumption	Actual Average (Last 3 Years: Plan B)	Actual Average (Last 6 Years: Plan A & Plan B)	Proposed Assumption
Less than 1	5.00%	3.99%	3.74%	4.25%
1 – 2	5.50%	5.95%	5.91%	5.75%
2 – 3	4.50%	4.88%	4.66%	4.75%
3 – 4	3.50%	4.11%	3.69%	4.00%
4 – 5	2.50%	3.10%	2.69%	3.00%
5 – 6	2.00%	2.19%	2.09%	2.00%
6 – 7	1.50%	2.12%	1.96%	2.00%
7 – 8	1.25%	1.76%	1.63%	1.75%
8 – 9	1.25%	2.47%	2.08%	1.70%
9 – 10	1.25%	2.03%	1.79%	1.60%
10 – 11	1.00%	1.15%	1.42%	1.40%
11 – 12	1.00%	0.47%	1.38%	1.35%
12 – 13	0.75%	3.24%	1.45%	1.30%
13 – 14	0.75%	3.07%	1.30%	1.25%
14 – 15	0.75%	1.50%	1.30%	1.15%
15 and over	0.55%	(1.18%)	0.96%	0.75%

For General Plan B members with less than seven years of service, we recommend the above adjustments to the merit and promotion salary increases, based on Plan B experience only. As mentioned above, for members with more than seven years of service, the recommended assumptions are based on the combined experience for General Plan A and Plan B members.

The following table shows the Safety Plan A members' actual average merit and promotion increases by years of service over the three-year period from January 1, 2021 through December 31, 2023. As mentioned above, we have also included the actual average increases based on the past six years (January 1, 2018 through December 31, 2023) for Safety Plan A and Plan B members. These actual increases were reduced by the actual average inflation plus "across-the-board" increase (i.e., wage inflation, estimated as the increase in average salaries) for each year during the experience period (4.05% on average for the most recent three-year period and 3.62% for the most recent six-year period). The current and proposed assumptions are also shown.

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Safety Plan A — Merit and Promotion Salary Increase Rates

Years of Service	Current Assumption	Actual Average (Last 3 Years: Plan A)	Actual Average (Last 6 Years: Plan A & Plan B)	Proposed Assumption
Less than 1	7.50%	(0.10%)	5.82%	7.50%
1 – 2	7.50%	5.05%	7.38%	7.50%
2 – 3	5.00%	2.58%	4.46%	5.00%
3 – 4	4.50%	1.59%	3.61%	4.50%
4 – 5	3.50%	1.42%	2.93%	3.50%
5 – 6	1.75%	0.79%	2.15%	1.75%
6 – 7	1.50%	3.18%	2.14%	1.50%
7 – 8	1.25%	0.03%	1.17%	1.75%
8 – 9	1.25%	(0.16%)	1.54%	1.75%
9 – 10	1.25%	2.35%	1.93%	1.75%
10 – 11	1.25%	1.60%	1.00%	1.55%
11 – 12	1.25%	0.63%	1.15%	1.25%
12 – 13	1.25%	0.05%	1.00%	1.25%
13 – 14	1.00%	0.60%	0.76%	1.00%
14 – 15	1.00%	0.76%	1.05%	1.00%
15 and over	1.00%	1.03%	1.08%	1.00%

For Safety Plan A members with less than seven years of service, we recommend no changes to the current merit and promotion salary increases. This is because at those years of service, there is relatively limited experience available for Safety Plan A members since most of the members with fewer than seven years of service have entered Plan B. For Safety Plan A members with more than seven years of service, we recommend the above adjustments to the merit and promotion salary increases, based on Safety Plan A and Plan B experience.

The following table shows similar information for Safety Plan B members, with the exception that the actual average merit and promotion increases by years of service over the three-year period from January 1, 2021 through December 31, 2023 are shown for Plan B only.

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Safety Plan B — Merit and Promotion Salary Increase Rates

Years of Service	Current Assumption	Actual Average (Last 3 Years: Plan B)	Actual Average (Last 6 Years: Plan A & Plan B)	Proposed Assumption
Less than 1	7.50%	6.93%	5.82%	7.00%
1 – 2	7.50%	7.06%	7.38%	7.50%
2 – 3	5.00%	3.84%	4.46%	4.75%
3 – 4	4.50%	3.39%	3.61%	4.25%
4 – 5	3.50%	2.47%	2.93%	3.25%
5 – 6	1.75%	1.98%	2.15%	2.00%
6 – 7	1.50%	2.17%	2.14%	1.75%
7 – 8	1.25%	1.21%	1.17%	1.75%
8 – 9	1.25%	2.52%	1.54%	1.75%
9 – 10	1.25%	2.79%	1.93%	1.75%
10 – 11	1.25%	0.19%	1.00%	1.55%
11 – 12	1.25%	5.09%	1.15%	1.25%
12 – 13	1.25%	5.05%	1.00%	1.25%
13 – 14	1.00%	N/A	0.76%	1.00%
14 – 15	1.00%	N/A	1.05%	1.00%
15 and over	1.00%	N/A	1.08%	1.00%

For Safety Plan B members with less than seven years of service, we recommend the above adjustments to the merit and promotion salary increases, based on Plan B experience only. As mentioned above, for members with more than seven years of service, the recommended assumptions are based on the combined experience for Safety Plan A and Plan B members.

Based on this experience, we are proposing increases in the merit and promotion salary increases for General members and about the same merit and promotion salary increases for Safety members in service categories greater than seven. For General Plan B members, we are proposing an overall increase in the service categories less than seven, while for Safety Plan B members we are proposing an overall decrease in the service categories less than seven.

Chart 1 on page 31 compares the actual merit and promotion increase experience for General Plan A members with the current and proposed assumptions.

Chart 2 on page 31 compares the actual merit and promotion increase experience for General Plan B members with the current and proposed assumptions.

Chart 3 on page 32 compares the actual merit and promotion increase experience for Safety Plan A members with the current and proposed assumptions.

Chart 4 on page 32 compares the actual merit and promotion increase experience for Safety Plan B members with the current and proposed assumptions.

Section 3: Economic Assumptions

Chart 1: Merit and Promotion Salary Increase Rates
General Plan A Members

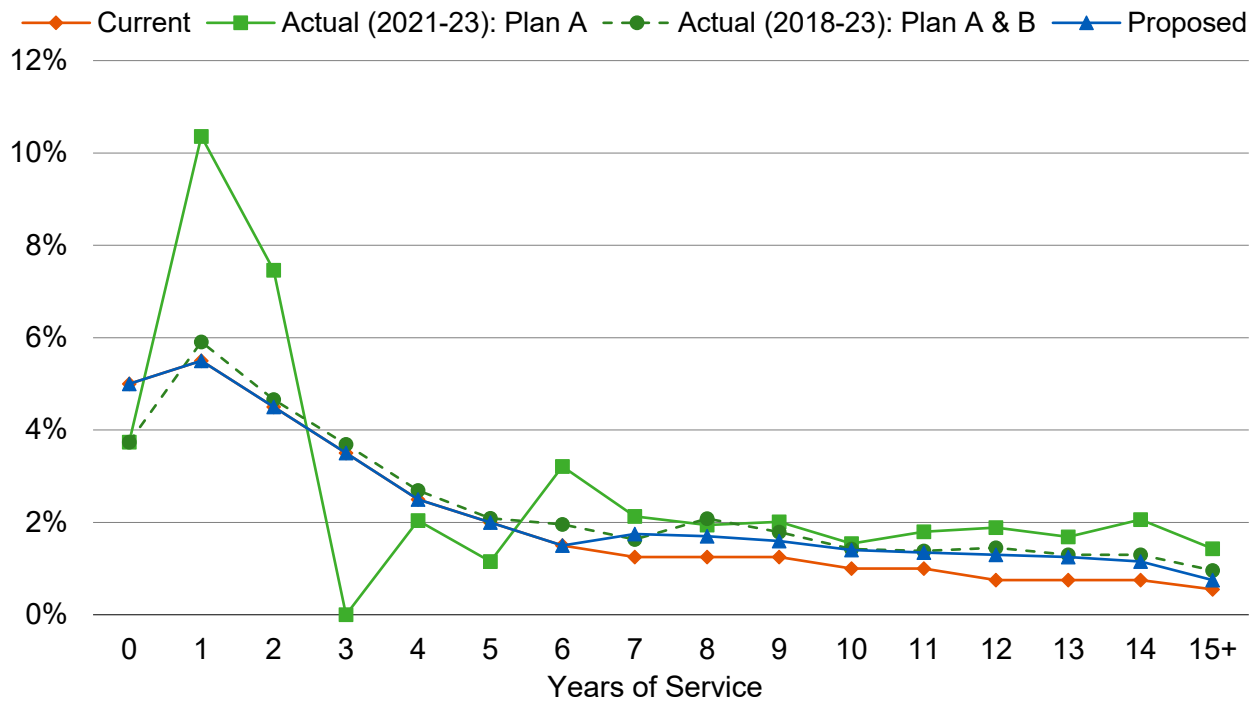
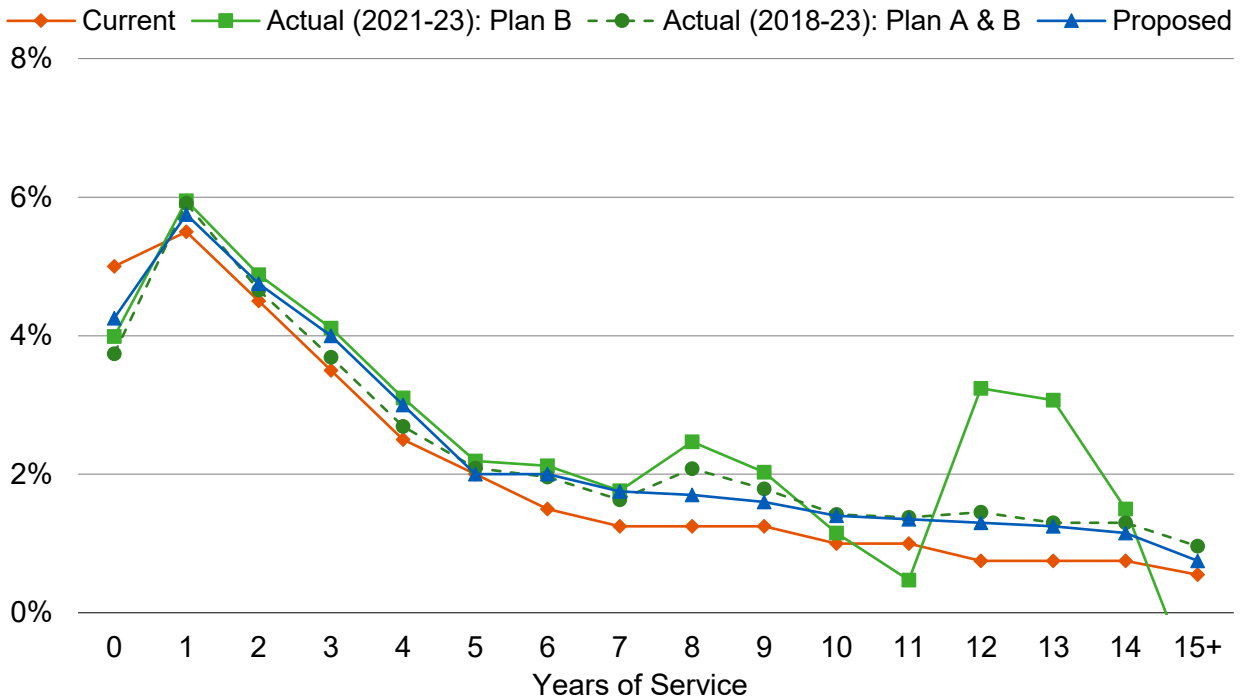


Chart 2: Merit and Promotion Salary Increase Rates
General Plan B Members



Section 3: Economic Assumptions

Chart 3: Merit and Promotion Salary Increase Rates
Safety Plan A Members

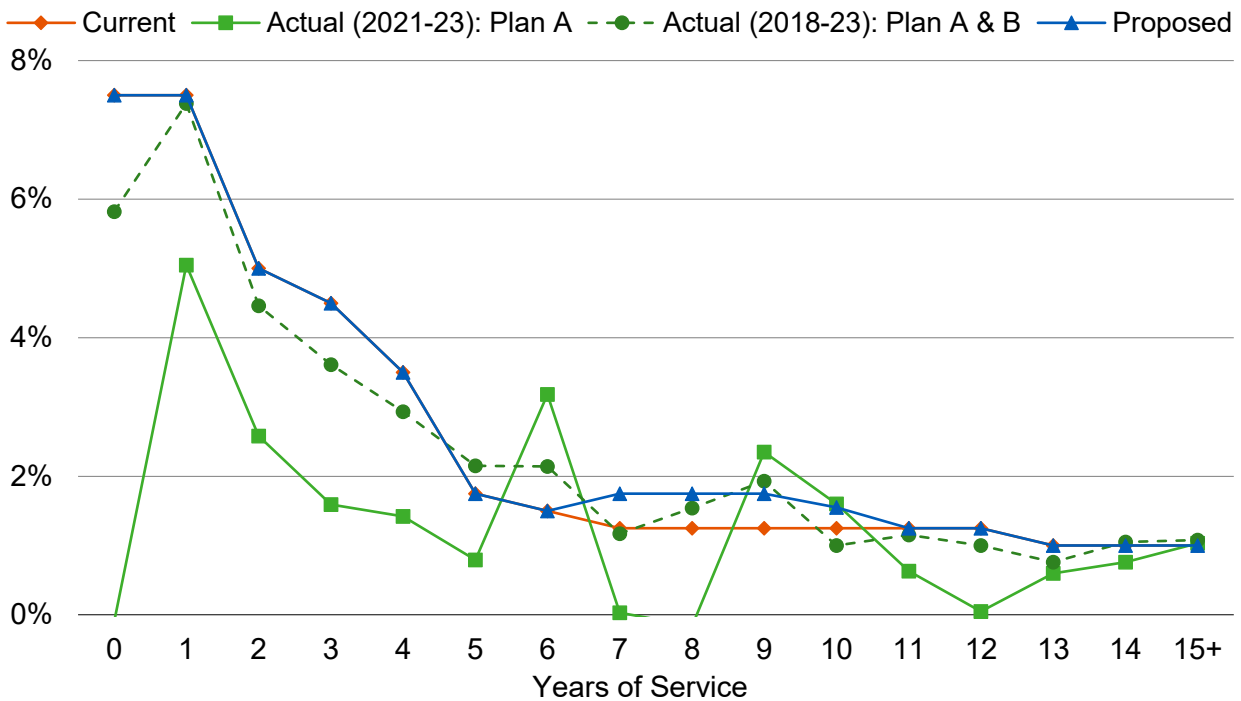
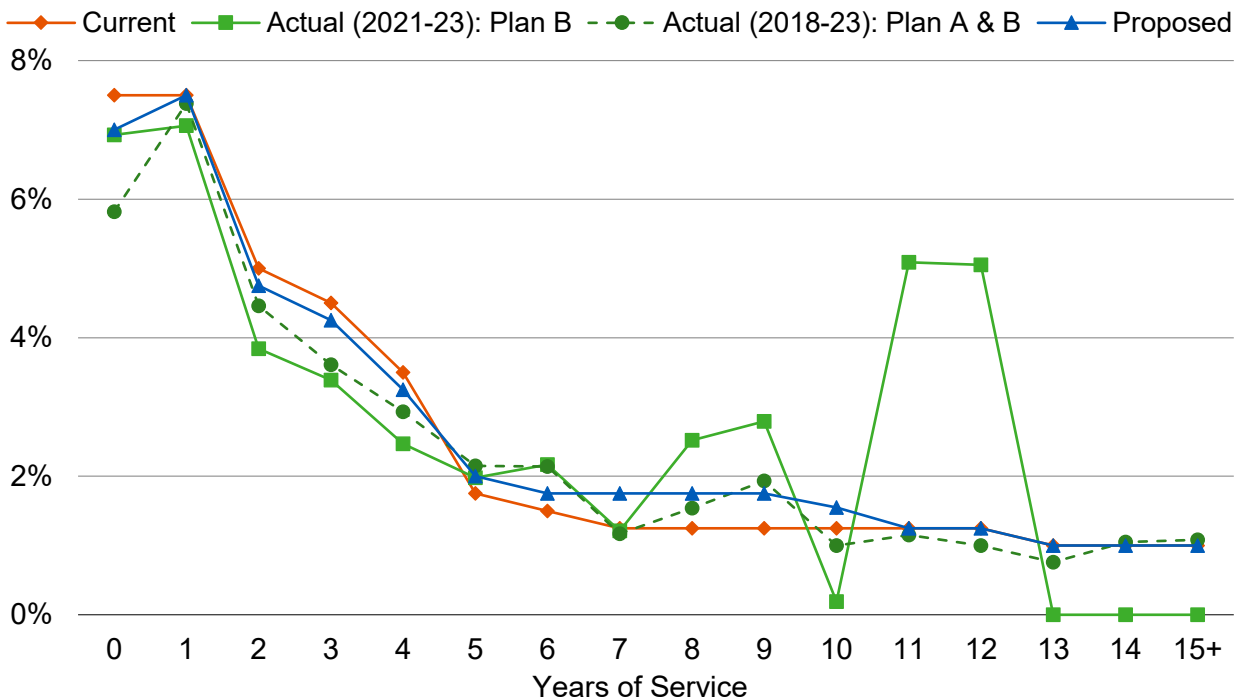


Chart 4: Merit and Promotion Salary Increase Rates
Safety Plan B Members



Section 3: Economic Assumptions

Active member payroll

Projected active member payrolls are used to develop the UAAL contribution rate. Future values are determined as a product of the number of employees in the workforce and the average pay for all employees. The average pay for all employees increases only by inflation and real “across-the-board” pay increases. The merit and promotion increases are not included, because this average pay is not specific to an individual.

Under the Board’s current practice, the UAAL contribution rate is developed by assuming that the number of active members will remain about the same, so that the total payroll for all active members will increase annually over the amortization periods at the same assumed rates of inflation plus real “across-the-board” salary increase assumptions as are used to project the members’ future benefits. Note again that this does not include the assumed merit and promotion increases, because longer service members are assumed to be replaced by new members.

As part of reviewing the current practice, we have summarized in the table below how the number of active members and total payroll has changed since over the last six valuations.

Active Members and Total Payroll

Year Ending December 31	Number of Active Members	Total Payroll (\$ in ‘000s)
2018	4,021	\$359,491
2019	4,040	359,633
2020	4,090	381,337
2021	4,066	388,704
2022	4,103	402,780
2023	4,242	434,986
Average Annual Increase	1.08%	3.89%

While there was an average 1.08% annual increase in the total number of active members, the annual increase in General membership was 1.59% while the annual **decrease** in Safety membership was 1.45%. We understand from discussions with SCERA that the reduction in Safety membership was due to difficulty in recruitment and retention and was not a structural change. We will continue to monitor the Safety membership in future experience studies.

The average annual rate of increase in payroll during the above period was 3.89% before accounting for the 1.08% growth in the total active workforce (and 2.78% after netting out the impact due to the growth in the active workforce). We note that the average annual rate of increase in payroll is also affected by the number of Plan B members who have reached the limit on pensionable compensation imposed by PEPR. This is because everything else being equal, after those members reach the pensionable compensation limit, their salaries as applied in the computation of the total payroll would only increase by inflation (and no across-the-board salary increase). However, in the case of SCERA, the proportion of members who have reached the limit was relatively small as of December 31, 2023 (less than 4%).

Section 3: Economic Assumptions

After considering the above factors and experience, we recommend maintaining the payroll growth assumption at 3.00% annually (consistent with the combined recommended inflation and real “across-the-board” salary increase assumptions).

Section 4: Demographic Assumptions

A. Mortality rates - healthy

The “healthy” mortality rates project the life expectancy of a member who retires from service (i.e., who did not retire on a disability pension). Also, the “healthy” pre-retirement (employee) mortality rates project what proportion of members will live to retirement.

The Public Retirement Plans Mortality tables (Pub-2010) were published by the Retirement Plans Experience Committee (RPEC) of the SOA in 2019. These were the first published mortality tables based exclusively on public sector pension plan experience in the United States. Within the Pub-2010 family of mortality tables, there are separate tables by job categories of General, Safety and Teachers. Included with the mortality tables is the analysis prepared by RPEC that continues to observe that benefit amount for healthy retirees and salary for employees are the most significant predictors of mortality differences within the job categories. Therefore, Pub-2010 includes mortality rates developed on an “amount-weighted” basis, with higher credibility assigned to experience from annuitants and employees receiving larger benefits and salaries, respectively.

A generational mortality table provides dynamic projections of mortality experience for each cohort of retirees. For example, the mortality rate for someone who is 65 next year will be slightly less than for someone who is 65 this year. In general, using generational mortality anticipates increases in the cost of the plan over time as participants’ life expectancies are projected to increase and is now the established practice within the actuarial profession.

Periodically¹ RPEC publishes updates to their mortality improvement scales. The two-dimensional mortality improvement scale MP-2021 is the latest improvement scale available as of the date of this report.

We continue to recommend using the “amount-weighted” above-median version of the Pub-2010 mortality tables (adjusted for SCERA experience as discussed herein).

We also continue to recommend that the mortality improvement scale be adopted and applied generationally where each future year has its own mortality table that reflects the forecasted improvements. We recommend that the MP-2021 mortality improvement scale be used.

In order to reflect more SCERA experience in our analysis of the mortality assumption, we have used experience over a fifteen-year period by using data from the current experience study period (from January 1, 2021 through December 31, 2023) and the last four experience study

¹ We understand that RPEC generally publishes an update to their mortality improvement scale annually based on the newest mortality data available. However, the mortality data observed during 2020 (which would have been the newest data available to develop a mortality improvement scale for 2022) was severely impacted by the COVID-19 pandemic and RPEC elected to not release a new mortality improvement scale for 2022 that would have incorporated the substantially higher rate of mortality experience from 2020. Therefore, the MP-2021 remains the most recent mortality improvement scale published.

Section 4: Demographic Assumptions

periods (from January 1, 2018 through December 31, 2020; from January 1, 2015 through December 31, 2017; from January 1, 2012 through December 31, 2014; and from January 1, 2009 through December 30, 2011).

In 2008 the SOA published an article recommending that mortality assumptions include an adjustment for credibility. Under this approach, the number of deaths needed for full credibility for a headcount-weighted mortality table is just over 1,000,¹ where full credibility means a 90% confidence that the actual experience will be within 5% of the expected value. For SCERA, the number of deaths varies for each cohort and varies from 0 deaths for Safety active females to 570 deaths for General healthy retiree females over the 15-year period studied. In our recommended assumptions, we have adjusted the Pub-2010 mortality tables to fit SCERA's experience based on the partial credibility for each cohort.

Post-retirement mortality (service retirements)

The current mortality tables used for post-retirement mortality are as follows:

- **General members:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2020.
- **Safety members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2020.

The following table shows the observed benefit weighted deaths for healthy retired members based on the actual experience during the 15 years studied. Also shown are the expected benefit weighted deaths under the current and proposed assumptions. This information is shown separately by gender. As shown in the table below, the proposed mortality tables have an actual to expected ratio of 99% and 90% for General and Safety, respectively, after adjustments for partial credibility. In future years the ratios should remain around 99% and 90% for General and Safety, respectively, as long as actual mortality improves at the same rates as anticipated by the generational mortality tables.

As discussed, we continue to recommend the use of a generational mortality table, which incorporates a more explicit assumption for future mortality improvement. Accordingly, the goal is to start with a mortality table that closely matches the current experience (without a margin for future mortality improvement), and then reflect mortality improvement by projecting lower mortality rates in future years.

¹ The number of deaths needed for full credibility for an "amount" weighted mortality table is generally higher and based on the dispersion of the benefit amount for a given retiree group.

Section 4: Demographic Assumptions

Healthy Retiree Mortality Experience – Benefit Weighted (\$ in millions)

Gender	General Current Expected Weighted Deaths	General Actual Weighted Deaths	General Proposed Expected Weighted Deaths	Safety Current Expected Weighted Deaths	Safety Actual Weighted Deaths	Safety Proposed Expected Weighted Deaths
Male	\$12.25	\$11.47	\$11.60	\$2.72	\$2.44	\$2.71
Female	10.95	10.87	10.89	0.43	0.38	0.43
Total	\$23.20	\$22.34	\$22.49	\$3.15	\$2.82	\$3.14
Actual / Expected	96%		99%¹	90%		90%

Notes:

1. Experience shown above is weighted by annual benefit amounts for deceased members.
2. Expected amounts under the current and proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the year the death occurred (or was expected to occur).
3. Results may not add due to rounding.

Based on standard statistical theory, the data used in our analysis is only partially credible under the recommended “amount-weighted” basis when dispersion of retirees’ benefit amounts is considered, particularly for the Safety cost groups. Therefore, the proposed mortality tables reflect only a partial adjustment for actual SCERA experience. In future experience studies, more data will be available which may further increase the credibility of the SCERA experience.

We recommend updating the mortality tables used for post-retirement mortality to the following:

- **General members:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates decreased by 5% for males and increased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021.
- **Safety members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021.

Chart 5 on page 43 compares the actual to expected deaths on an amount-weighted basis for General service retirement members over the fifteen-year period for the current and proposed assumptions.

Chart 6 on page 43 compares the actual to expected deaths on an amount-weighted basis for Safety service retirement members over the fifteen-year period for the current and proposed assumptions.

¹ If we used the benchmark Pub-2010 General Healthy Retiree table without any adjustment, the proposed actual to expected ratio would remain at 99%.

Section 4: Demographic Assumptions

Chart 7 on page 44 shows the life expectancies (i.e., expected future lifetime) under the current and proposed tables for General service retirement members on an amount-weighted basis. Life expectancies under the current and proposed generational mortality rates are based on age as of 2023. In practice, assumed life expectancies will increase in accordance with the mortality improvement scale.

Chart 8 on page 44 shows the life expectancies (i.e., expected future lifetime) under the current and proposed tables for Safety service retirement members on an amount-weighted basis. Life expectancies under the current and proposed generational mortality rates are based on age as of 2023. In practice, assumed life expectancies will increase in accordance with the mortality improvement scale.

Beneficiary Mortality

The current mortality table used for beneficiary mortality is as follows:

- **All beneficiaries:** Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2020.

In studying the mortality for the beneficiaries in our prior and the current studies, we reviewed the actual deaths compared to the expected deaths and recommended using the Pub-2010 Contingent Survivor mortality tables for the beneficiaries. The Pub-2010 Contingent Survivor mortality tables are developed based only on beneficiary data **after** the death of the member. This is consistent with the mortality experience that we have available for beneficiaries. The Pub-2010 Contingent Survivor mortality rates are comparable to SCERA's actual mortality experience for beneficiaries.

The following table shows the observed benefit weighted deaths for beneficiaries based on the actual experience during the 15 years studied. Also shown are the expected benefit weighted deaths under the current and proposed assumptions. This information is shown separately by gender. As shown in the table below, the proposed mortality table has an actual to expected ratio of 109% after adjustments for partial credibility. In future years the ratio should remain around 109% as long as actual mortality improves at the same rates as anticipated by the generational mortality tables.

Section 4: Demographic Assumptions

Beneficiary Mortality Experience – Benefit Weighted (\$ in millions)

Gender	Current Expected Weighted Deaths	Actual Weighted Deaths	Proposed Expected Weighted Deaths
Male	\$0.82	\$0.87	\$0.82
Female	3.28	3.59	3.27
Total	\$4.10	\$4.47	\$4.09
Actual / Expected	109%		109%¹

Notes:

1. Experience shown above is weighted by annual benefit amounts for deceased beneficiaries.
2. Expected amounts under the current and proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the year the death occurred (or was expected to occur).
3. Results may not add due to rounding.

The proposed mortality table reflects current experience to the extent that the experience is credible based on standard statistical theory. For SCERA, there is less data available for beneficiaries, so it is given little credibility and the proposed tables are only slightly adjusted.

We recommend updating the mortality table used for beneficiary mortality to the following:

- **Not in pay status at the valuation:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates decreased by 5% for males and increased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021.
- **In pay status at the valuation:** Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2021.

As noted above, we have continued to recommend the Pub-2010 Contingent Survivor mortality tables (with higher mortality rates) for beneficiaries **after** the death of the member, but the General Healthy Retiree tables (with lower mortality rates) for beneficiaries **before** the death of the member.

For the purposes of the actuarial valuations (for funding and financial reporting), when calculating the liability for the continuance to a beneficiary of a surviving member, we recommend that the General Healthy Retiree mortality tables be used for beneficiary mortality

¹ If we used the benchmark Pub-2010 Contingent Survivor table without any adjustment, the proposed actual to expected ratio would be 115%.

Section 4: Demographic Assumptions

both before and after the expected death of the member, decreased by 5% males and increased by 5% females. Upon the actual death of the member (i.e., for all beneficiaries in pay status as of the valuation date), we recommend for the purposes of the actuarial valuations that we use the Contingent Survivor mortality tables increased by 5% for males and females. We note that the use of different mortality tables (before and after the death of the member) has been found by the RPEC to be reasonable.

Pre-retirement mortality

The current mortality tables used for pre-retirement mortality are as follows:

- **General members:** Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females) decreased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2020.
- **Safety members:** Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females) decreased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2020.

The table below shows the observed salary-weighted deaths for active members based on the actual experience during the 15 years studied. Also shown are the expected salary-weighted deaths under the current and proposed assumptions. This information is shown separately by gender. As shown in the table below, the proposed mortality tables have an actual to expected ratio of 85% and 54% for General and Safety, respectively, after adjustments for partial credibility. In future years the ratios should remain around 85% and 54% for General and Safety, respectively, as long as actual mortality improves at the same rates as anticipated by the generational mortality tables.

Pre-Retirement Mortality Experience – Salary-Weighted (*\$ in millions*)

Gender	General Current Expected Weighted Deaths	General Actual Weighted Deaths	General Proposed Expected Weighted Deaths	Safety Current Expected Weighted Deaths	Safety Actual Weighted Deaths	Safety Proposed Expected Weighted Deaths
Male	\$2.16	\$1.50	\$2.16	\$0.65	\$0.42	\$0.65
Female	2.13	2.13	2.11	0.12	0.00	0.12
Total	\$4.29	\$3.63	\$4.27	\$0.77	\$0.42	\$0.77
Actual / Expected	85%		85%¹	54%		54%²

¹ If we used the benchmark Pub-2010 General Employee table without any adjustment, the proposed actual to expected ratio would be 83%.

² If we used the benchmark Pub-2010 Safety Employee table without any adjustment, the proposed actual to expected ratio would be 52%.

Section 4: Demographic Assumptions

Notes:

1. Experience shown above is weighted by annual salary for deceased members.
2. Expected amounts under the current and proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the year the death occurred (or was expected to occur).
3. Results may not add due to rounding.

The proposed mortality tables reflect current experience to the extent that the experience is credible based on standard statistical theory. For SCERA, there is less data available for actives, so it is given little credibility and the proposed tables are only slightly adjusted.

We recommend updating the mortality tables used for pre-retirement mortality to the following:

- **General members:** Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females) decreased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021.
- **Safety members:** Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females) decreased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021.

Currently, our assumption is that all General and Safety member pre-retirement deaths are non-service connected. Based on the actual experience during the last three years of 14 total deaths, there were none due to service-connected causes. Therefore, we recommend maintaining the current assumption for both General and Safety members.

Mortality table for member contributions, optional forms of payment and reserves

There are administrative reasons why a generational mortality table is more difficult to implement for determining member contributions for the legacy tiers (i.e., non-PEPRA), optional forms of payment and reserves. For determining member contributions, one emerging practice is to approximate the use of a generational mortality table by the use of a static table with projection of the mortality improvement from the measurement year over a period that is close to the duration of the benefit payments for active members. We would recommend the use of this approximation for determining member contributions for employees in the legacy tiers.

We recommend updating the mortality tables used for determining contributions to the following:

- **General members:** Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates decreased by 5% for males and increased by 5% for females, projected 32 years (from 2010) with the two-dimensional mortality improvement scale MP-2021, weighted one-third male and two-thirds female.
- **Safety members:** Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected 32 years (from 2010) with

Section 4: Demographic Assumptions

the two-dimensional mortality improvement scale MP-2021, weighted three-fourths male and one-fourth female.

For optional forms of payment and reserves, there are some administrative issues that need to be resolved with SCERA and its vendor maintaining the pension administration software before we can recommend a comparable generational scale to anticipate future mortality improvement. We have been having ongoing discussions with SCERA and its vendor and will provide a recommendation to SCERA for use in reflecting mortality improvement for determining optional forms of payment after we have another discussion following the Board's adoption of the assumptions recommended in this study.

Section 4: Demographic Assumptions

Chart 5: Post-Retirement Benefit-Weighted Deaths (\$ in millions)
General Service Retired Members (January 1, 2009 through December 31, 2023)

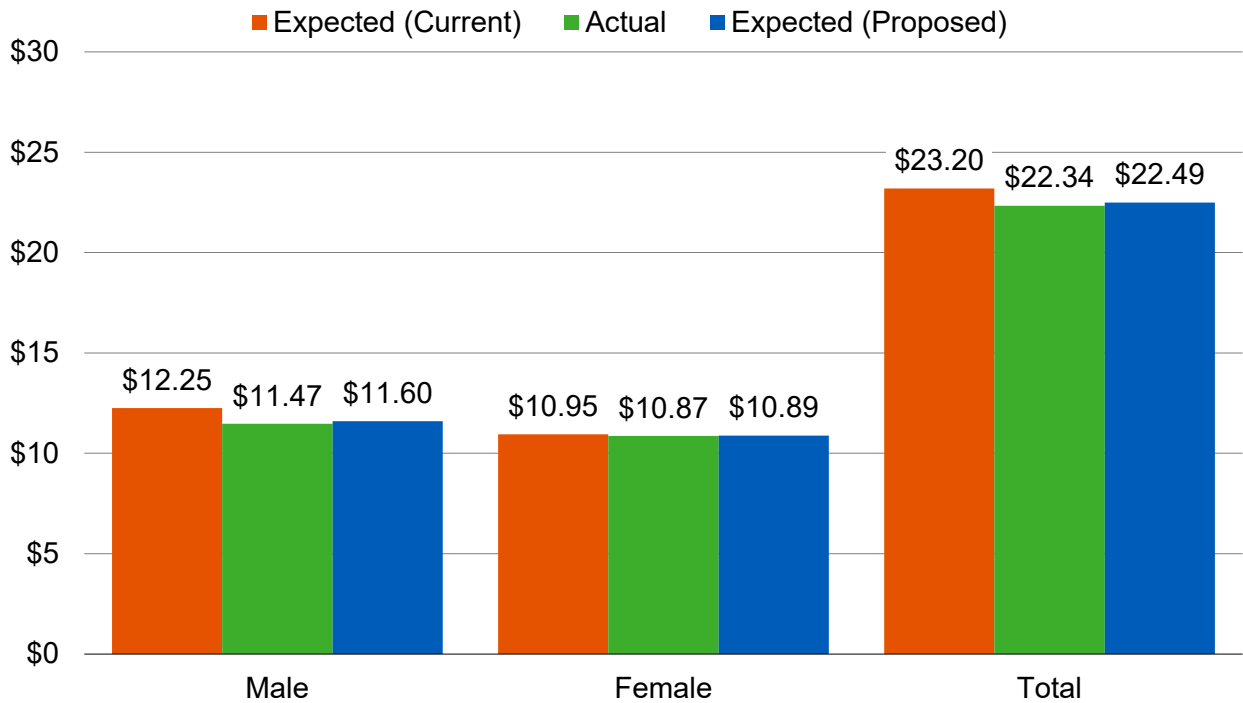
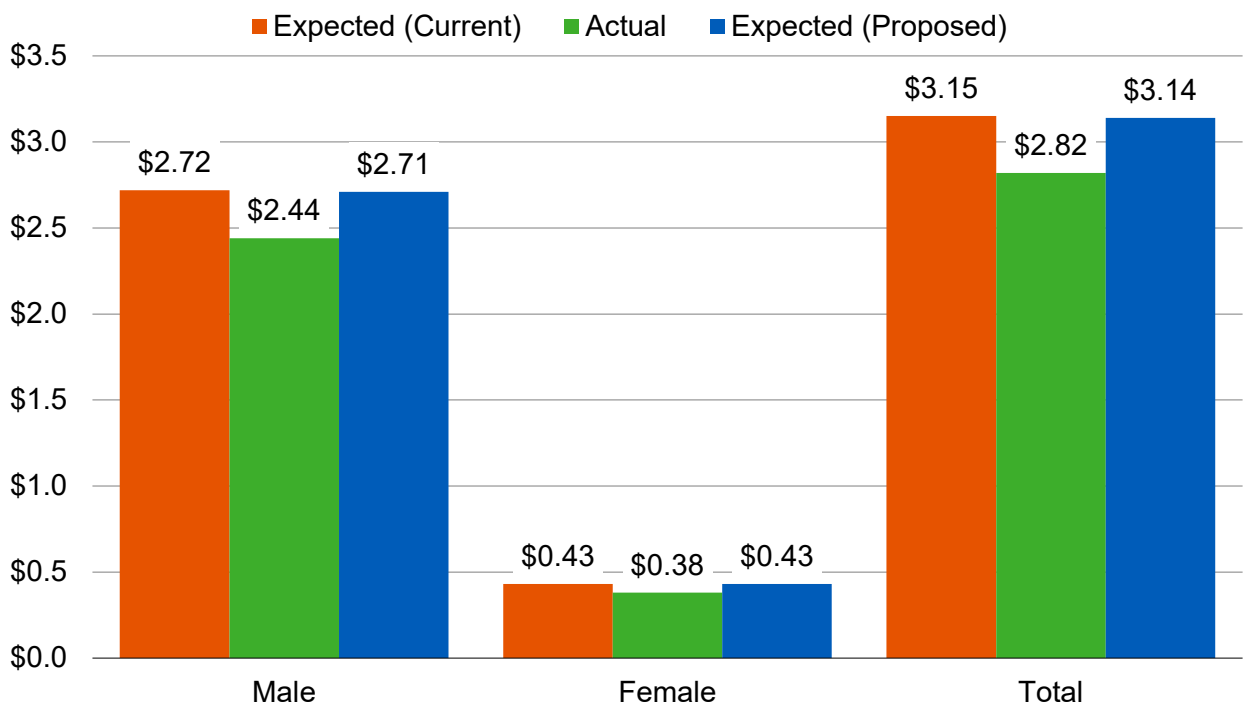


Chart 6: Post-Retirement Benefit-Weighted Deaths (\$ in millions)
Safety Service Retired Members (January 1, 2009 through December 31, 2023)



Section 4: Demographic Assumptions

Chart 7: Benefit-Weighted Life Expectancies for Age in 2023
General Service Retired Members

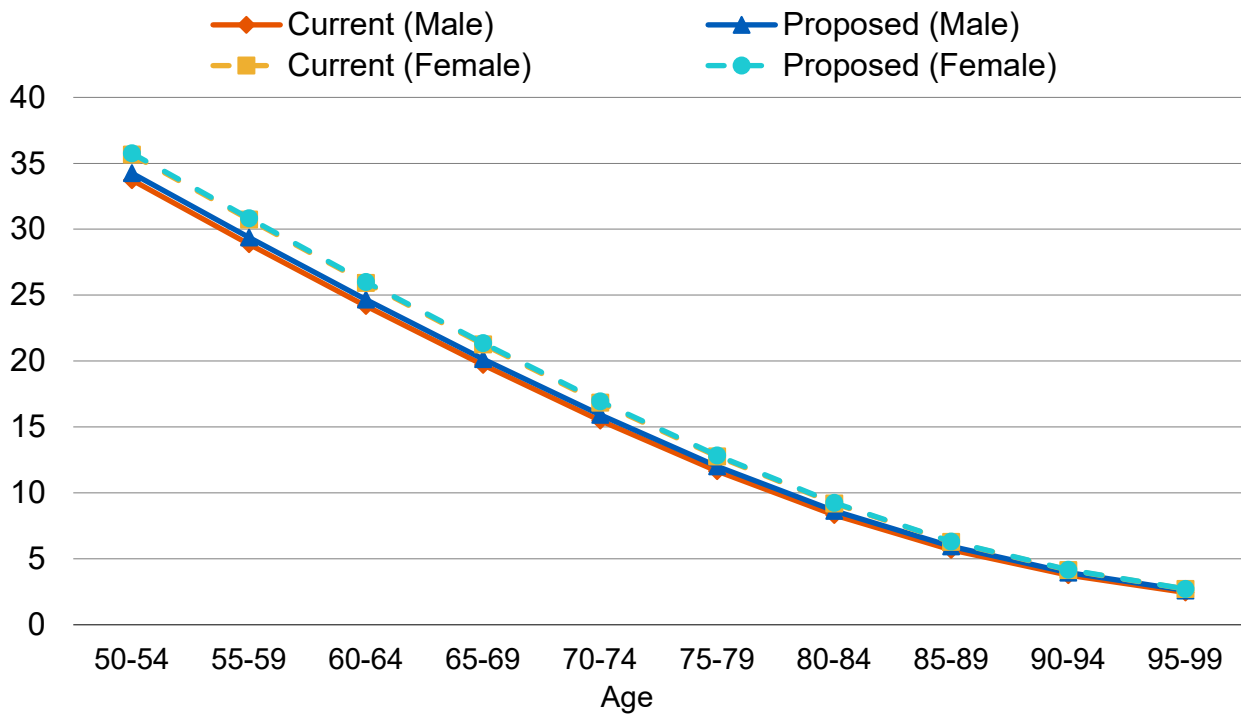
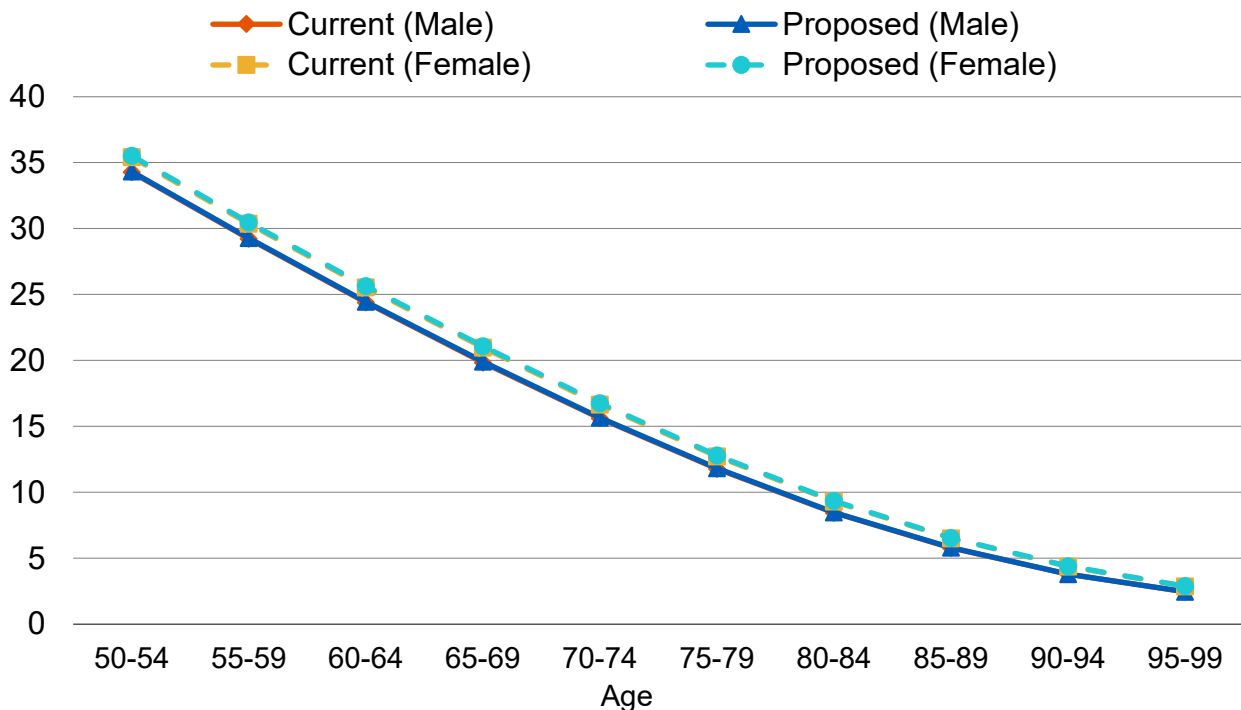


Chart 8: Benefit-Weighted Life Expectancies for Age in 2023
Safety Service Retired Members



Section 4: Demographic Assumptions

B. Mortality rates - disabled

Since mortality rates for disabled members can vary from those of healthy members, a different mortality assumption is often used.

The current mortality tables used for disabled mortality are as follows:

- **General members:** Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 5% for males and decreased by 10% for females, projected generationally with the two-dimensional mortality improvement scale MP-2020.
- **Safety members:** Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2020.

The following table shows the observed benefit-weighted deaths for disability retired members based on the actual experience during the 15 years studied. Also shown are the expected benefit weighted deaths under the current and proposed assumptions. This information is shown separately by gender. As shown in the table below, the proposed mortality tables have an actual to expected ratio of 75% and 88% for General and Safety, respectively, after adjustments for partial credibility. In future years the ratios should remain around 75% and 88% for General and Safety, respectively, as long as actual mortality improves at the same rates as anticipated by the generational mortality tables.

Disabled Retiree Mortality Experience – Benefit Weighted
(*\$ in millions*)

Gender	General Current Expected Weighted Deaths	General Actual Weighted Deaths	General Proposed Expected Weighted Deaths	Safety Current Expected Weighted Deaths	Safety Actual Weighted Deaths	Safety Proposed Expected Weighted Deaths
Male	\$1.63	\$1.20	\$1.62	\$1.33	\$1.28	\$1.32
Female	1.51	1.14	1.50	0.24	0.10	0.24
Total	\$3.13	\$2.35	\$3.12	\$1.56	\$1.38	\$1.56
Actual / Expected	75%		75%¹	88%		88%²

Notes:

1. Experience shown above is weighted by annual benefit amounts for deceased members.
2. Expected amounts under the current and proposed generational mortality table are based on mortality rates from the base year projected with mortality improvements to the year the death occurred (or was expected to occur).
3. Results may not add due to rounding.

¹ If we used the benchmark Pub-2010 Non-Safety Disabled Retiree table without any adjustment, the proposed actual to expected ratio would be 69%.

² If we used the benchmark Pub-2010 Safety Disabled Retiree table without any adjustment, the proposed actual to expected ratio would remain at 88%.

Section 4: Demographic Assumptions

Similar to mortality rates for service retirees, the proposed mortality tables reflect current experience to the extent that the experience is credible based on standard statistical theory. For SCERA, there is less data available for disabled retirees, so it is given little credibility and the proposed tables are only slightly adjusted.

We recommend updating the mortality tables used for disabled mortality to the following:

- **General members:** Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 5% for males and decreased by 10% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021.
- **Safety members:** Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021.

Chart 9 on page 47 compares the actual to expected deaths on an amount-weighted basis for General disabled members over the fifteen-year period for the current and proposed assumptions.

Chart 10 on page 47 compares the actual to expected deaths on an amount-weighted basis for Safety disabled members over the fifteen-year period for the current and proposed assumptions.

Chart 11 on page 48 shows the life expectancies (i.e., expected future lifetime) under the current and proposed tables for General disabled members on an amount-weighted basis. Life expectancies under the current and proposed generational mortality rates are based on age as of 2023. In practice, assumed life expectancies will increase in accordance with the mortality improvement scale.

Chart 12 on page 48 shows the life expectancies (i.e., expected future lifetime) under the current and proposed tables for Safety disabled members on an amount-weighted basis. Life expectancies under the current and proposed generational mortality rates are based on age as of 2023. In practice, assumed life expectancies will increase in accordance with the mortality improvement scale.

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Chart 9: Post-Retirement Benefit-Weighted Deaths (\$ in millions)
General Disabled Members (January 1, 2009 through December 31, 2023)

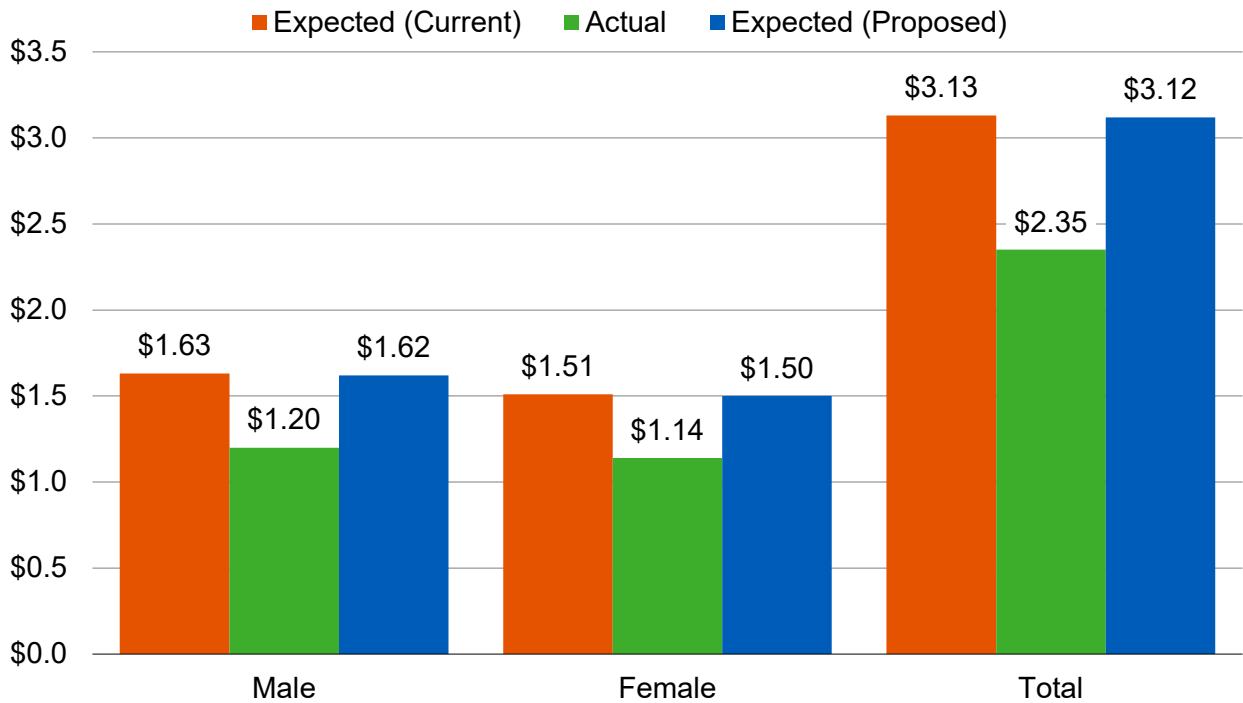
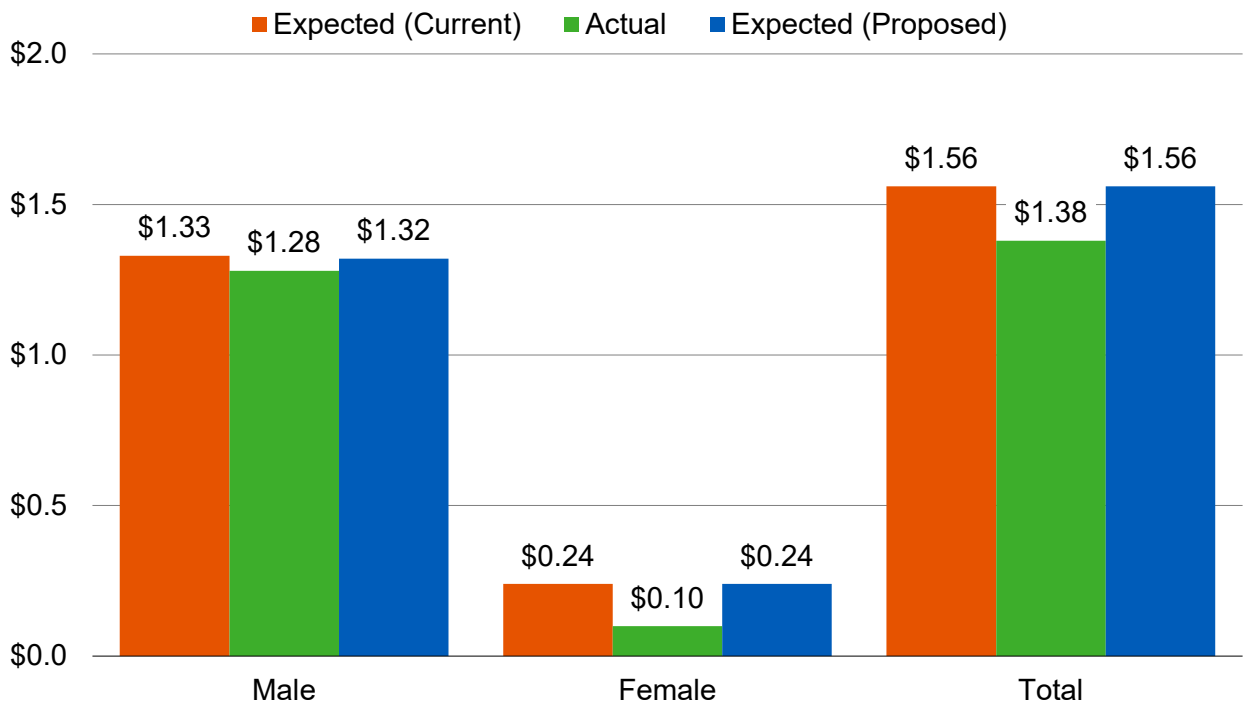


Chart 10: Post-Retirement Benefit-Weighted Deaths (\$ in millions)
Safety Disabled Members (January 1, 2009 through December 31, 2023)



Section 4: Demographic Assumptions

Chart 11: Benefit-Weighted Life Expectancies for Age in 2023
General Disabled Members

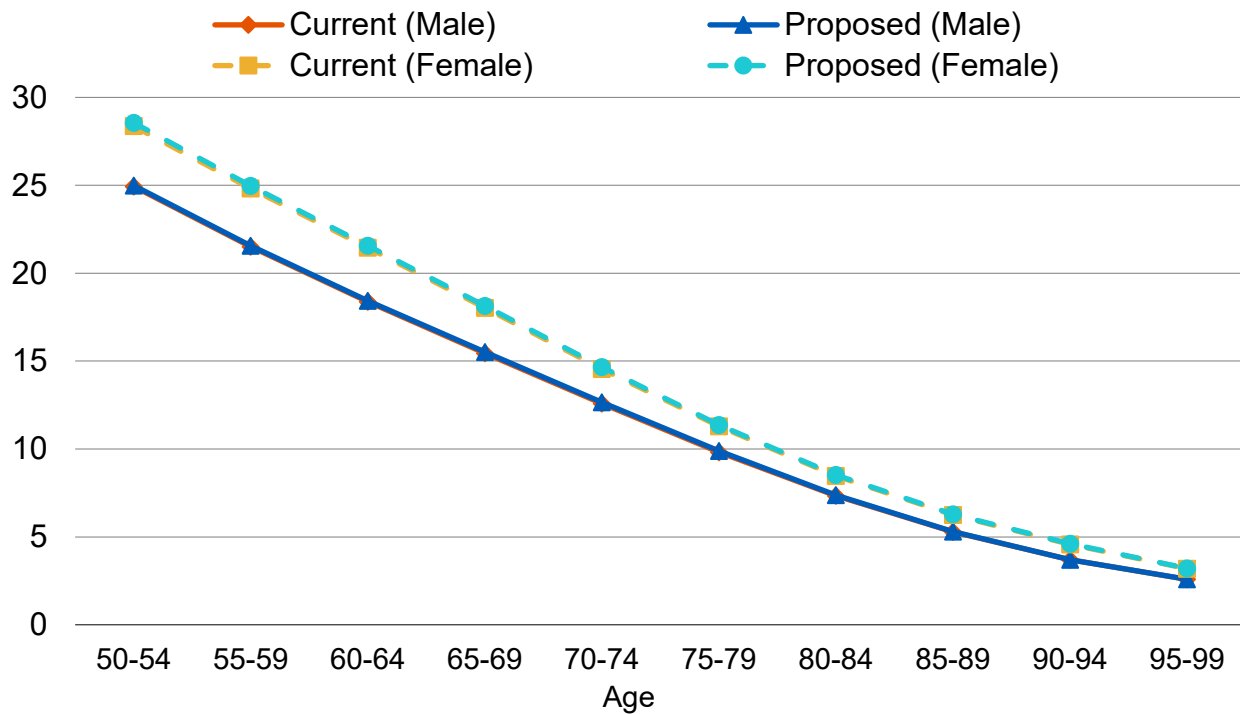
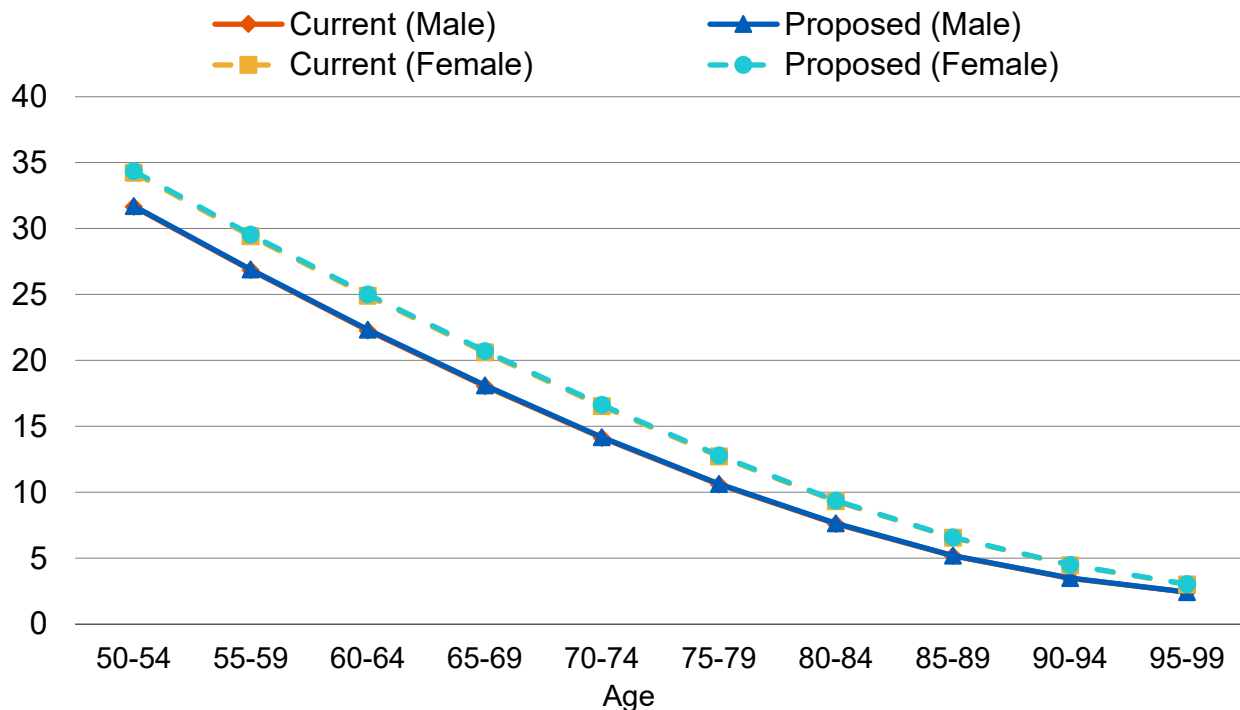


Chart 12: Benefit-Weighted Life Expectancies for Age in 2023
Safety Disabled Members



Section 4: Demographic Assumptions

C. Disability incidence rates

When a member becomes disabled, he or she may be entitled to at least a 50% of pay pension (service-connected disability), or a pension that depends upon the member's years of service (non-service-connected disability).

The following tables show the observed disability incidence rates based on the actual experience over the past three years. Also shown are the current assumed rates and the rates we propose. Please note that we have combined service and non-service-connected disability incidence in the table below. This information is shown separately for General and Safety members.

Disability Incidence Rates — General

Age	Current Rate	Actual Rate	Proposed Rate
20 – 24	0.05%	0.00%	0.01%
25 – 29	0.05%	0.00%	0.01%
30 – 34	0.05%	0.00%	0.01%
35 – 39	0.05%	0.00%	0.01%
40 – 44	0.20%	0.13%	0.20%
45 – 49	0.20%	0.16%	0.20%
50 – 54	0.25%	0.35%	0.25%
55 – 59	0.30%	0.07%	0.25%
60 – 64	0.30%	0.33%	0.30%
65 – 69	0.30%	0.31%	0.30%
70 and over	0.00%	0.00%	0.00%
Actual / Expected	0.75		0.84

Section 4: Demographic Assumptions

Disability Incidence Rates — Safety

Age	Current Rate	Actual Rate (Last 3 Years)	Actual Rate (Last 6 Years)	Proposed Rate
20 – 24	0.10%	0.00%	0.00%	0.10%
25 – 29	0.20%	0.93%	0.44%	0.50%
30 – 34	1.00%	1.74%	1.07%	1.50%
35 – 39	1.50%	2.62%	2.47%	2.00%
40 – 44	1.50%	3.43%	2.33%	2.25%
45 – 49	2.50%	3.49%	2.55%	3.00%
50 – 54	2.50%	6.52%	5.08%	3.75%
55 – 59	3.00%	7.20%	4.86%	3.75%
60 – 64	3.00%	4.35%	3.54%	3.50%
65 and over	0.00%	3.70%	2.70%	0.00%
Actual / Expected	2.03			1.48

Based on this experience, we recommend decreasing slightly the disability incidence rate assumption overall for General members and increasing the assumption overall for Safety members.

We note that the number of actual Safety disabilities in the current experience study period increased significantly when compared to actual experience in prior studies, as shown below.

Experience Study Period	Number of Safety Disabilities
2012 – 2014	20
2015 – 2017	44
2018 – 2020	35
2021 – 2023	70

We understand from our discussion with SCERA that the uptick in recent disability retirements is not a trend that they could identify and could be due to fluctuations among the Safety membership. Therefore, when setting the recommended assumptions we also reviewed the actual rate of Safety disabilities over a six-year period from 2018-2020 and 2021-2023 (as shown above).

Chart 13 on page 52 compares the number of actual disabilities for General members over the past three years to the current and proposed assumptions.

Chart 14 on page 52 compares the number of actual disabilities for Safety members over the past three years to the current and proposed assumptions.

Chart 15 on page 53 compares the actual disability incidence experience for General members with the current and proposed assumptions.

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Chart 16 on page 53 compares the actual disability incidence experience for Safety members with the current and proposed assumptions.

Service vs. non-service-connected disability

The following table shows the observed percentage of new disabled members that received a service-connected disability based on the actual experience over the past three years for General and Safety separately. Also shown are the current and proposed assumptions.

Disabled Members Receiving a Service-Connected Disability

	General	Safety
Current assumption	55%	100%
Actual percentage	64%	100%
Proposed assumption	60%	100%

Based on this experience, we recommend increasing the assumption for future disabled members receiving a service-connected disability for General members to 60% and maintaining the assumption for Safety members at 100%. The remaining percentage are assumed to be non-service-connected disabilities (40% for General and 0% for Safety members).

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Chart 13: Actual Number of Disability Retirements Compared to Expected
General Members

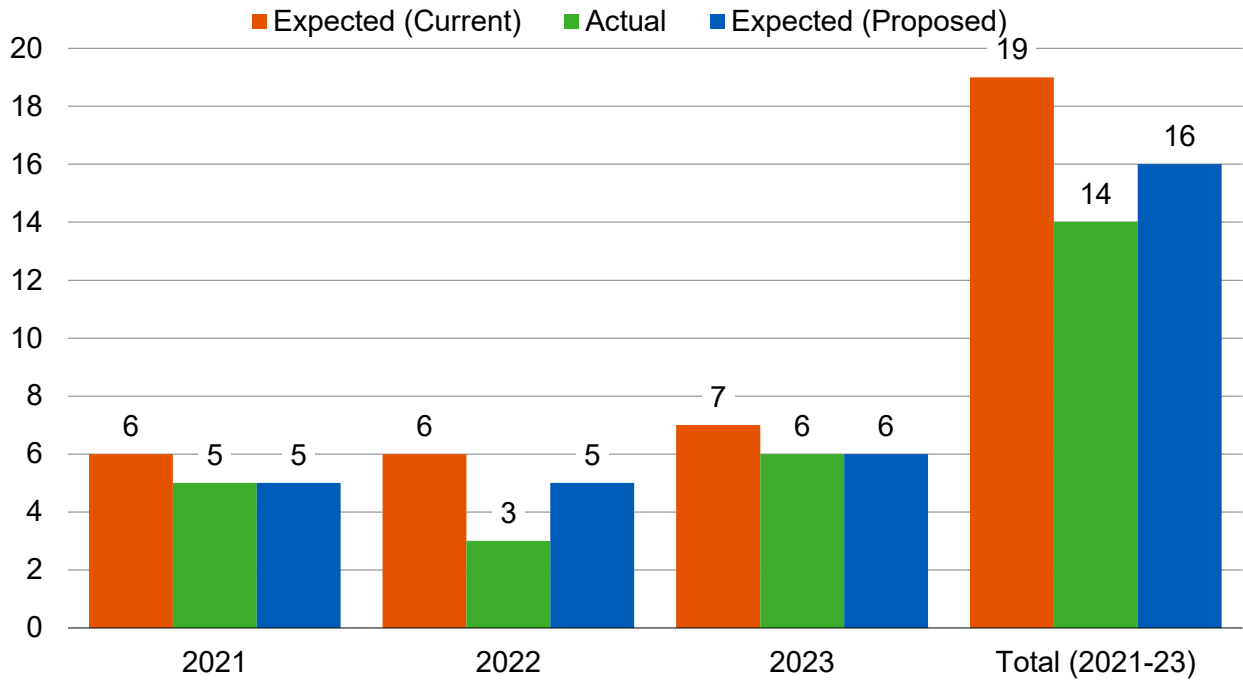
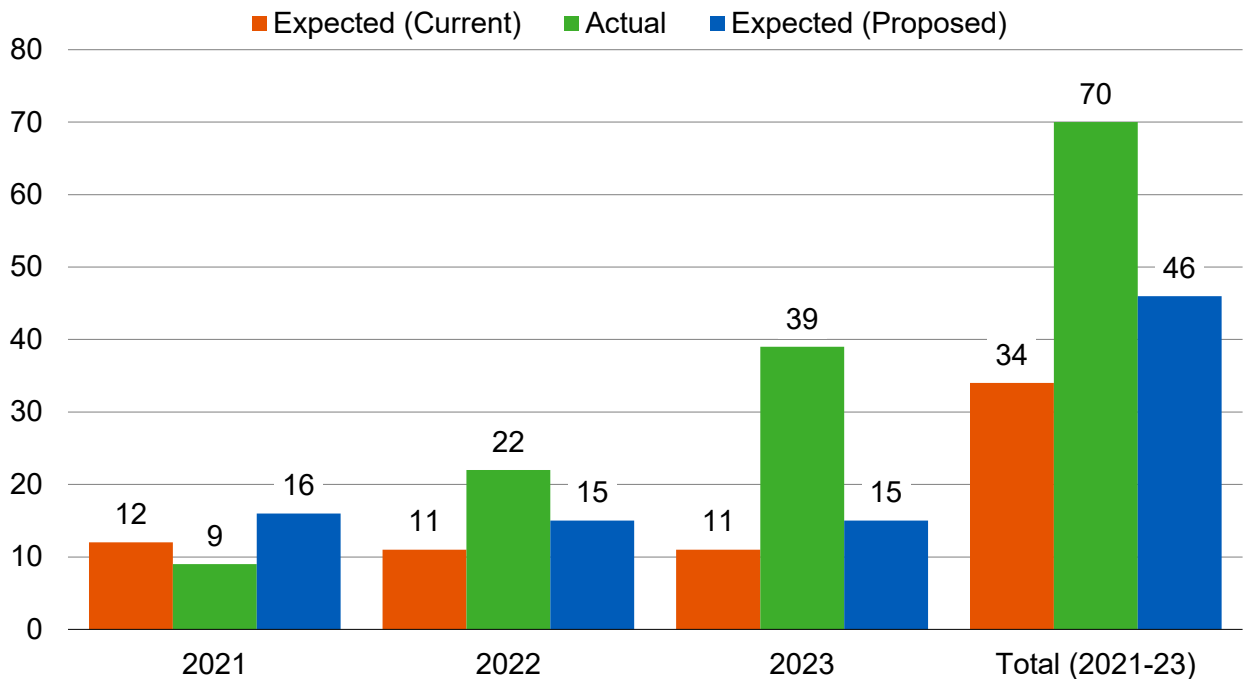


Chart 14: Actual Number of Disability Retirements Compared to Expected
Safety Members¹



¹ The total expected number of disability retirements under the proposed assumptions (46) is lower than the actual average number of disability retirements observed during the 2018-2020 and 2021-2023 experience studies (53) but is about the same as the actual disability retirements observed during the 2015-2017 experience study period (44).

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Chart 15: Disability Incidence Rates
General Members

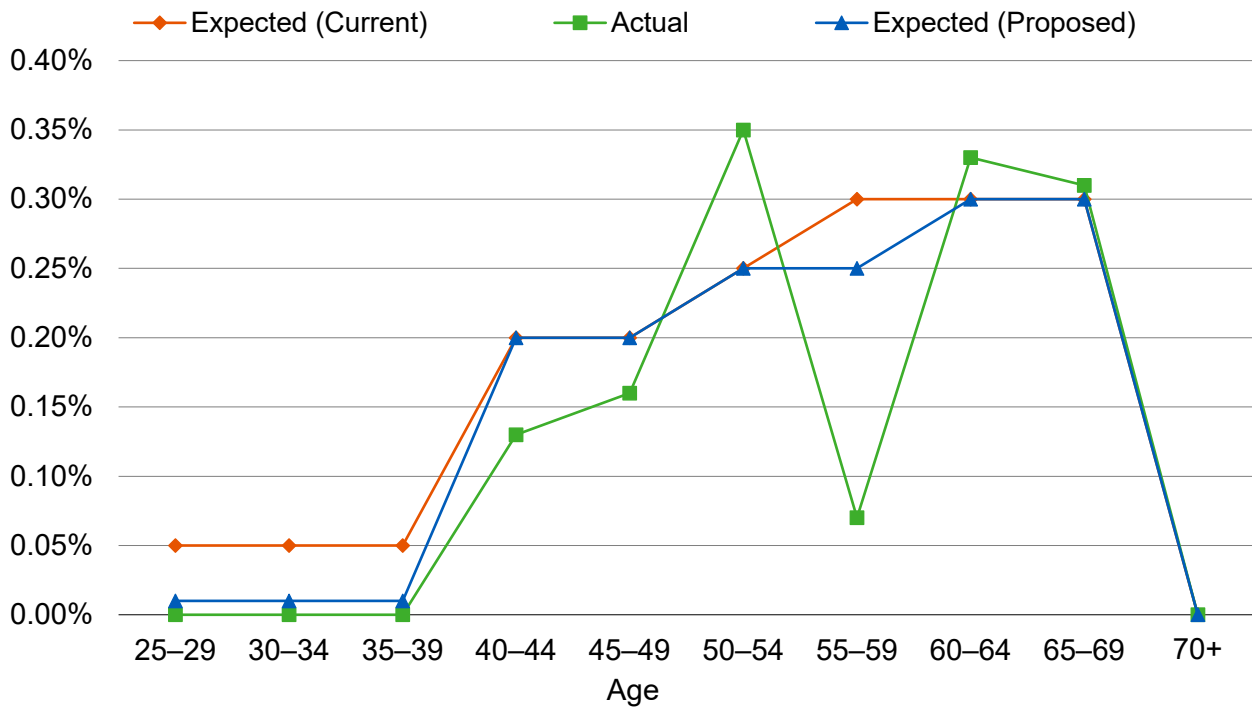
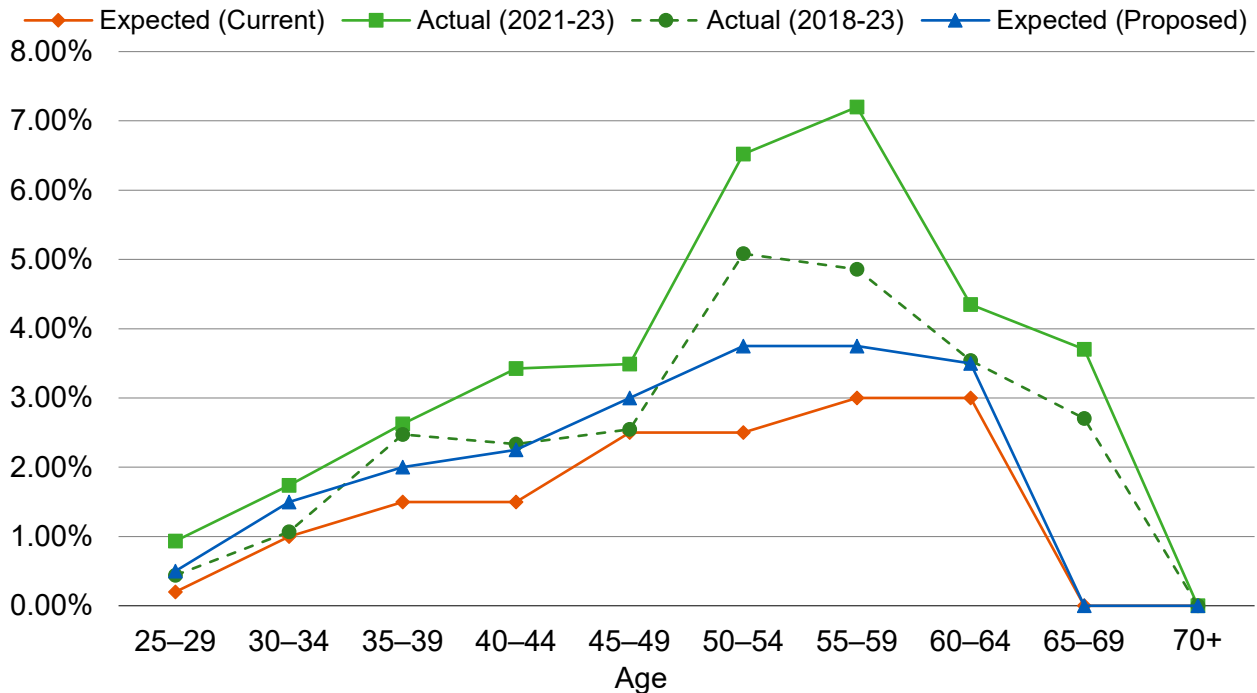


Chart 16: Disability Incidence Rates
Safety Members



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D. Termination rates

Termination rates include all terminations for reasons other than death, disability, or retirement. Under the current assumptions there are separate rates of termination for withdrawal (members expected to receive a refund) and for vested termination (members expected to receive a deferred vested retirement benefit). **With this study, we continue to recommend that this same assumption structure be used.**

The current withdrawal and vested termination rates are based on a function of the member's years of service as well as their age. **With this study, we continue to recommend that this same assumption structure be used.**

Furthermore, the current withdrawal and vested termination rates are applied until the member is first assumed to retire. That is, we assume that members eligible to retire at termination will retire in accordance with the retirement rate assumptions rather than terminate and defer their benefit. **We recommend maintaining the assumption that members who are eligible to retire will elect to receive their retirement benefit in lieu of a refund of contributions or a deferred vested benefit.**

The following tables show the observed¹ withdrawal rates based on the actual experience over the past three years. Also shown are the current assumed rates and the rates we propose. This information is shown separately for General and Safety members.

Withdrawal Rates — Less than Five Years of Service

Years of Service	General Current Rate	General Actual Rate	General Proposed Rate	Safety Current Rate	Safety Actual Rate	Safety Proposed Rate
Less than 1	5.75%	6.96%	6.00%	3.00%	4.39%	3.25%
1 – 2	2.75%	2.12%	2.75%	2.40%	3.06%	2.75%
2 – 3	2.50%	2.89%	2.75%	1.40%	0.00%	1.50%
3 – 4	2.50%	1.29%	2.25%	1.40%	0.97%	1.25%
4 – 5	1.75%	1.30%	1.50%	1.40%	0.83%	1.00%
Actual / Expected	1.00		0.99	0.98		0.98

¹ We have excluded any members that were eligible for retirement.

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Withdrawal Rates — Five or More Years of Service

Age	General Current Rate	General Actual Rate	General Proposed Rate	Safety Current Rate	Safety Actual Rate	Safety Proposed Rate
Under 29	1.25%	2.17%	1.25%	1.00%	0.00%	1.00%
30 – 34	1.00%	0.75%	0.90%	0.75%	0.99%	0.75%
35 – 39	0.50%	0.72%	0.55%	0.40%	0.68%	0.40%
40 – 44	0.40%	0.19%	0.35%	0.15%	0.00%	0.15%
45 – 49	0.35%	0.21%	0.30%	0.05%	0.00%	0.05%
50 – 54	0.30%	0.00%	0.20%	0.00%	0.00%	0.00%
55 – 59	0.10%	0.00%	0.05%	0.00%	0.00%	0.00%
60 – 64	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
65 – 69	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Actual / Expected	0.82		0.88	1.13		1.13

Based on this experience, we recommend minor adjustments to the withdrawal rates for both General and Safety members.

It is important to note that not every age category has enough exposures and/or decrements such that the results in that category are statistically credible even if we look at six years' worth of experience. This is mainly the case at the highest age categories since most members in those categories are eligible to retire and so have been excluded from our review of this termination experience.

Chart 17 on page 56 compares the number of actual to expected withdrawals for General members over the past three years for the current and proposed assumptions.

Chart 18 on page 56 compares the number of actual to expected withdrawals for Safety members over the past three years for the current and proposed assumptions.

Chart 19 on page 57 compares the actual withdrawal experience for General members with less than five years of service with the current and proposed assumptions.

Chart 20 on page 57 compares the actual withdrawal experience for Safety members with less than five years of service with the current and proposed assumptions.

Chart 21 on page 58 compares the actual withdrawal experience for General members with five or more years of service with the current and proposed assumptions.

Chart 22 on page 58 compares the actual withdrawal experience for Safety members with five or more years of service with the current and proposed assumptions.

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Chart 17: Actual Number of Withdrawals Compared to Expected
General Members

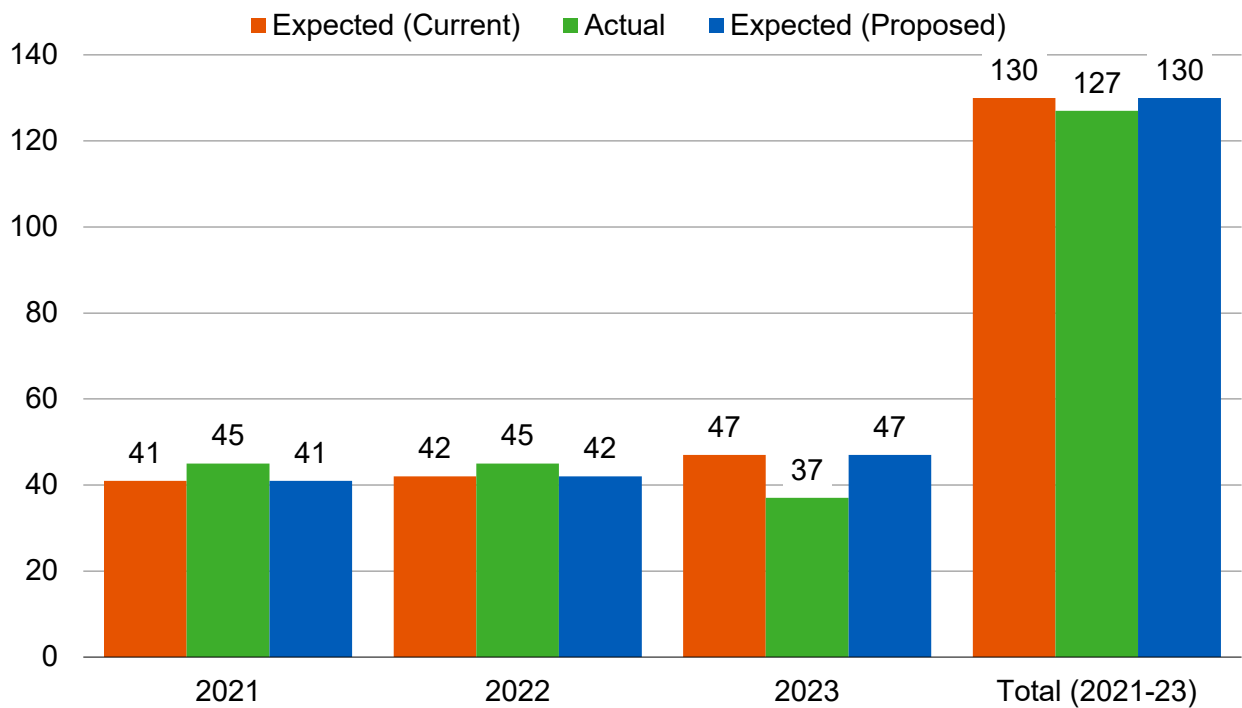
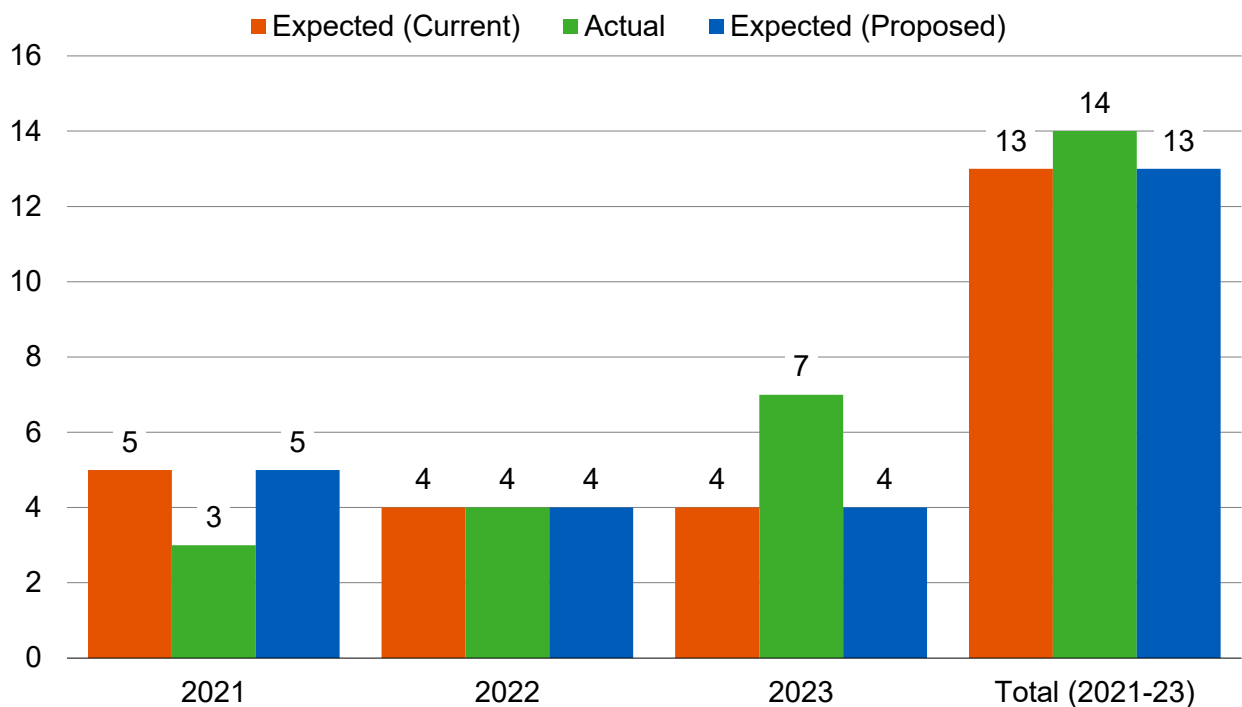


Chart 18: Actual Number of Withdrawals Compared to Expected
Safety Members



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Chart 19: Withdrawal Rates — Less than Five Years of Service
General Members

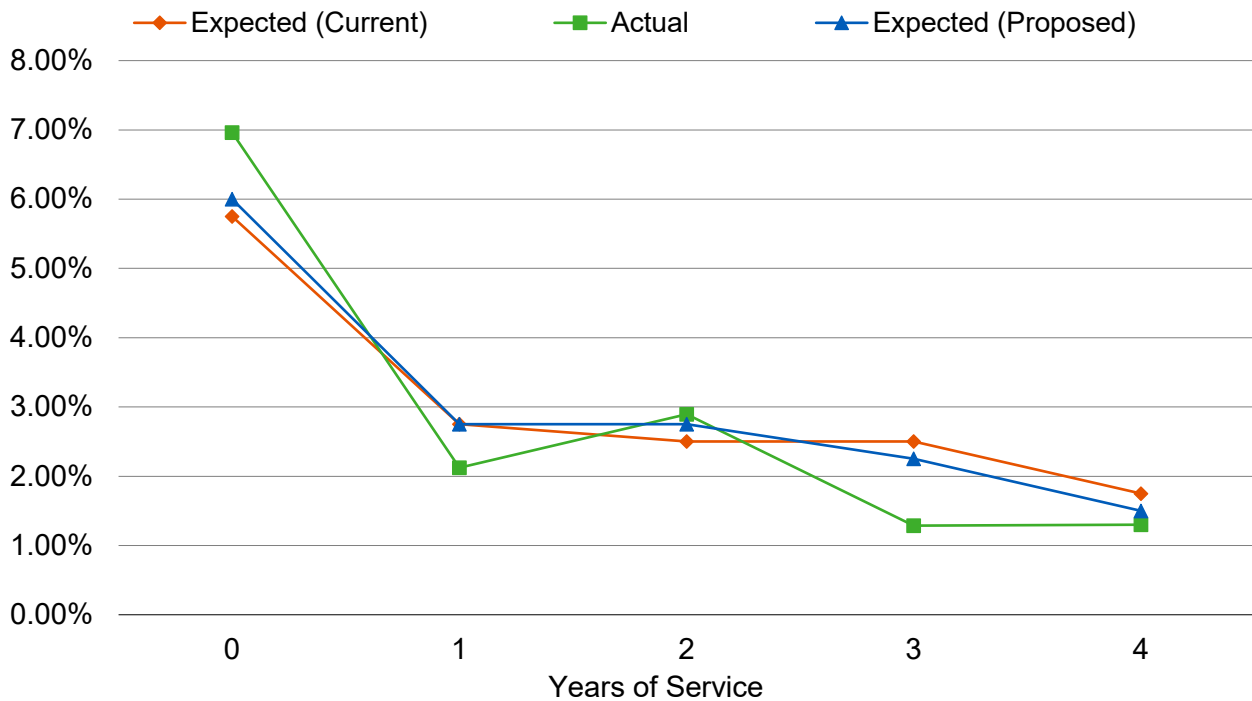
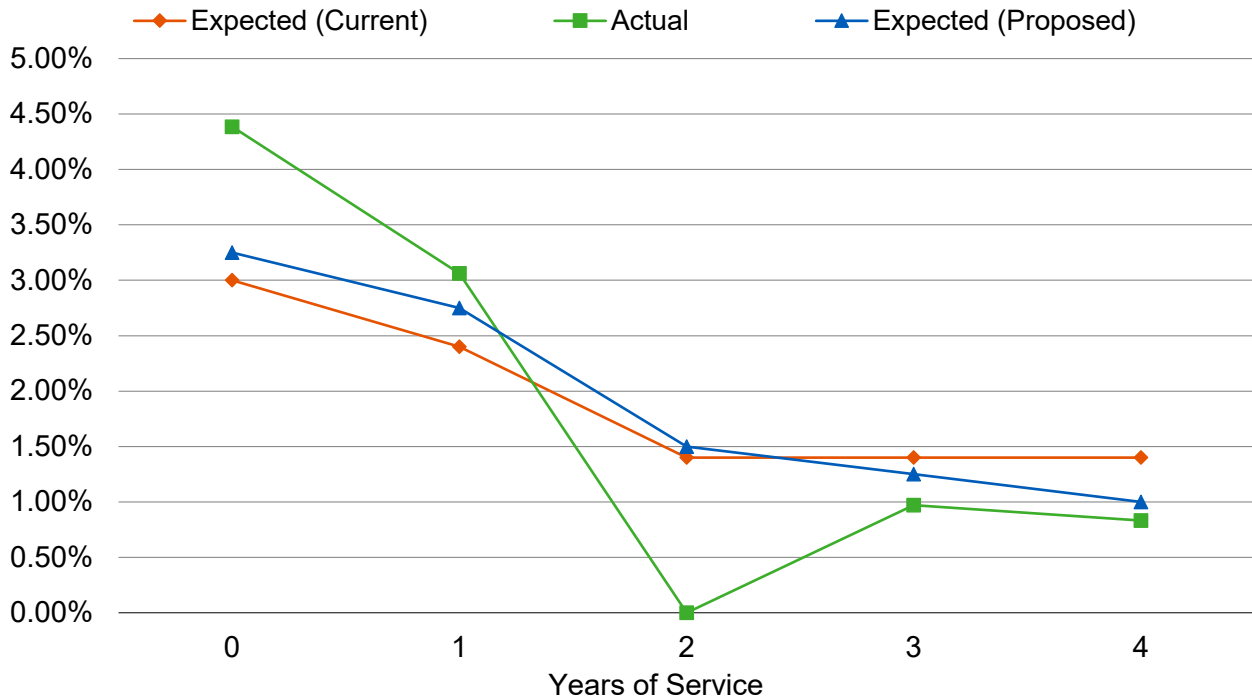


Chart 20: Withdrawal Rates — Less than Five Years of Service
Safety Members



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Chart 21: Withdrawal Rates — Five or More Years of Service
General Members

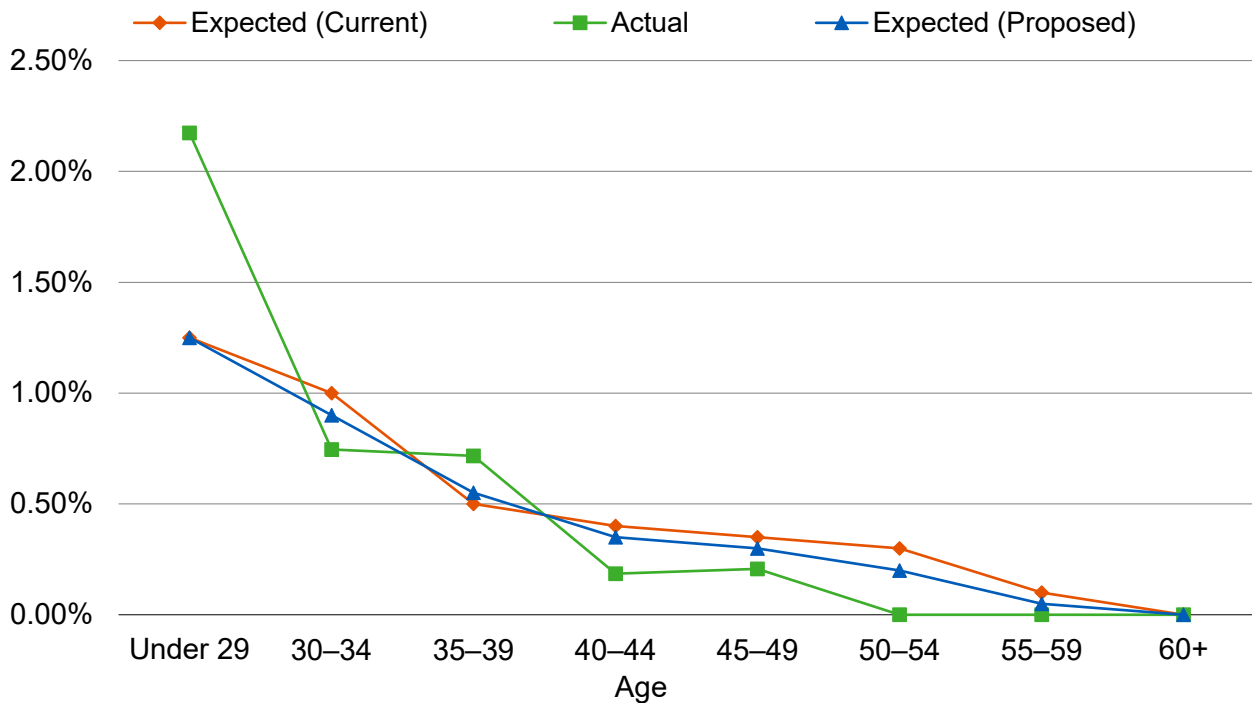
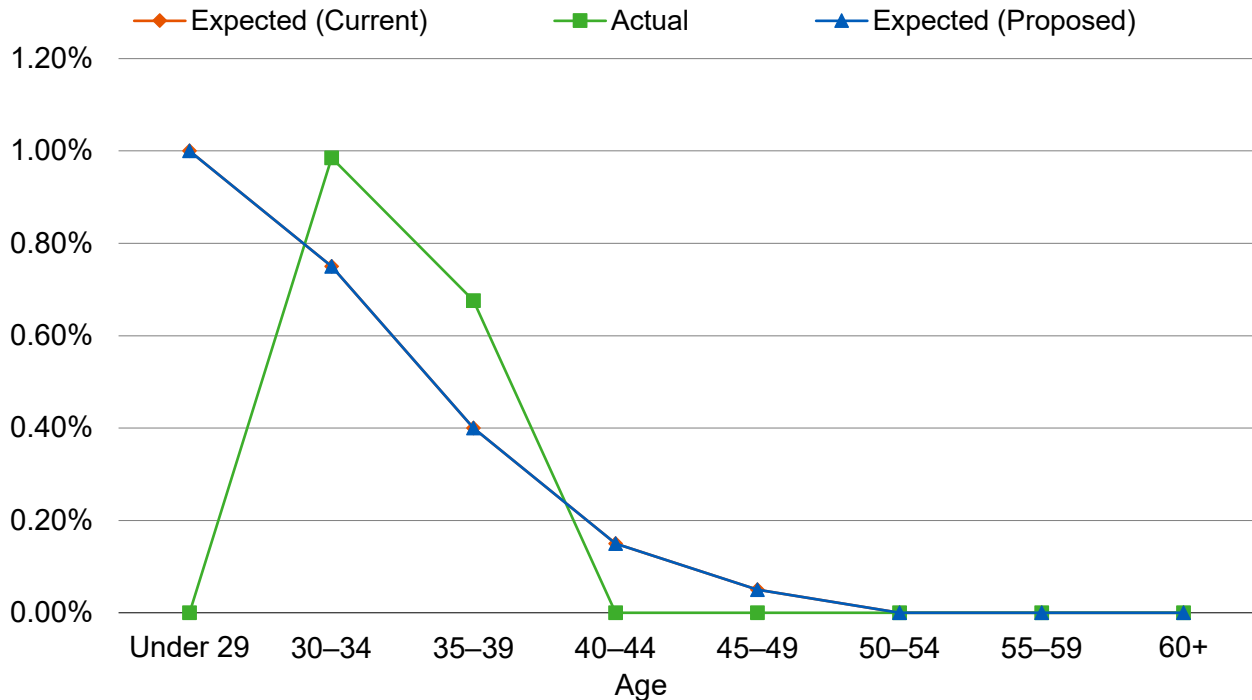


Chart 22: Withdrawal Rates — Five or More Years of Service
Safety Members



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The following tables show the observed¹ vested termination rates based on the actual experience over the past three years. Also shown are the current assumed rates and the rates we propose. This information is shown separately for General and Safety members.

Vested Termination Rates — Less than Five Years of Service

Years of Service	General Current Rate	General Actual Rate	General Proposed Rate	Safety Current Rate	Safety Actual Rate	Safety Proposed Rate
Less than 1	8.00%	9.60%	8.75%	7.50%	16.67%	9.00%
1 – 2	6.00%	4.81%	6.00%	6.00%	12.24%	6.50%
2 – 3	5.50%	8.20%	6.00%	4.00%	4.40%	4.50%
3 – 4	4.50%	7.17%	5.75%	4.00%	6.80%	4.50%
4 – 5	4.00%	6.13%	5.00%	4.00%	5.00%	4.25%
Actual / Expected²	1.25		1.12	1.78		1.58

Vested Termination — Five or More Years of Service

Age	General Current Rate	General Actual Rate	General Proposed Rate	Safety Current Rate	Safety Actual Rate	Safety Proposed Rate
Under 29	4.00%	10.87%	6.00%	3.75%	5.71%	4.50%
30 – 34	4.00%	5.72%	4.75%	2.50%	3.94%	3.00%
35 – 39	3.00%	6.45%	4.25%	2.00%	3.72%	2.75%
40 – 44	3.00%	3.81%	3.75%	1.00%	1.83%	1.50%
45 – 49	2.25%	3.83%	3.00%	0.75%	0.72%	0.75%
50 – 54	2.25%	4.37%	3.00%	0.00%	14.29%	0.75%
55 – 59	2.25%	3.75%	2.75%	0.00%	0.00%	0.00%
60 – 64	2.25%	7.46%	2.75%	0.00%	0.00%	0.00%
65 – 69	2.25%	0.00%	2.25%	0.00%	0.00%	0.00%
Actual / Expected³	1.68		1.29	1.74		1.33

Based on this experience, we recommend increasing the vested termination rates for both General and Safety members.

We observed a large increase in termination rates during the past three years when compared to similar observations from prior experience studies. In particular, the vested termination rates for General members increased by 20% from the prior study, while the vested termination rates for Safety members increased by 70%. Additionally, the majority of these increases occurred during the first two years of the three-year period (i.e., during 2021 and 2022). While we have

¹ We have excluded any members that were eligible for retirement.

² The actual to expected ratios under the proposed assumptions for the 2023 calendar year are 1.04 and 1.00 for General and Safety members, respectively.

³ The actual to expected ratios under the proposed assumptions for the 2023 calendar year are 1.09 and 1.00 for General and Safety members, respectively.

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increased the vested termination rates to reflect the recent increase in experience, we have put more weight on the experience for 2023, which is more consistent with vested termination observed in prior studies. Therefore, the actual to expected ratios for the three years in total, as shown on the prior page, are higher than what we would typically propose. However, the actual to expected ratios for 2023, also shown on the prior page in footnotes 2 and 3, are closer to 1.00.

As previously mentioned, it is important to note that not every age category has enough exposures and/or decrements such that the results in that category are statistically credible even if we look at six years' worth of experience. This is mainly the case at the highest age categories since most members in those categories are eligible to retire and so have been excluded from our review of this termination experience.

Chart 23 on page 61 compares the number of actual to expected vested terminations for General members over the past three years for the current and proposed assumptions.

Chart 24 on page 61 compares the number of actual to expected vested terminations for Safety members over the past three years for the current and proposed assumptions.

Chart 25 on page 62 compares the actual vested termination experience for General members with less than five years of service with the current and proposed assumptions.

Chart 26 on page 62 compares the actual vested termination experience for Safety members with less than five years of service with the current and proposed assumptions.

Chart 27 on page 63 compares the actual vested termination experience for General members with five or more years of service with the current and proposed assumptions.

Chart 28 on page 63 compares the actual vested termination experience for Safety members with five or more years of service with the current and proposed assumptions.

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Chart 23: Actual Number of Vested Terminations Compared to Expected
General Members

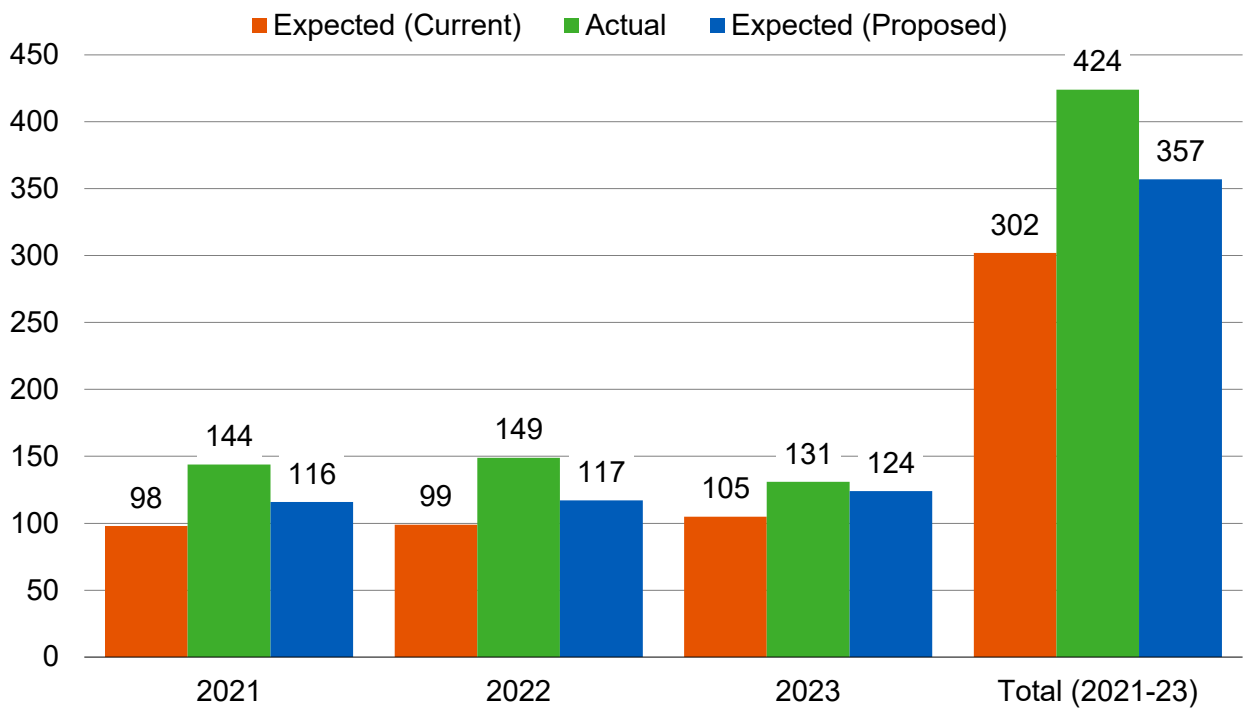
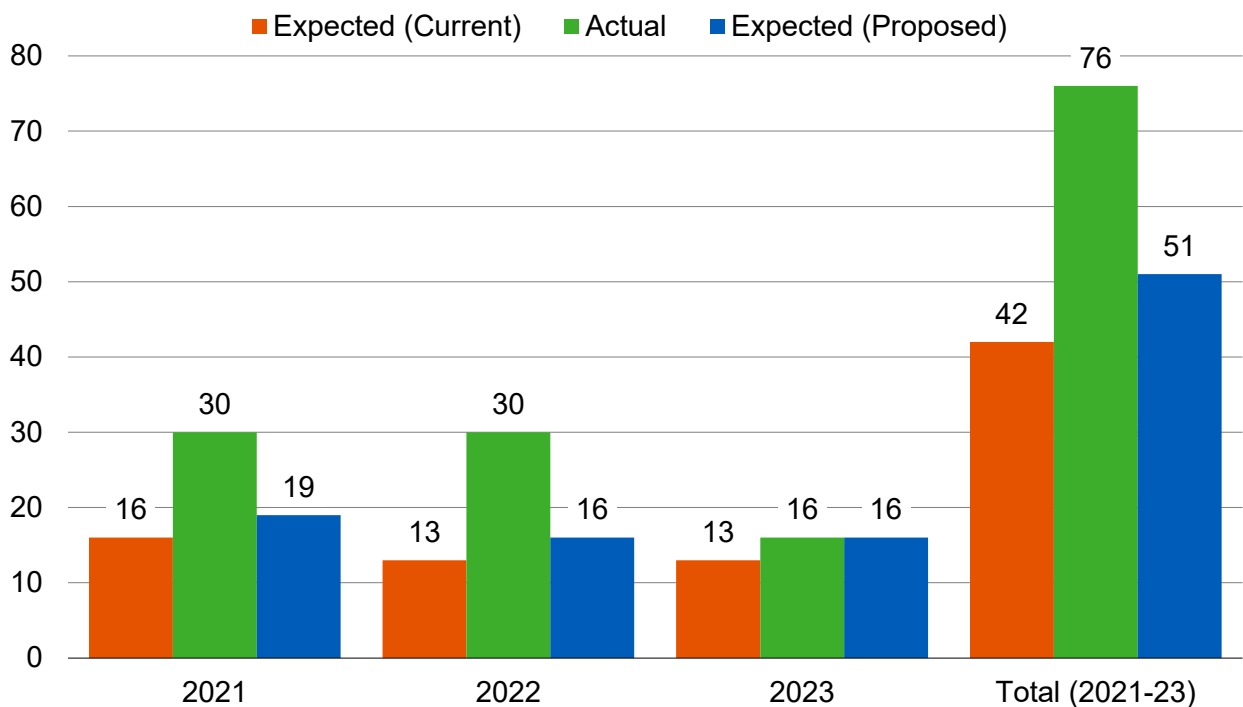


Chart 24: Actual Number of Vested Terminations Compared to Expected
Safety Members



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Chart 25: Vested Termination Rates — Less than Five Years of Service
General Members

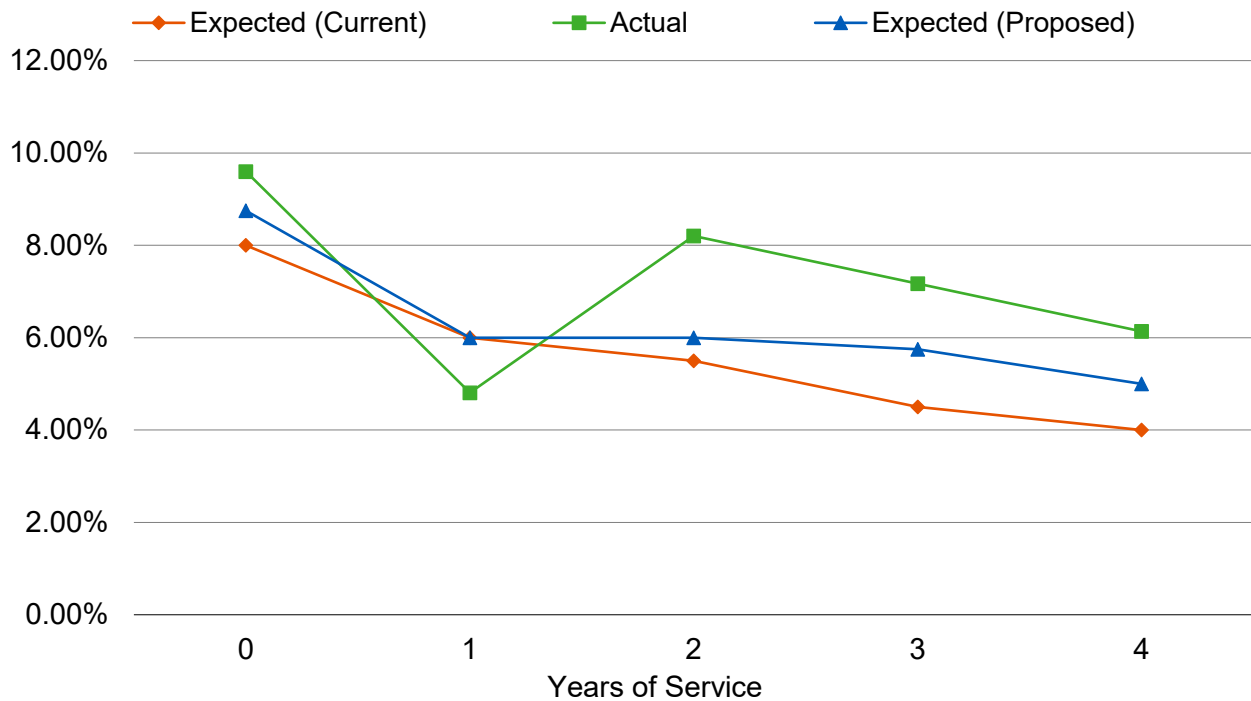
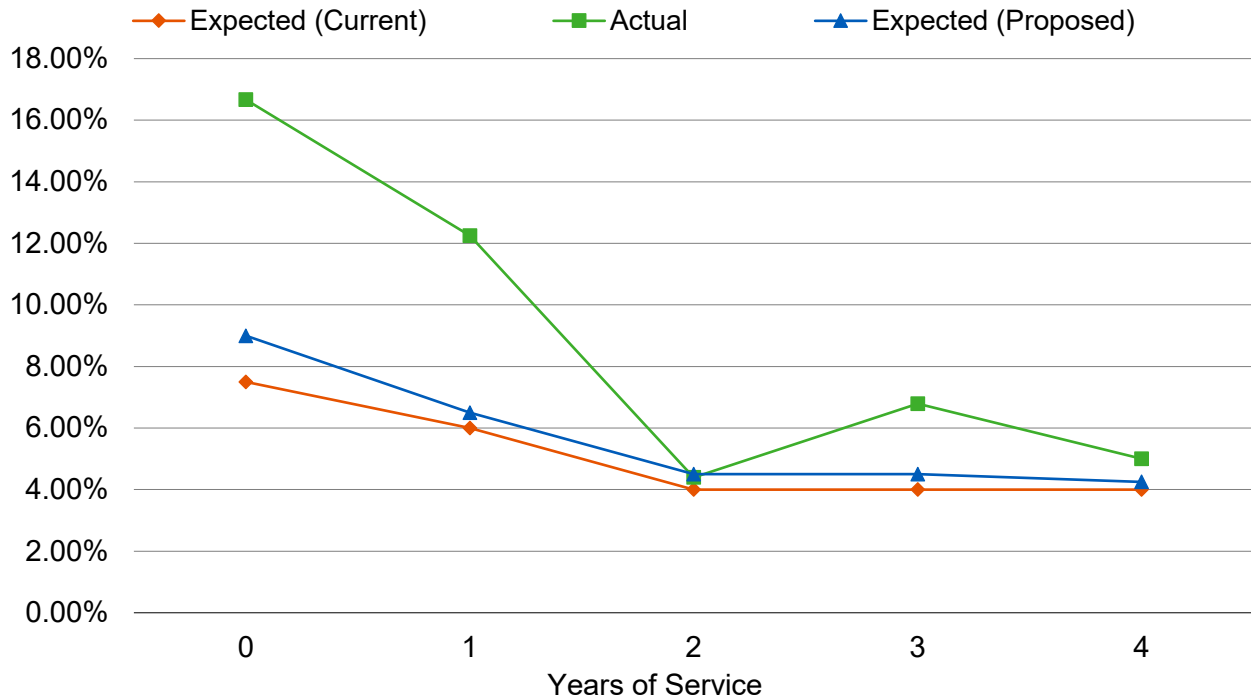


Chart 26: Vested Termination Rates — Less than Five Years of Service
Safety Members



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Chart 27: Vested Termination Rates — Five or More Years of Service
General Members

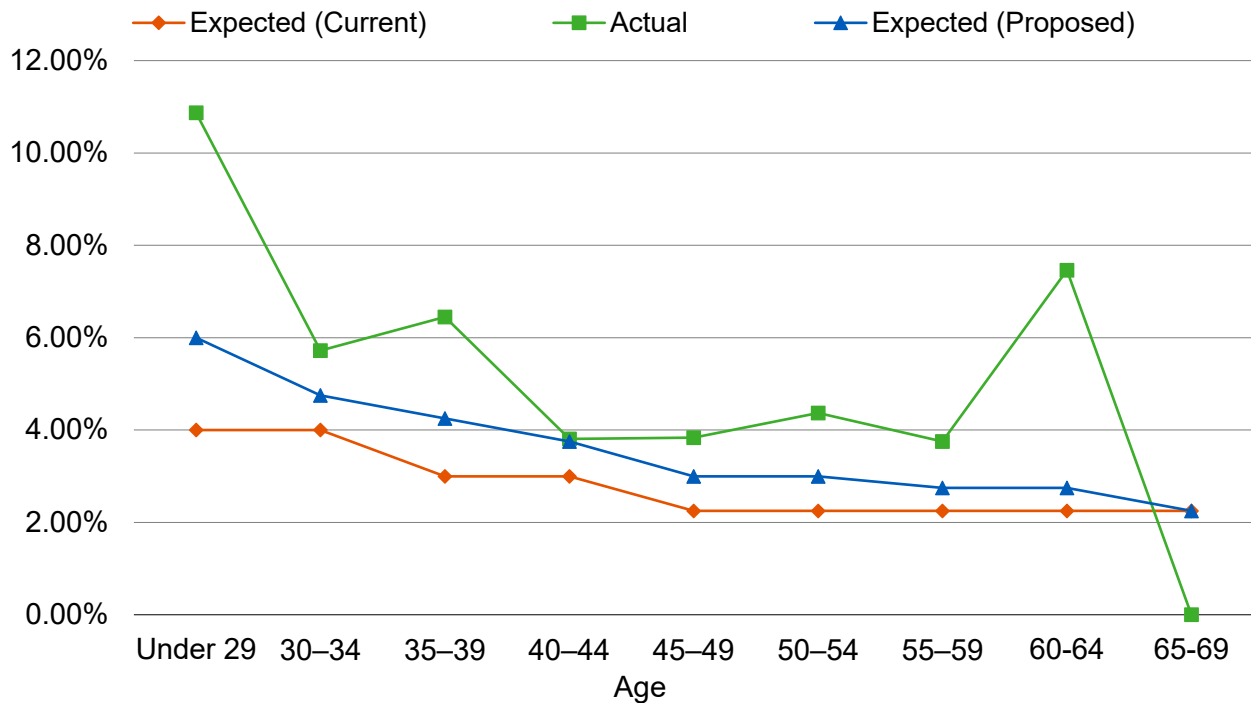
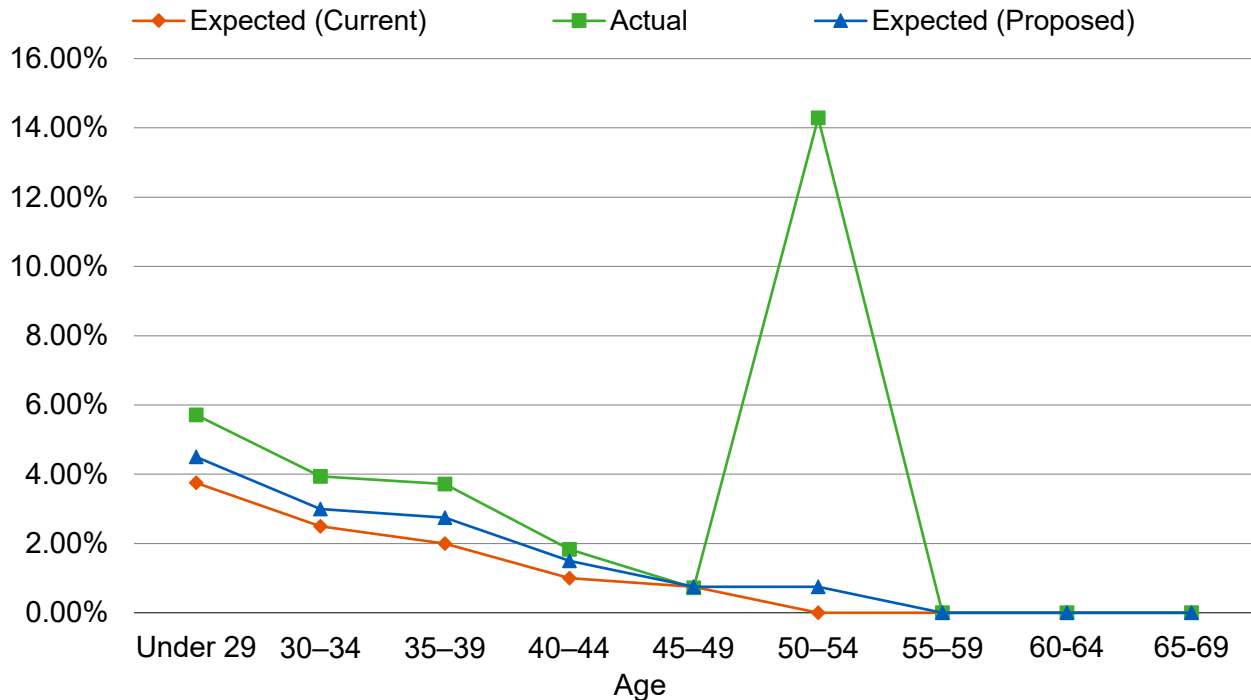


Chart 28: Vested Termination Rates — Five or More Years of Service
Safety Members



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E. Retirement rates

The age at which a member retires from service (i.e., who did not retire on a disability pension) will affect both the amount of the benefits that will be paid to that member as well as the period over which funding must take place.

Continuing the practice adopted in the last experience study, the retirement assumptions apply different sets of age-based retirement assumptions for those with less than 30 years of service and to those with more than 30 years of service.

General Plan A

The following table shows the observed service retirement rates for General Plan A members (i.e., non-PEPRA) based on the actual experience over the past three years, separately for those with less than 30 years of service and more than 30 years of service. The observed service retirement rates were determined by comparing those members who actually retired from service to those eligible to retire from service. Also shown are the current assumed rates and the rates we propose.

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Retirement Rates – General Plan A *by Years of Service (YOS)*

Age	<30 YOS Current Rate	<30 YOS Actual Rate	<30 YOS Proposed Rate	30+ YOS Current Rate	30+ YOS Actual Rate	30+ YOS Proposed Rate
Under 50	0.00%	N/A	0.00%	0.00%	N/A	0.00%
50	5.00%	7.65%	6.00%	10.00%	N/A	10.00%
51	3.50%	6.17%	4.00%	10.00%	0.00%	8.00%
52	4.50%	4.12%	4.25%	10.00%	0.00%	8.00%
53	5.00%	4.71%	4.75%	15.00%	23.08%	15.00%
54	5.50%	3.47%	4.75%	20.00%	7.14%	10.00%
55	10.00%	8.19%	9.00%	20.00%	0.00%	10.00%
56	8.50%	7.98%	8.50%	20.00%	24.14%	20.00%
57	8.50%	5.81%	8.50%	20.00%	22.58%	20.00%
58	10.00%	8.81%	10.00%	25.00%	37.50%	30.00%
59	18.00%	9.15%	15.00%	40.00%	41.67%	40.00%
60	21.00%	23.66%	22.00%	40.00%	66.67%	50.00%
61	21.00%	19.79%	20.00%	40.00%	0.00%	30.00%
62	27.00%	24.18%	25.00%	45.00%	28.57%	30.00%
63	27.00%	26.76%	27.00%	45.00%	25.00%	30.00%
64	27.00%	26.92%	27.00%	45.00%	0.00%	30.00%
65	32.00%	31.37%	32.00%	45.00%	28.57%	35.00%
66	40.00%	28.57%	32.00%	45.00%	50.00%	45.00%
67	40.00%	28.13%	35.00%	45.00%	0.00%	45.00%
68	40.00%	31.82%	35.00%	50.00%	0.00%	45.00%
69	50.00%	35.71%	40.00%	50.00%	0.00%	50.00%
70 and over	100.00%	21.21%	100.00%	100.00%	66.67%	100.00%

Based on this experience, we recommend decreases in the retirement rates at certain ages and recommend increases in the retirement rates at other ages. Overall, the proposed rates represent a slight decrease in the retirement rates for General Plan A members.

Chart 29 on page 69 compares the number of actual to expected retirements for General Plan A members over the past three years for the current and proposed assumptions. Chart 30 on page 69, Chart 31 on page 70, and Chart 32 on page 70 compares the same information for Safety Plan A, General Plan B, and Safety Plan B, respectively.

Chart 33 on page 71 that follows later in this section compares the actual retirement experience with the current and proposed assumptions for General Plan A members with less than 30 years of service.

Chart 34 on page 71 compares the actual retirement experience with the current and proposed assumptions for General Plan A members with 30 or more years of service.

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Safety Plan A

The following table shows the observed service retirement rates for Safety Plan A members (i.e., non-PEPRA) based on the actual experience over the past three years, separately for those with less than 30 years of service and more than 30 years of service. Also shown are the current assumed rates and the rates we propose.

Retirement Rates — Safety Plan A by Years of Service (YOS)

Age	<30 YOS Current Rate	<30 YOS Actual Rate	<30 YOS Proposed Rate	30+ YOS Current Rate	30+ YOS Actual Rate	30+ YOS Proposed Rate
46	2.00%	0.00%	2.00%	0.00%	N/A	0.00%
47	2.00%	2.38%	2.00%	0.00%	N/A	0.00%
48	6.00%	2.22%	5.00%	6.00%	N/A	6.00%
49	15.00%	13.33%	15.00%	15.00%	0.00%	15.00%
50	18.00%	15.79%	18.00%	18.00%	0.00%	18.00%
51	14.00%	15.56%	14.00%	16.00%	0.00%	16.00%
52	12.00%	12.50%	12.00%	18.00%	50.00%	18.00%
53	14.00%	12.50%	13.00%	25.00%	0.00%	20.00%
54	16.00%	13.33%	14.00%	50.00%	0.00%	25.00%
55	18.00%	16.67%	17.00%	50.00%	33.33%	30.00%
56	25.00%	21.74%	23.00%	50.00%	0.00%	30.00%
57	20.00%	20.00%	20.00%	50.00%	0.00%	35.00%
58	20.00%	0.00%	20.00%	50.00%	0.00%	40.00%
59	20.00%	25.00%	25.00%	75.00%	50.00%	50.00%
60	50.00%	20.00%	30.00%	75.00%	0.00%	50.00%
61	50.00%	28.57%	30.00%	75.00%	N/A	50.00%
62	50.00%	20.00%	30.00%	75.00%	0.00%	50.00%
63	50.00%	20.00%	30.00%	75.00%	N/A	50.00%
64	50.00%	0.00%	50.00%	75.00%	0.00%	50.00%
65 and over	100.00%	55.56%	100.00%	100.00%	40.00%	100.00%

Based on this experience, we recommend decreases overall in the retirement rates for Safety Plan A members, both with less than 30 years of service and with 30 or more years of service.

Chart 35 on page 72 compares the actual retirement experience with the current and proposed assumptions for Safety Plan A members with less than 30 years of service.

Chart 36 on page 72 compares the actual retirement experience with the current and proposed assumptions for Safety Plan A members with 30 or more years of service.

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General Plan B and Safety Plan B

On January 1, 2013, new PEPRA formulas were implemented for new General and Safety tiers, these new tiers are referred to as Plan B. With this study, we are beginning to use actual Plan B retirement experience to propose the retirement rates as the number of Plan B retirements continues to increase over time. However, it is still the case that relatively limited experience is available, especially for the Safety Plan B tier, so there is some smoothing of the proposed rates at most ages. This assumption will continue to be monitored in future experience studies, including whether service-based retirement rates should also be implemented for Plan B.

The following tables show the current assumed rates and the rates we propose for General Plan B and Safety Plan B members.

Retirement Rates — General Plan B and Safety Plan B

Age	General Current Rate	General Actual Rate	General Proposed Rate	Safety Current Rate	Safety Actual Rate	Safety Proposed Rate
50	0.00%	N/A	0.00%	5.00%	N/A	5.00%
51	0.00%	N/A	0.00%	5.00%	N/A	5.00%
52	3.50%	0.00%	3.00%	4.50%	0.00%	4.50%
53	1.00%	2.44%	2.00%	4.50%	0.00%	4.00%
54	2.00%	0.00%	2.00%	7.50%	0.00%	6.50%
55	2.50%	3.70%	2.50%	16.50%	0.00%	15.50%
56	3.50%	4.76%	3.50%	15.00%	0.00%	14.00%
57	4.50%	8.33%	5.00%	12.00%	33.33%	20.00%
58	5.00%	2.38%	5.00%	16.00%	0.00%	16.00%
59	7.50%	2.78%	5.00%	16.00%	25.00%	20.00%
60	8.00%	5.56%	6.00%	50.00%	50.00%	30.00%
61	12.00%	8.57%	9.00%	50.00%	0.00%	30.00%
62	15.00%	11.11%	13.00%	50.00%	0.00%	30.00%
63	20.00%	13.04%	15.00%	50.00%	0.00%	30.00%
64	25.00%	7.69%	15.00%	50.00%	0.00%	50.00%
65	25.00%	17.50%	23.00%	100.00%	33.33%	100.00%
66	25.00%	25.93%	25.00%	100.00%	100.00%	100.00%
67	25.00%	26.67%	25.00%	100.00%	N/A	100.00%
68	25.00%	41.67%	30.00%	100.00%	0.00%	100.00%
69	25.00%	28.57%	30.00%	100.00%	0.00%	100.00%
70 and over	100.00%	21.62%	100.00%	100.00%	N/A	100.00%

Chart 37 on page 73 compares the actual retirement experience with the current and proposed assumptions for General Plan B members.

Chart 38 on page 73 compares the actual retirement experience with the current and proposed assumptions for Safety Plan B members.

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Deferred vested members

In the last experience study, separate deferred vested retirement ages were introduced for reciprocal and non-reciprocal members.

The following table shows the observed deferred vested retirement age for General members based on the actual experience over the past **six** years, separately for those who went on to work at a reciprocal retirement system and those that did not. Also shown are the current assumed retirement ages and the retirement ages we propose.

General Members' Deferred Vested Retirement Age

Line Description	Reciprocal Members	Non-Reciprocal Members
Current assumption	60.0	58.0
Actual average age	60.9	58.2
Proposed assumption	60.0	58.0

Based on this experience, we recommend maintaining the deferred vested retirement age assumption for General members with reciprocity at age 60 and for General members without reciprocity at age 58.

The following table shows the observed deferred vested retirement age for Safety members based on the actual experience over the past **six** years, separately for those who went on to work at a reciprocal retirement system and those that did not. Also shown are the current assumed retirement ages and the retirement ages we propose.

Safety Members' Deferred Vested Retirement Age

Line Description	Reciprocal Members	Non-Reciprocal Members
Current assumption	55.0	52.0
Actual average age	54.6	50.6
Proposed assumption	55.0	51.0

Based on this experience, we recommend maintaining the deferred vested retirement age assumption for Safety members with reciprocity at age 55 and decreasing the assumption for Safety member without reciprocity to age 51.

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Chart 29: Actual Number of Retirements Compared to Expected
General Plan A Members

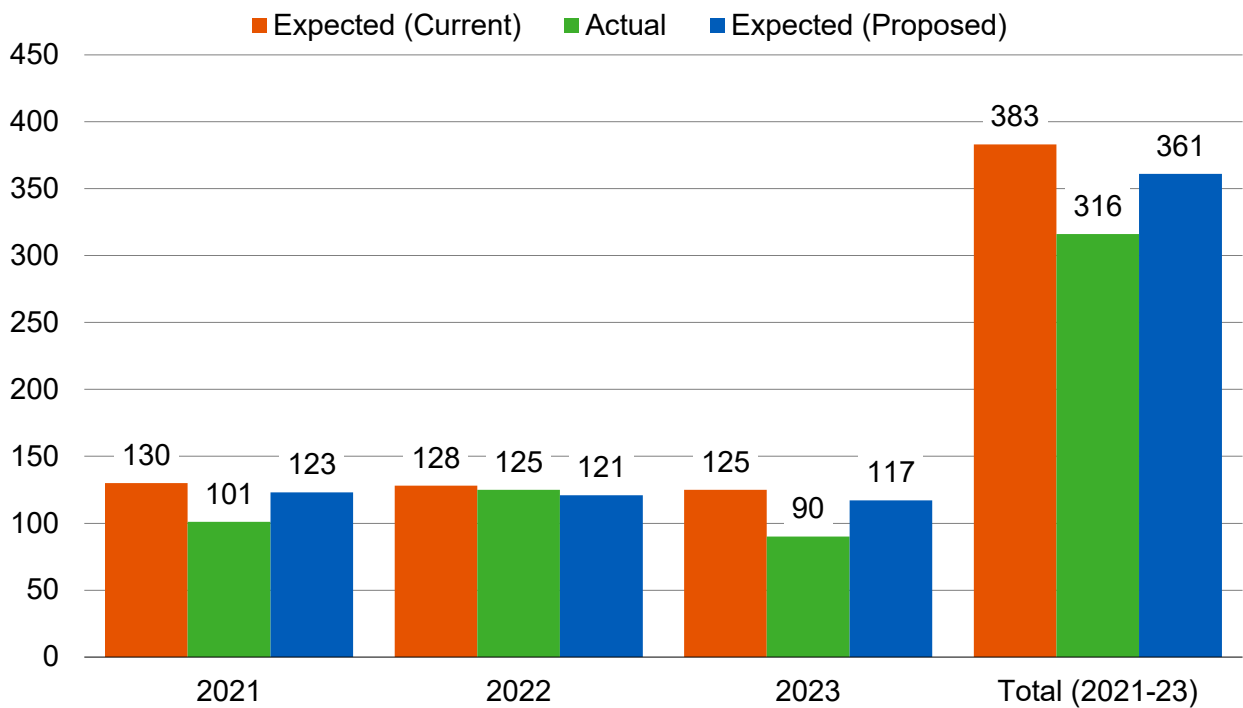
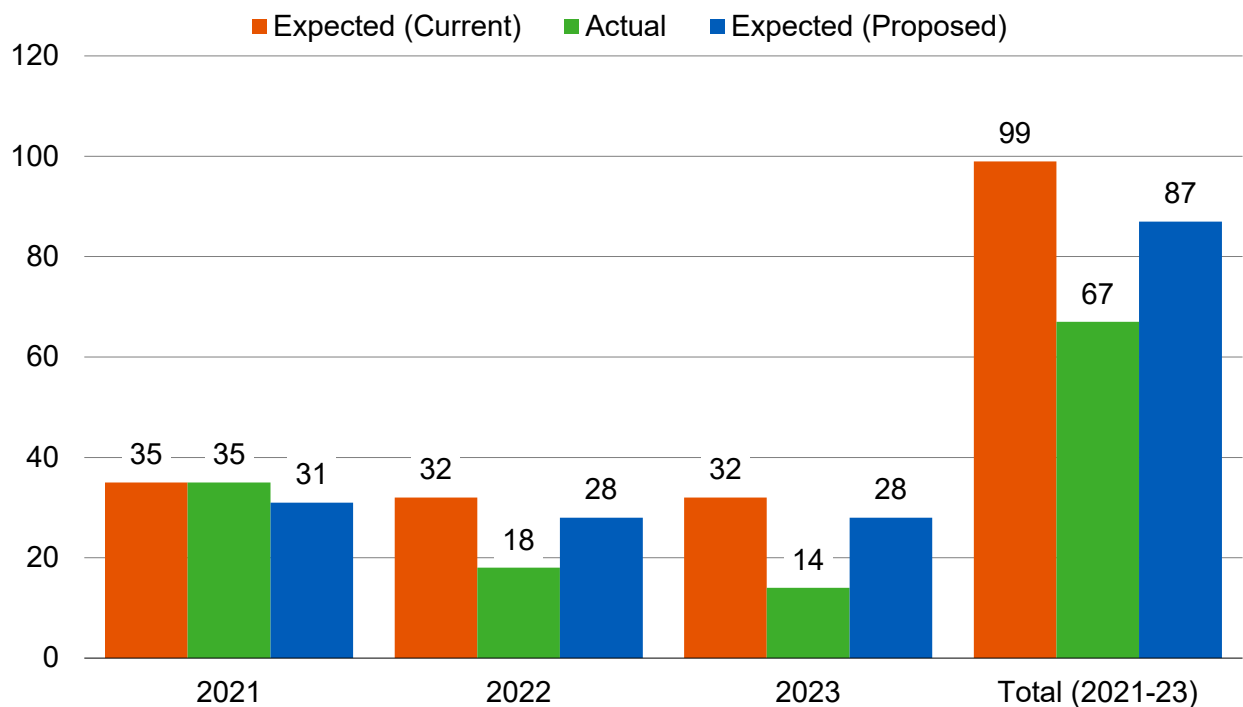


Chart 30: Actual Number of Retirements Compared to Expected
Safety Plan A Members



Section 4: Demographic Assumptions

Chart 31: Actual Number of Retirements Compared to Expected
General Plan B Members

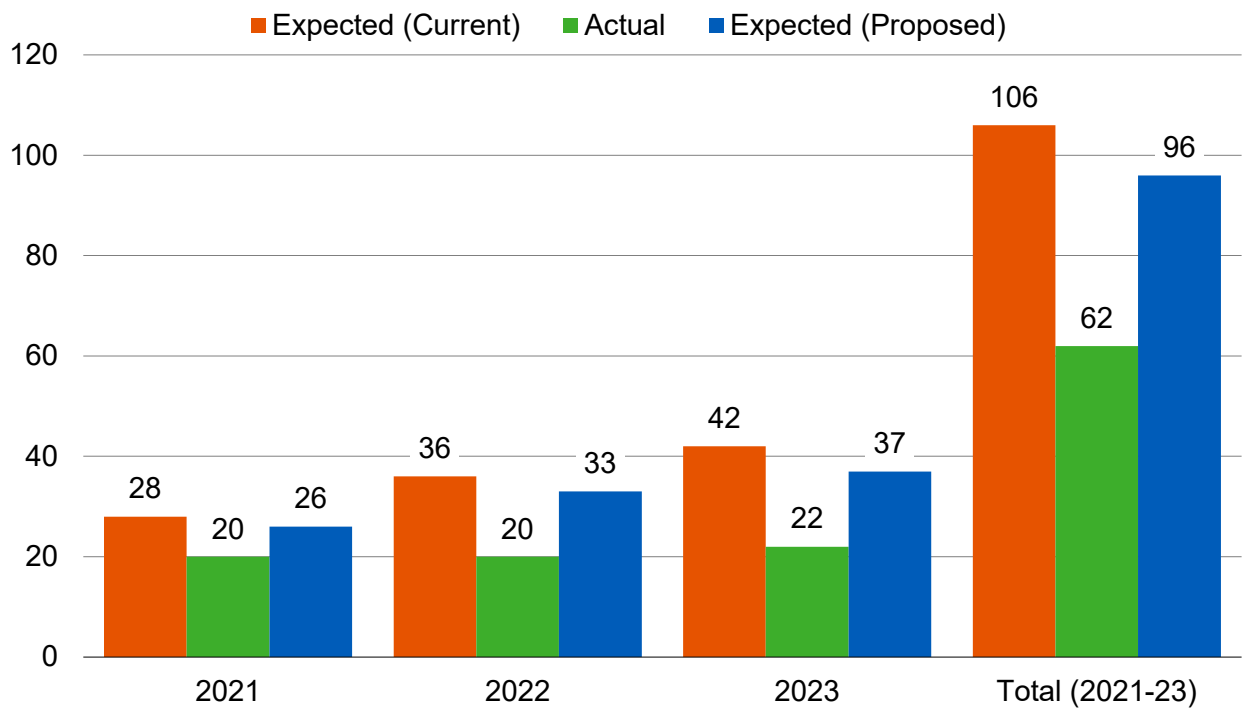
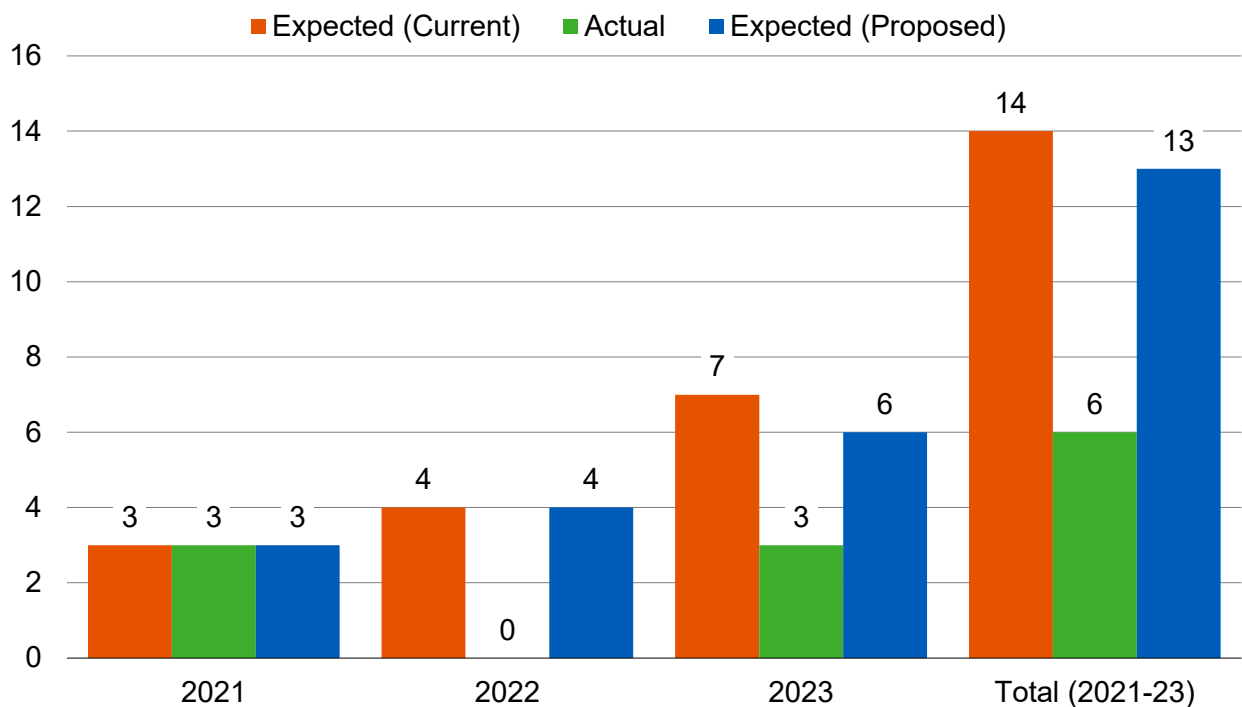


Chart 32: Actual Number of Retirements Compared to Expected
Safety Plan B Members



Section 4: Demographic Assumptions

Chart 33: Retirement Rates

General Plan A Members with less than 30 Years of Service

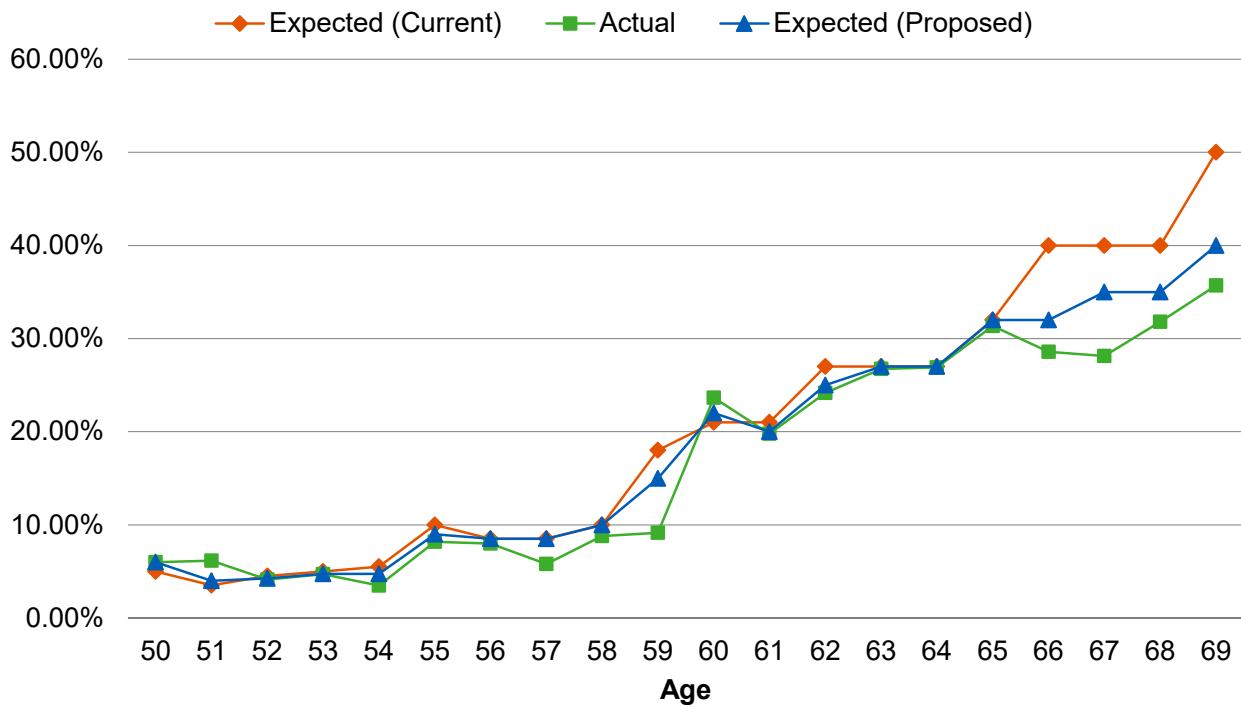
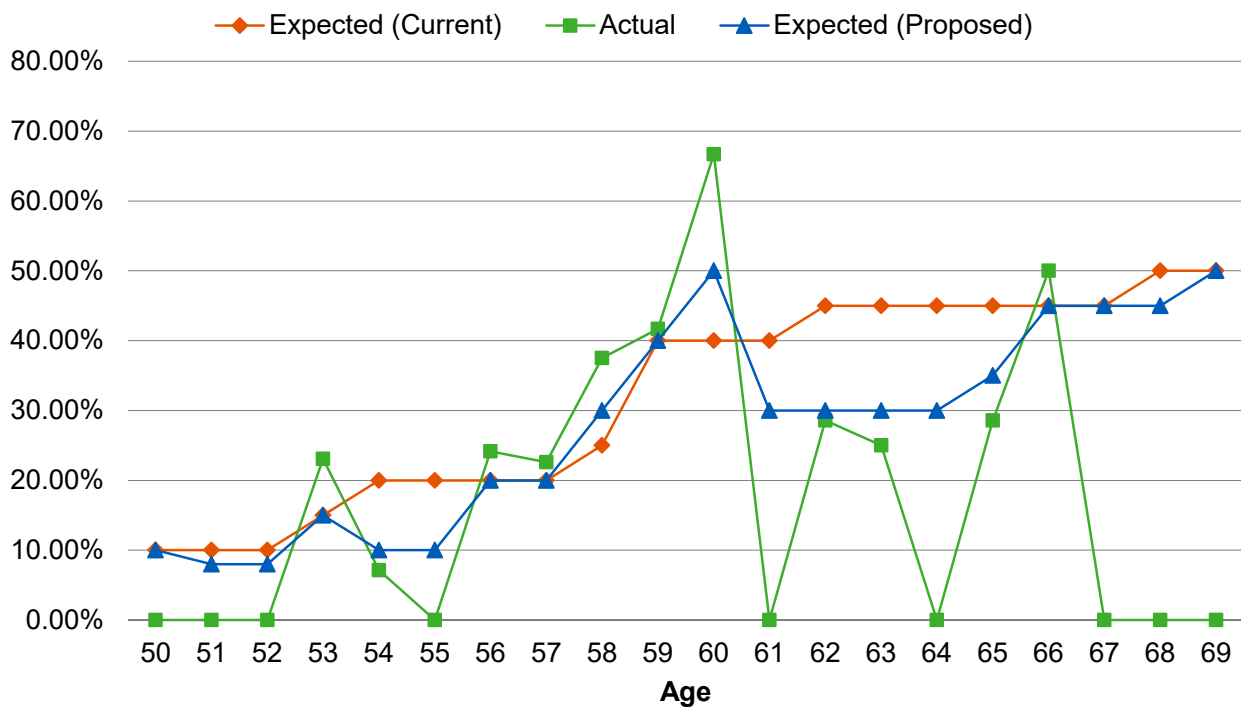


Chart 34: Retirement Rates

General Plan A Members with 30 or more Years of Service



Section 4: Demographic Assumptions

Chart 35: Retirement Rates

Safety Plan A Members with less than 30 Years of Service

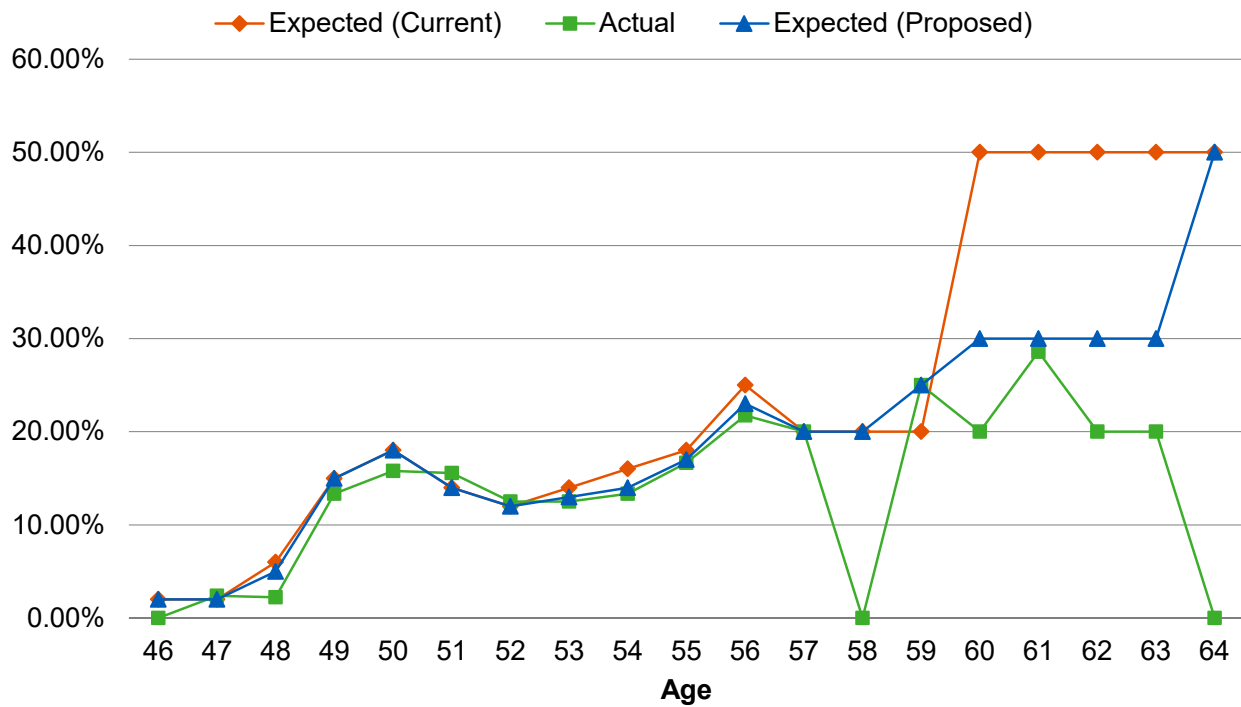
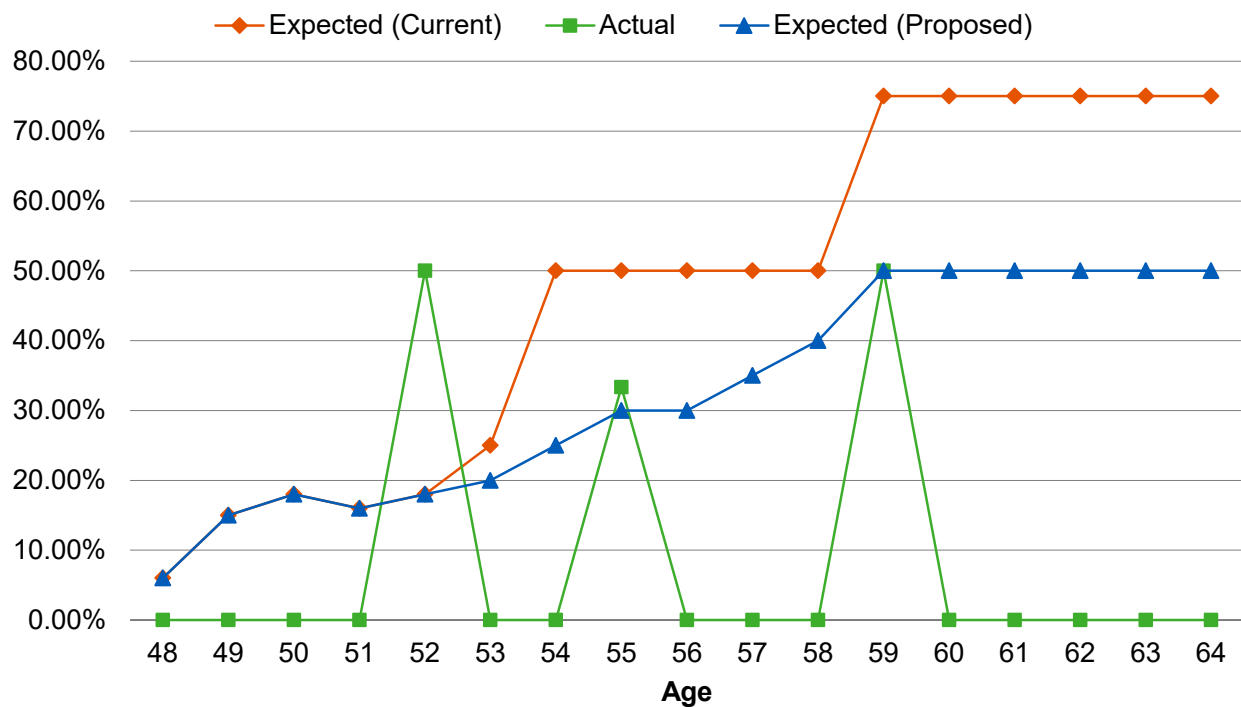


Chart 36: Retirement Rates

Safety Plan A Members with 30 or more Years of Service



Section 4: Demographic Assumptions

Chart 37: Retirement Rates
General Plan B Members

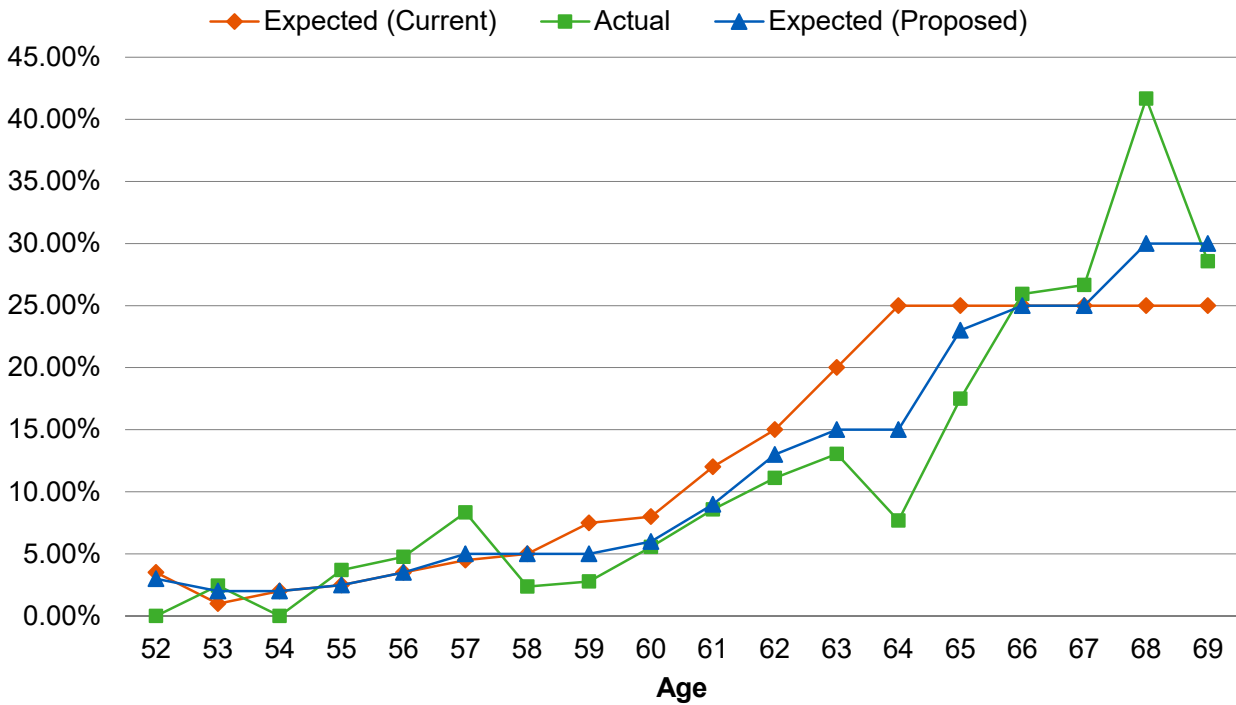
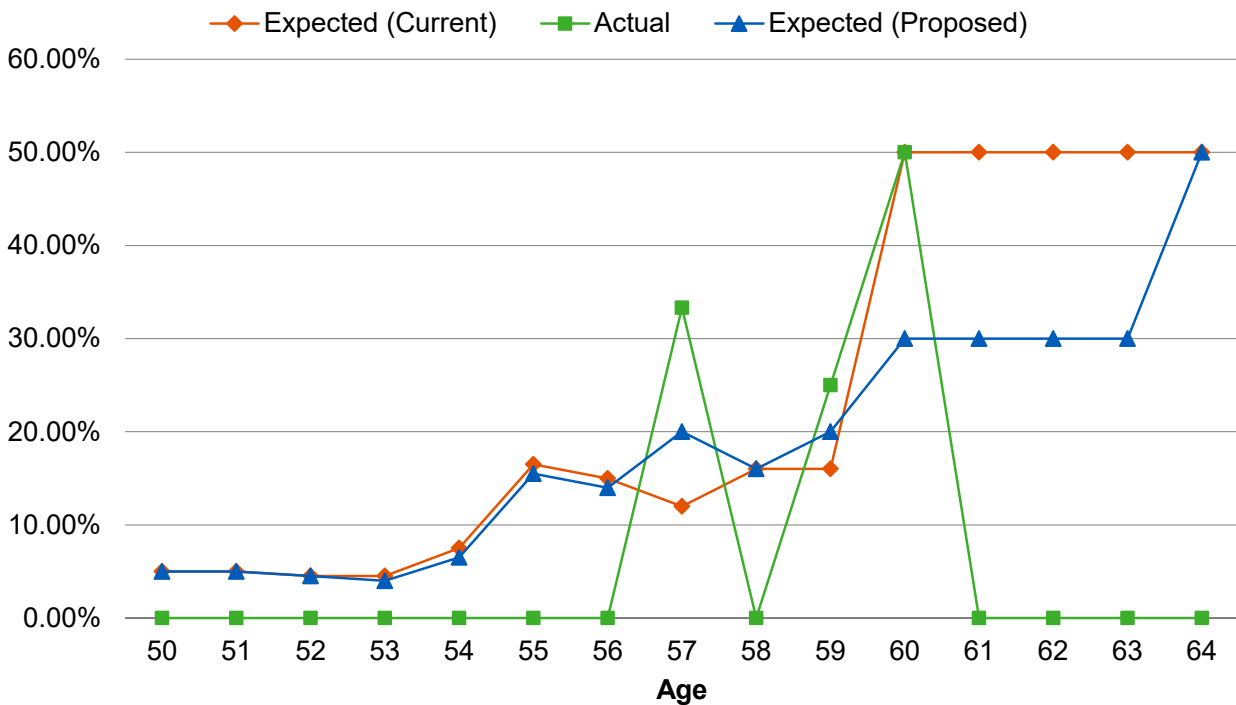


Chart 38: Retirement Rates
Safety Plan B Members



Section 4: Demographic Assumptions

F. Cashouts

The Board of Retirement has determined that several additional pay elements should be included as Earnable Compensation. These additional pay elements fall into two categories:

- Ongoing Pay Elements – Those that are expected to be received relatively uniformly over a member's employment years; and
- Cashout Pay Elements – Those that are expected to increase during the member's final average earnings pay period.

The first category is recognized in the actuarial calculations by virtue of being included in the current pay of active members. The second category requires a separate actuarial assumption to anticipate its impact on a member's retirement benefit for the Court and Sonoma Valley Fire District members in Plan A.

Court

In this study, we have collected data for new retirements over the last three years to estimate vacation and holiday cashouts for active General Plan A Court members as a percentage of final average pay. The results are summarized in the following table:

General Plan A – Court

Year Ending December 31,	Actual Average Cashout
2021	1.81%
2022	1.38%
2023	2.55%
Average	1.87%
Current assumption	3.25%
Proposed assumption	2.50%

Beginning with the 2016/2017 fiscal year, General Plan A Court members may no longer cash out sick leave. Instead, General Plan A Court members must convert any unused sick leave at retirement to service credit. It should be noted that, similar to the employees at the County and the Sonoma Valley Fire District, when a Court employee applies for retirement and has unused sick leave to convert, SCERA bills the employer for the cost of the conversion at the time of retirement. Therefore, no assumption for the conversion of sick leave is needed for the actuarial valuation.

Based on the above experience, we recommend reducing the cashout assumption for General Plan A Court members from 3.25% to 2.50%.

Sonoma Valley Fire District

We have also reviewed the cashout assumptions for Sonoma Valley Fire District General Plan A and Safety Plan A members.

Section 4: Demographic Assumptions

As of December 31, 2023, there is only one General Sonoma Valley Fire District Plan A member. Based on discussions with SCERA, we understand that this member has been cashing out the maximum allowable cashout of 96 hours of vacation time per year. Since the member is cashing out the maximum allowable hours, there will not be any additional hours to cash out in their year of retirement. **Therefore, the cashout assumption for General Plan A members is no longer applicable, so we recommend removing this cashout assumption.**

As of December 31, 2023, there were 30 Safety Sonoma Valley Fire District Plan A members. Historically, we reviewed individual cashout information by year, with the last available dataset prepared for the 2020 calendar year. While individual cashout information was not available for the current study period, we analyzed the prior information for 2020 and observed that the majority of members who cashed out the maximum allowable hours on an ongoing basis were over the age of 40, as they approached retirement. Therefore, we have applied a simplifying assumption to the current group of 30 Safety Plan A members that those who are over the age of 40 (as of December 31, 2023) would also cash out their maximum allowable hours on an ongoing basis, while those members who are under the age of 40 would not cash out any hours. We have applied these simplifying assumptions to develop the “assumed ongoing cashout hours” shown in the table below.

Safety Plan A – Sonoma Valley Fire District

Line Description	Assumed Ongoing Cashout Hours ¹ (1)	Policy Maximum (2)	Difference Between (2) and (1)
Vacation	74	96	
Administrative Leave	19	19	
Total	93	115	22
Current assumption ²			52
Proposed assumption³			21

Based on our new approach of applying a 100% ongoing cashout assumption for members who are over the age of 40 and a 0% ongoing cashout assumption for members who are under the age of 40, we recommend reducing the cashout assumption for Safety Plan A Sonoma Valley Fire District from 2.50% to 1.00%.

County

It should be noted that County active employees are no longer eligible for cashouts.

However, for General Plan A County members who terminated prior to June 1, 2014 we have maintained the current cashout assumption of 4%. Similarly, for Safety Plan A County members who terminated prior to June 1, 2014 we have maintained the current cashout assumption of 6%. This is based on our understanding that salaries reported for the valuation have not been adjusted for cashouts. (These assumptions were based on the cashout assumptions in effect at the time the County ceased allowing cashouts at retirement on a go-forward basis.)

¹ See discussion immediately preceding this table for the calculation of these amounts.

² Calculated by multiplying the FTE hours (i.e., 80×26.089 , or 2,087.12) by the 2.5% current assumption used in our valuation.

³ Calculated by multiplying the FTE hours (i.e., 80×26.089 , or 2,087.12) by a 1.0% assumption.

Section 4: Demographic Assumptions

G. Miscellaneous assumptions

Reciprocity

Under the current assumptions, a percentage of future deferred vested members are assumed to go on to work under a reciprocal retirement system. The following table shows the observed reciprocity percent based on the actual experience as of December 31, 2023. Also shown are the current and proposed assumptions.

Percent of Deferred Vested Members Covered under Reciprocal System

Line Description	General	Safety
Current assumption	25%	35%
Actual percent	22%	28%
Proposed assumption	25%	30%

We recommend maintaining the reciprocal assumption at 25% for General members while decreasing the assumption to 30% for Safety members. This recommendation takes into account the experience of all deferred vested members as of December 31, 2023 instead of just new deferred vested members during the three-year period. This is because there is a lag between a member's date of termination and the time that it is known if they have reciprocity with a reciprocal retirement system.

In addition, we recommend 3.75% and 4.00% annual salary increase assumptions for General and Safety members, respectively, be utilized to anticipate salary increases from the date of termination from SCERA to the expected date of retirement for deferred vested members covered by a reciprocal retirement system. These assumptions are based on the ultimate 0.75% and 1.00% merit and promotion salary increase assumptions for General and Safety members, respectively, together with the 2.50% inflation and 0.50% "across-the-board" salary increase assumptions that are recommended in *Section 3* of this report.

Future benefit accruals

Benefits are based on the years of service and compensation earned by the member. In order to project benefits and determine the liabilities, an assumption about the amount of service earned by members each year is necessary.

Over the past three years, the average service earned by continuing active members from one valuation date to the next was 0.98 years.

We recommend maintaining the current assumption that all members earn full-time service (or 1.00 year of service) per year in the future.

Unknown data for members

When various elements of valuation data are not available, an assumption must be made in order to project benefits and determine liabilities.

Section 4: Demographic Assumptions

In particular, there were about 40 records in the December 31, 2023 valuation who were reported with an unknown gender.

The following table shows the gender of active members based on actual experience over the past three years. Also shown are the current and proposed assumptions for members with unknown gender. This information is shown separately for active General and Safety members.

General Member — Assumption for Unknown Gender

	Male Member	Female Member
Current assumption	100%	0%
Actual percent	35%	65%
Proposed assumption	0%	100%

Safety Member — Assumption for Unknown Gender

	Male Member	Female Member
Current assumption	100%	0%
Actual percent	77%	33%
Proposed assumption	100%	0%

Based on this experience, we recommend updating the assumption for members with unknown gender to assume General members are female and Safety members are male. These assumptions will continue to be monitored in future experience studies.

Form of payment

Under the plan provisions, an eligible survivor of a deceased member who has elected the unmodified option is eligible to receive a benefit continuance upon the member's death.

In prior valuations, it was assumed that all active and inactive members would select the unmodified option at retirement. Actual experience for recent new retirees shows that 87% select the unmodified option. **Therefore, we recommend maintaining the assumption that all members will elect the unmodified option at retirement.**

Percent with eligible survivor

The value of a member's retirement, disability, or death benefit depends on the percentage of members who are assumed to have an eligible spouse or domestic partner.

The following table shows the observed percentage of new retirees who were reported with an eligible spouse or domestic partner at the time of retirement based on the actual experience over the past three years. Also shown are the current and proposed assumptions. This information is shown separately by the member's gender.

Section 4: Demographic Assumptions

New Retirees with Eligible Spouse or Domestic Partner and Selected Unmodified Option

Line Description	Male Member	Female Member
Current assumption	70%	55%
Actual percent	65%	54%
Proposed assumption	65%	55%

Based on this experience, we recommend decreasing the percent with eligible survivor assumption for male members to 65% and maintaining the assumption for female members at 55%.

Eligible survivor age and gender

Since the present value of the survivor's automatic continuance benefit is dependent on the survivor's age and gender, we must also have assumptions for these demographics of the survivor. Based on the experience for members who retired during the current three-year period (results shown in the table below) and studies done for other retirement systems, **we recommend the following:**

- 1. We recommend maintaining the survivor gender assumption that male members have a female survivor, and female members have a male survivor.** We note that this assumption is consistent with the actual data for most members as of December 31, 2023, even with the inclusion of domestic partners.
- 2. We recommend maintaining the spouse age difference assumption that male retirees are three years older than their spouses and female retirees are two years younger than their spouses.** These assumptions will continue to be monitored in future experience studies.

Member's Age as Compared to Spouse's Age

Line Description	Male Retiree	Female Retiree
Current assumption	3 years older	2 years younger
Actual percent	2.5 years older	2.1 years younger
Proposed assumption	3 years older	2 years younger

Section 4: Demographic Assumptions

H. Change in methodology

With this experience study we are recommending a technical change in the calculation of an active member's entry age. We note that this change does not impact the active member's total present value of benefits, only the allocation of that present value between prior service (actuarial accrued liability) and future service (normal costs).

Previously, when determining entry age for use in the actuarial cost method, entry age was set equal to the member's age as of the valuation date minus years of eligibility service. With this experience study, we recommend setting entry age for use in the actuarial cost method equal to the member's age as of the valuation date minus the lesser of years of eligibility service and years of benefit service. Additionally, we are recommending a change to round down the service to the next lowest integer when calculating entry age.

We note that these changes do not impact a member's entry age in determining Plan A contribution rates, these are technical changes for how our program applies the actuarial cost method. The overall impact of these changes would increase the total average employer and member contribution rates by 0.05% and 0.08% of payroll, respectively. Included in the 0.05% employer total rate impact is a reduction in the unfunded actuarial accrued liability of \$13.2 million.

Section 5: Cost Impact

We have estimated the impact of all the recommended demographic and economic assumptions as if they were applied to the December 31, 2023 actuarial valuation. The table below shows the changes in the employer and member contribution rates due to the proposed assumption changes separately for the recommended economic assumption changes (as recommended in *Section 3* of this report which include the recommended merit and promotion salary increases) and the recommended demographic assumption changes (as recommended in *Section 4* of this report).

As discussed in the December 31, 2023 actuarial valuation, active members represented by some of the bargaining groups have agreed to pay additional employee Normal Cost contributions that are above those determined under the County Employees Retirement Law of 1937 (CERL), as permitted under the California Public Employees' Pension Reform Act of 2013 (CalPEPRA). The impact to the member contribution rate for Plan A members shown herein reflect only the impact on the minimum member contribution rates specified in the CERL. However, those additional contributions (with the exception of General Plan A County members) are calculated as a fixed percentage of pay and would not be impacted by the change in assumptions. Because General Plan A County members have agreed to pay two-thirds of the difference between the employee and employer normal cost contribution, those employees would share in a portion of the rate reduction that has been allocated to the employer within this report.

Cost Impact of the Recommended Assumptions Based on December 31, 2023 Actuarial Valuation

Assumption	Impact on Average Employer Contribution Rates	Impact on Average Member Contribution Rates
Changes in demographic assumptions	0.32%	0.08%
Changes in economic assumptions	0.24%	0.13%
Changes in methodology	0.05%	0.08%
Total change in average rate	0.61%	0.29%
Estimated increase in annual amount (\$ in '000s)¹	\$2,802	\$1,304

Assumption	Impact on UAAL	Impact on Funded Ratio (VVA ² Basis)
Changes in demographic assumptions	\$14.3 million	(0.36%)
Changes in economic assumptions	12.8 million	(0.32%)
Changes in methodology	(13.2) million	0.33%
Total change	\$13.8 million	(0.34%)

Note: Results may not add due to rounding.

¹ Based on December 31, 2023 projected compensation as determined under each set of assumptions.

² Valuation value of assets.

Section 5: Cost Impact

The tables below show the average employer and member contribution rate impacts for each cost group due to the recommended assumption changes as if they were applied to the December 31, 2023 actuarial valuation.

Employer Contribution Rate Increases/(Decreases) (% of Payroll)

Plan of Membership	Normal Cost	UAAL	Total	Annual Amount (\$ in '000s)
General				
Plan A – County (w/ UAAL rate sunset)	(0.09%)	0.40%	0.31%	\$260
Plan A – County (w/o UAAL rate sunset)	(0.09%)	0.40%	0.31%	250
Plan A – Court	(0.24%)	0.41%	0.17%	16
Plan A – Sonoma Valley Fire District	(0.12%)	0.61%	0.49%	1
Plan B – County	0.08%	0.40%	0.48%	984
Plan B – Court	0.08%	0.41%	0.49%	37
Plan B – Sonoma Valley Fire District	0.08%	0.61%	0.69%	1
Safety¹				
Plan A – County	2.43%	(0.60%)	1.83%	\$757
Plan A – Sonoma Valley Fire District	3.13%	(0.61%)	2.52%	119
Plan B – County	1.64%	(0.60%)	1.04%	349
Plan B – Sonoma Valley Fire District	1.48%	(0.61%)	0.87%	28
Total Plan	0.40%	0.21%	0.61%	\$2,802

Average Member Contribution Rate Increases/(Decreases) (% of Payroll)

Plan of Membership	Total	Annual Amount (\$ in '000s)
General		
Plan A – County (w/ UAAL rate sunset)	0.30%	\$236
Plan A – County (w/o UAAL rate sunset)	0.30%	231
Plan A – Court	0.25%	17
Plan A – Sonoma Valley Fire District	0.00%	0
Plan B – County	0.08%	153
Plan B – Court	0.08%	6
Plan B – Sonoma Valley Fire District	0.08%	0
Safety		
Plan A – County	0.10%	41
Plan A – Sonoma Valley Fire District	(0.06%)	(3)
Plan B – County	1.64%	570
Plan B – Sonoma Valley Fire District	1.48%	51
Total Plan	0.29%	\$1,304

Note: Results may not add due to rounding.

¹ For the Safety membership group, the primary cost driver was the increase in the disability retirement assumptions.

Appendix A: Current Actuarial Assumptions

Economic assumptions

Net investment return

6.75%, net of investment and administrative expenses.

Inflation rate

Increase of 2.50% per year.

Cost-of-Living Adjustment (COLA)

Not applicable.

Employee contribution crediting rate

2.50%, credited semi-annually (actual increase is based on ten-year Treasury rate).

Payroll growth

Inflation of 2.50% per year plus “across-the-board” salary increase of 0.50% per year.

Increases in Internal Revenue Code Section 401(a)(17) Compensation Limit

Increase of 2.50% per year from the valuation date.

Increase in Section 7522.10 Compensation Limit

Increase of 2.50% per year from the valuation date.

Appendix A: Current Actuarial Assumptions

Salary increases

The annual rate of compensation increase includes:

- Inflation at 2.50%, plus
- “Across-the-board” salary increase of 0.50% per year, plus
- Merit and promotion increase based on years of service:

Merit and Promotion Increases (%)

Years of Service	General	Safety
Less than 1	5.00	7.50
1 – 2	5.50	7.50
2 – 3	4.50	5.00
3 – 4	3.50	4.50
4 – 5	2.50	3.50
5 – 6	2.00	1.75
6 – 7	1.50	1.50
7 – 8	1.25	1.25
8 – 9	1.25	1.25
9 – 10	1.25	1.25
10 – 11	1.00	1.25
11 – 12	1.00	1.25
12 – 13	0.75	1.25
13 – 14	0.75	1.00
14 – 15	0.75	1.00
15 and over	0.55	1.00

Demographic assumptions

Post-retirement mortality rates

Healthy

- **General members:**
 - Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2020
- **Safety members:**
 - Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2020

Appendix A: Current Actuarial Assumptions

Disabled

- **General members:**
 - Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 5% for males and decreased by 10% for females, projected generationally with the two-dimensional mortality improvement scale MP-2020
- **Safety members:**
 - Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2020

Beneficiary

- **All beneficiaries:**
 - Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2020

Pre-retirement mortality rates

- **General members:**
 - Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates decreased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2020
- **Safety members:**
 - Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates decreased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2020

Appendix A: Current Actuarial Assumptions

Pre-Retirement Mortality Rates (%) – Before Generational Projection from 2010

Age	General Male	General Female	Safety Male	Safety Female
20	0.03	0.01	0.04	0.01
25	0.02	0.01	0.03	0.02
30	0.03	0.01	0.03	0.02
35	0.04	0.02	0.04	0.03
40	0.05	0.03	0.05	0.04
45	0.08	0.05	0.07	0.06
50	0.12	0.08	0.10	0.08
55	0.18	0.11	0.14	0.11
60	0.26	0.17	0.22	0.14
65	0.38	0.27	0.34	0.20
70	0.58	0.44	0.63	0.39

All pre-retirement deaths are assumed to be non-service connected.

Mortality rates for Plan A member contributions

- **General members:**

- Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5% for females, projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2020, weighted one-third male and two-thirds female

- **Safety members:**

- Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected 30 years (from 2010) with the two-dimensional mortality improvement scale MP-2020, weighted three-fourths male and one-fourth female

Appendix A: Current Actuarial Assumptions

Disability incidence rates

Disability Incidence Rates (%)

Age	General	Safety
20	0.05	0.10
25	0.05	0.16
30	0.05	0.68
35	0.05	1.30
40	0.14	1.50
45	0.20	2.10
50	0.23	2.50
55	0.28	2.80
60	0.30	3.00
65	0.30	0.00
70	0.00	0.00

55% of General disabilities are assumed to be service-connected disabilities and the other 45% are assumed to be non-service-connected disabilities.

100% of Safety disabilities are assumed to be service-connected disabilities.

Appendix A: Current Actuarial Assumptions

Withdrawal rates

Withdrawal Rates (%) — Less Than Five Years of Service

Years of Service	General	Safety
Less than 1	5.75	3.00
1 – 2	2.75	2.40
2 – 3	2.50	1.40
3 – 4	2.50	1.40
4 – 5	1.75	1.40

Withdrawal Rates (%) — Five or More Years of Service

Age	General	Safety
20	1.25	1.00
25	1.25	1.00
30	1.10	0.85
35	0.70	0.54
40	0.44	0.25
45	0.37	0.09
50	0.32	0.02
55	0.18	0.00
60	0.04	0.00
65	0.00	0.00
70	0.00	0.00

No withdrawal is assumed after a member is first assumed to retire.

Appendix A: Current Actuarial Assumptions

Vested termination

Vested Termination Rates (%) — Less Than Five Years of Service

Years of Service	General	Safety
Less than 1	8.00	7.50
1 – 2	6.00	6.00
2 – 3	5.50	4.00
3 – 4	4.50	4.00
4 – 5	4.00	4.00

Vested Termination Rates (%) — Five or More Years of Service

Age	General	Safety
20	4.00	3.75
25	4.00	3.75
30	4.00	3.00
35	3.40	2.20
40	3.00	1.40
45	2.55	0.85
50	2.25	0.30
55	2.25	0.00
60	2.25	0.00
65	2.25	0.00
70	0.00	0.00

No vested termination is assumed after a member is first assumed to retire.

Appendix A: Current Actuarial Assumptions

Retirement rates

Retirement Rates (%) - General

Age	Plan A Less than 30 Years of Service	Plan A 30 or More Years of Service	Plan B
Under 50	0.00	0.00	0.00
50	5.00	10.00	0.00
51	3.50	10.00	0.00
52	4.50	10.00	3.50
53	5.00	15.00	1.00
54	5.50	20.00	2.00
55	10.00	20.00	2.50
56	8.50	20.00	3.50
57	8.50	20.00	4.50
58	10.00	25.00	5.00
59	18.00	40.00	7.50
60	21.00	40.00	8.00
61	21.00	40.00	12.00
62	27.00	45.00	15.00
63	27.00	45.00	20.00
64	27.00	45.00	25.00
65	32.00	45.00	25.00
66	40.00	45.00	25.00
67	40.00	45.00	25.00
68	40.00	50.00	25.00
69	50.00	50.00	25.00
70 and over	100.00	100.00	100.00

Appendix A: Current Actuarial Assumptions

Retirement Rates (%) - Safety

Age	Plan A Less than 30 Years of Service	Plan A 30 or More Years of Service	Plan B
Under 45	0.00	0.00	0.00
46	2.00	0.00	0.00
47	2.00	0.00	0.00
48	6.00	6.00	0.00
49	15.00	15.00	0.00
50	18.00	18.00	5.00
51	14.00	16.00	5.00
52	12.00	18.00	4.50
53	14.00	25.00	4.50
54	16.00	50.00	7.50
55	18.00	50.00	16.50
56	25.00	50.00	15.00
57	20.00	50.00	12.00
58	20.00	50.00	16.00
59	20.00	75.00	16.00
60	50.00	75.00	50.00
61	50.00	75.00	50.00
62	50.00	75.00	50.00
63	50.00	75.00	50.00
64	50.00	75.00	50.00
65 and over	100.00	100.00	100.00

Inactive members

Current and Future Inactive Member Assumptions

Category	% of Future ¹ Inactive Members	Annual Salary Increases from Separation Date	Retirement Age
General with reciprocity	25%	3.55%	60
General without reciprocity	75%	N/A	58
Safety with reciprocity	35%	4.00%	55
Safety without reciprocity	65%	N/A	52

Inactive members without reciprocity who terminate with less than five years of service and are not vested are assumed to retire at age 70 for both General and Safety if they decide to leave their contributions on deposit.

Future benefit accruals

1.0 year of service per year of employment.

¹ SCERA provides the reciprocity status for current deferred vested members in the valuation census data.

Appendix A: Current Actuarial Assumptions

Unknown data for members

Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.

Definition of active members

All active members of SCERA as of the valuation date.

Form of payment

All active and inactive members are assumed to elect the unmodified option at retirement.

Survivor assumptions

Current Active and Inactive Member Survivor Assumptions

Member Gender	% with Eligible Survivor at Retirement or Pre-Retirement Death	Survivor Age	Survivor Gender
Male member	70%	3 years younger than member	Female
Female member	55%	2 years older than member	Male

Cashouts

Plan A-County

For members who terminated prior to June 1, 2014, the following assumptions for a one-time compensation increase at retirement from vacation, sick leave and holiday cashouts are used:

General members	4.00%
Safety members	6.00%

Plan A-Court

The following assumptions for a one-time compensation increase at retirement from vacation and holiday cashouts are used:

General members	3.25%
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Plan A-SVFD

The following assumptions for a one-time compensation increase at retirement from vacation and administrative leave cashouts are used:

General members	2.00%
Safety members	2.50%

Entry Age for use in actuarial cost method

Member's age at valuation date minus years of eligibility service.

Appendix B: Proposed Actuarial Assumptions

Economic Assumptions

Net investment return

6.75%, net of investment and administrative expenses.

Inflation rate

Increase of 2.50% per year.

Cost-of-Living Adjustment (COLA)

Not applicable.

Employee contribution crediting rate

2.50%, credited semi-annually (actual increase is based on ten-year Treasury rate).

Payroll growth

Inflation of 2.50% per year plus “across-the-board” salary increase of 0.50% per year.

Increases in Internal Revenue Code Section 401(a)(17) Compensation Limit

Increase of 2.50% per year from the valuation date.

Increase in Section 7522.10 Compensation Limit

Increase of 2.50% per year from the valuation date.

Appendix B: Proposed Actuarial Assumptions

Salary increases

The annual rate of compensation increase includes:

- Inflation at 2.50%, plus
- “Across-the-board” salary increase of 0.50% per year, plus
- Merit and promotion increase based on years of service:

Merit and Promotion Increases (%)

Years of Service	General Plan A	General Plan B	Safety Plan A	Safety Plan B
Less than 1	5.00	4.25	7.50	7.00
1 – 2	5.50	5.75	7.50	7.50
2 – 3	4.50	4.75	5.00	4.75
3 – 4	3.50	4.00	4.50	4.25
4 – 5	2.50	3.00	3.50	3.25
5 – 6	2.00	2.00	1.75	2.00
6 – 7	1.50	2.00	1.50	1.75
7 – 8	1.75	1.75	1.75	1.75
8 – 9	1.70	1.70	1.75	1.75
9 – 10	1.60	1.60	1.75	1.75
10 – 11	1.40	1.40	1.55	1.55
11 – 12	1.35	1.35	1.25	1.25
12 – 13	1.30	1.30	1.25	1.25
13 – 14	1.25	1.25	1.00	1.00
14 – 15	1.15	1.15	1.00	1.00
15 and over	0.75	0.75	1.00	1.00

Demographic assumptions

Post-retirement mortality rates

Healthy

- **General members:**
 - Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates decreased by 5% for males and increased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021
- **Safety members:**
 - Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected generationally with the two-dimensional mortality improvement scale MP-2021

Appendix B: Proposed Actuarial Assumptions

Disabled

- **General members:**
 - Pub-2010 Non-Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 5% for males and decreased by 10% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021
- **Safety members:**
 - Pub-2010 Safety Disabled Retiree Amount-Weighted Mortality Table (separate tables for males and females) with rates decreased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP-2021

Beneficiary

- **Beneficiaries not currently in pay status:**
 - Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates decreased by 5% for males and increased by 5% for females, projected generationally with the two-dimensional mortality improvement scale MP 2021
- **Beneficiaries in pay status:**
 - Pub-2010 Contingent Survivor Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates increased by 5% for males and females, projected generationally with the two-dimensional mortality improvement scale MP-2021

Pre-retirement mortality rates

- **General members:**
 - Pub-2010 General Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates decreased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021
- **Safety members:**
 - Pub-2010 Safety Employee Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates decreased by 5% for males, projected generationally with the two-dimensional mortality improvement scale MP-2021

Appendix B: Proposed Actuarial Assumptions

Pre-Retirement Mortality Rates (%) – Before Generational Projection from 2010

Age	General Male	General Female	Safety Male	Safety Female
20	0.03	0.01	0.04	0.01
25	0.02	0.01	0.03	0.02
30	0.04	0.02	0.04	0.03
35	0.05	0.03	0.05	0.04
40	0.06	0.04	0.05	0.05
45	0.08	0.05	0.07	0.07
50	0.12	0.07	0.09	0.08
55	0.18	0.11	0.14	0.11
60	0.27	0.17	0.22	0.15
65	0.39	0.26	0.34	0.19
70	0.55	0.41	0.63	0.37

All pre-retirement deaths are assumed to be non-service connected.

Mortality rates for Plan A member contributions

- **General members:**
 - Pub-2010 General Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females) with rates decreased by 5% for males and increased by 5% for females, projected 32 years (from 2010) with the two-dimensional mortality improvement scale MP-2021, weighted one-third male and two-thirds female.
- **Safety members:**
 - Pub-2010 Safety Healthy Retiree Amount-Weighted Above-Median Mortality Table (separate tables for males and females), projected 32 years (from 2010) with the two-dimensional mortality improvement scale MP-2021, weighted three-fourths male and one-fourth female.

Appendix B: Proposed Actuarial Assumptions

Disability incidence rates

Disability Incidence Rates (%)

Age	General	Safety
20	0.01	0.10
25	0.01	0.34
30	0.01	1.10
35	0.01	1.80
40	0.12	2.15
45	0.20	2.70
50	0.23	3.45
55	0.25	3.75
60	0.28	3.60
65	0.30	0.00
70	0.00	0.00

60% of General disabilities are assumed to be service-connected disabilities and the other 40% are assumed to be non-service-connected disabilities.

100% of Safety disabilities are assumed to be service-connected disabilities.

Appendix B: Proposed Actuarial Assumptions

Withdrawal rates

Withdrawal Rates (%) — Less Than Five Years of Service

Years of Service	General	Safety
Less than 1	6.00	3.25
1 – 2	2.75	2.75
2 – 3	2.75	1.50
3 – 4	2.25	1.25
4 – 5	1.50	1.00

Withdrawal Rates (%) — Five or More Years of Service

Age	General	Safety
20	1.25	1.00
25	1.25	1.00
30	1.04	0.85
35	0.69	0.54
40	0.43	0.25
45	0.32	0.09
50	0.24	0.02
55	0.11	0.00
60	0.02	0.00
65	0.00	0.00
70	0.00	0.00

No withdrawal is assumed after a member is first assumed to retire.

Appendix B: Proposed Actuarial Assumptions

Vested termination

Vested Termination Rates (%) — Less Than Five Years of Service

Years of Service	General	Safety
Less than 1	8.75	9.00
1 – 2	6.00	6.50
2 – 3	6.00	4.50
3 – 4	5.75	4.50
4 – 5	5.00	4.25

Vested Termination Rates (%) — Five or More Years of Service

Age	General	Safety
20	6.00	4.50
25	6.00	4.50
30	5.25	3.60
35	4.45	2.85
40	3.95	2.00
45	3.30	1.05
50	3.00	0.75
55	2.85	0.30
60	2.75	0.00
65	2.45	0.00
70	0.00	0.00

No vested termination is assumed after a member is first assumed to retire.

Appendix B: Proposed Actuarial Assumptions

Retirement rates

Retirement Rates (%) - General

Age	Plan A Less than 30 Years of Service	Plan A 30 or More Years of Service	Plan B
Under 50	0.00	0.00	0.00
50	6.00	10.00	0.00
51	4.00	8.00	0.00
52	4.25	8.00	3.00
53	4.75	15.00	2.00
54	4.75	10.00	2.00
55	9.00	10.00	2.50
56	8.50	20.00	3.50
57	8.50	20.00	5.00
58	10.00	30.00	5.00
59	15.00	40.00	5.00
60	22.00	50.00	6.00
61	20.00	30.00	9.00
62	25.00	30.00	13.00
63	27.00	30.00	15.00
64	27.00	30.00	15.00
65	32.00	35.00	23.00
66	32.00	45.00	25.00
67	35.00	45.00	25.00
68	35.00	45.00	30.00
69	40.00	50.00	30.00
70 and over	100.00	100.00	100.00

Appendix B: Proposed Actuarial Assumptions

Retirement Rates (%) - Safety

Age	Plan A Less than 30 Years of Service	Plan A 30 or More Years of Service	Plan B
Under 45	0.00	0.00	0.00
46	2.00	0.00	0.00
47	2.00	0.00	0.00
48	5.00	6.00	0.00
49	15.00	15.00	0.00
50	18.00	18.00	5.00
51	14.00	16.00	5.00
52	12.00	18.00	4.50
53	13.00	20.00	4.00
54	14.00	25.00	6.50
55	17.00	30.00	15.50
56	23.00	30.00	14.00
57	20.00	35.00	20.00
58	20.00	40.00	16.00
59	25.00	50.00	20.00
60	30.00	50.00	30.00
61	30.00	50.00	30.00
62	30.00	50.00	30.00
63	30.00	50.00	30.00
64	50.00	50.00	50.00
65 and over	100.00	100.00	100.00

Inactive members

Current and Future Inactive Member Assumptions

Category	% of Future ¹ Inactive Members	Annual Salary Increases from Separation Date	Retirement Age
General with reciprocity	25%	3.75%	60
General without reciprocity	75%	N/A	58
Safety with reciprocity	30%	4.00%	55
Safety without reciprocity	70%	N/A	51

Inactive members without reciprocity who terminate with less than five years of service and are not vested are assumed to retire at age 70 for both General and Safety if they decide to leave their contributions on deposit.

Future benefit accruals

1.0 year of service per year of employment.

¹ SCERA provides the reciprocity status for current deferred vested members in the valuation census data.

Appendix B: Proposed Actuarial Assumptions

Unknown data for members

Same as those exhibited by members with similar known characteristics. If not specified, General members are assumed to be female and Safety members are assumed to be female.

Definition of active members

All active members of SCERA as of the valuation date.

Form of payment

All active and inactive members are assumed to elect the unmodified option at retirement.

Survivor assumptions

Current Active and Inactive Member Survivor Assumptions

Member Gender	% with Eligible Survivor at Retirement or Pre-Retirement Death	Survivor Age	Survivor Gender
Male member	65%	3 years younger than member	Female
Female member	55%	2 years older than member	Male

Cashouts

Plan A-County

For members who terminated prior to June 1, 2014, the following assumptions for a one-time compensation increase at retirement from vacation, sick leave and holiday cashouts are used:

General members	4.00%
Safety members	6.00%

Plan A-Court

The following assumptions for a one-time compensation increase at retirement from vacation and holiday cashouts are used:

General members	2.50%
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Plan A-SVFD

The following assumptions for a one-time compensation increase at retirement from vacation and holiday cashouts are used:

General members	N/A
Safety members	1.00%

Entry Age for use in actuarial cost method

Member's age at valuation date minus the lesser of years of eligibility service or years of benefit service.

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