



## San Bernardino County Employees' Retirement Association

# ACTUARIAL EXPERIENCE STUDY

Analysis of Actuarial Experience  
During the Period  
July 1, 2013 through June 30, 2016



100 Montgomery Street Suite 500 San Francisco, CA 94104-4308  
T 415.263.8200 www.segalco.com

April 7, 2017

Board of Retirement  
San Bernardino County Employees' Retirement Association  
348 West Hospitality Lane, Third Floor  
San Bernardino, CA 92415-0014

**Re: Review of Actuarial Assumptions for the June 30, 2017 Actuarial Valuation**

Dear Members of the Board:

We are pleased to submit this report of our review of the actuarial experience for the San Bernardino County Employees' Retirement Association. This study utilizes the census data for the period July 1, 2013 to June 30, 2016 and provides the proposed actuarial assumptions, both economic and demographic, to be used in the June 30, 2017 valuation.

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.

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

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Angelo".

---

Paul Angelo, FSA, MAAA, FCA, EA  
Senior Vice President and Actuary

A handwritten signature in black ink, appearing to read "John W. Monroe".

---

John W. Monroe, ASA, MAAA, EA  
Vice President and Actuary

AW/bqb

5478758v4/05111.119

# Table of Contents

---

## **Actuarial Experience Study**

*Analysis of Actuarial Experience*

*During the Period July 1, 2013 through June 30, 2016*

I. Introduction, Summary, and Recommendations.....	1
II. Background and Methodology .....	5
Economic Assumptions .....	5
Demographic Assumptions.....	5
III. Economic Assumptions.....	7
A. Inflation.....	7
B. Investment Return.....	8
C. Salary Increase .....	16
IV. Demographic Assumptions.....	22
A. Retirement Rates .....	22
B. Mortality Rates - Healthy.....	29
C. Mortality Rates - Disabled.....	35
D. Termination Rates.....	38
E. Disability Incidence Rates .....	47
F. Leave Cashouts .....	51
G. Survivor Assumptions for Survivor Benefit Valuation .....	52
V. Cost Impact.....	53
Appendix A: Current Actuarial Assumptions .....	57
Appendix B: Proposed Actuarial Assumptions .....	66

# I. Introduction, Summary, and Recommendations

---

To project the cost and liabilities of the pension plan, 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. Changing assumptions reflects a basic change in thinking about the future, and it 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 July 1, 2013 through June 30, 2016. 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 put forth guidelines 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: inflation, investment return, promotional and merit salary increases, retirement from active employment, deferred vested retirement age, percent married, spouse age difference, pre-retirement mortality, post-retirement healthy and disabled life mortality, termination (refunds and deferred vested retirements), disability incidence (non-duty and duty), percent of members assumed to go on to work for a reciprocal system, reciprocal salary increases and survivor assumptions for use in the Survivor Benefit Valuation.

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

Pg #	Actuarial Assumption Categories	Recommendation
7	<b>Inflation:</b> Future increases in the Consumer Price Index (CPI) which drives investment returns and active member salary increases, as well as cost-of-living adjustments (COLAs) for retirees.	Reduce the inflation assumption from 3.25% to 3.00% per annum as discussed in Section (III)(A).
8	<b>Investment Return:</b> 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.	Reduce the investment return assumption from 7.50% to 7.00% per annum as discussed in Section (III)(B).
11	<b>Administrative Expenses:</b> Fees for administration, legal, accounting, and actuarial services, and other functions carried out by the Association.	Increase the explicit administrative expense load from 0.60% to 0.70% of projected payroll as discussed in Section (III)(B).
16	<b>Individual Salary Increases:</b> 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: <ul style="list-style-type: none"> <li>• Inflationary salary increases</li> <li>• Real “across the board” salary increases</li> <li>• Promotional and merit increases</li> </ul>	Reduce the current inflationary salary increase assumption from 3.25% to 3.00% and maintain the current real “across the board” salary increase assumption at 0.50%. This means that the combined inflationary and real “across the board” salary increases will decrease from 3.75% to 3.50%.  Change the promotional and merit increases to those developed in Section III(C). Future promotional and merit salary increases are higher under the proposed assumption.
22	<b>Retirement Rates:</b> The probability of retirement at each age at which participants are eligible to retire. <b>Other Retirement Related Assumptions including:</b> <ul style="list-style-type: none"> <li>• Percent married and spousal age differences for members not yet retired</li> <li>• Retirement age for inactive vested members</li> <li>• Future reciprocal members and reciprocal salary increases</li> </ul>	For active members, adjust the current retirement rates to those developed in Section (IV)(A). The recommended assumptions will anticipate slightly later retirements overall for active members in General Tiers 1, 2, and Safety Tier 1. No adjustments have been made to the Safety Tier 2 rates.  For active and inactive vested members, reduce the percent married at retirement assumption for males to 65% and maintain the assumption at 50% for females. Reduce the spouse age difference assumption from three years to two years for female members (female members are assumed to be two years younger than their male spouse beneficiaries). For inactive vested members, increase the assumed retirement age to 59 for General members and 53 for Safety members.  Increase the current proportion of future terminated members expected to be covered by a reciprocal system to 60% for Safety members and maintain the assumption at 40% for General members. In addition, reduce the current reciprocal salary increase assumptions to 4.50% for General members and 4.70% for Safety members.

Pg #	Actuarial Assumption Categories	Recommendation
29 35	<p><b>Mortality Rates:</b> The probability of dying at each age. Mortality rates are used to project life expectancies.</p>	<p>For healthy General pensioners and all beneficiaries, change from the current RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 with no age adjustments to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward one year for males, projected generationally with the two-dimensional mortality improvement scale MP-2016.</p> <p>For healthy Safety pensioners, change from the current RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 with ages set back two years for males and set back one year for females to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table with ages set back one year, projected generationally with the two-dimensional mortality improvement scale MP-2016.</p> <p>For disabled General pensioners, change from the current RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 with ages set forward seven years for males and set forward eight years for females to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward seven years, projected generationally with the two-dimensional mortality improvement scale MP-2016.</p> <p>For disabled Safety pensioners, change from the current RP-2000 Combined Table projected with Scale BB to 2020 with ages set forward two years to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set back one year, projected generationally with the two-dimensional mortality improvement scale MP-2016.</p> <p>For pre-retirement mortality, change from the current RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 with no age adjustments to the Headcount-Weighted RP-2014 Employee Mortality Table times 90%, projected generationally with the two-dimensional scale MP-2016.</p> <p>For determining member contribution rates, change the mortality rates to those developed in Section (IV)(B).</p> <p>The recommended mortality assumptions will anticipate longer life expectancy both pre- and post-retirement.</p>
38	<p><b>Termination Rates:</b> The probability of leaving employment at each age and receiving either a refund of contributions or a deferred vested retirement benefit.</p>	<p>Adjust the current termination rates to those developed in Section (IV)(D). The recommended assumptions will anticipate more terminations for General and Safety members.</p>
47	<p><b>Disability Incidence Rates:</b> The probability of becoming disabled at each age.</p>	<p>Adjust the current disability rates to those developed in Section (IV)(E). The recommended assumptions will anticipate fewer disability retirements for General members and Safety members.</p>

Pg #	Actuarial Assumption Categories	Recommendation
51	<b>Leave Cashouts:</b> Additional pay elements that are expected to be received during the member's final average earnings period.	Continue current practice of assuming that no leave cashouts occur during the member's final average earnings period above what the member has cashed out on an annual basis. However, we have observed that there is an upward trend in maximum cashouts allowable and more members became eligible for cashouts compared to last study. We will work with SBCERA to track the actual leave cashouts before retirement so that the data can be used in future experience studies.
52	<b>Survivor Assumptions for Survivor Benefit Valuation:</b> The probability of being married or having eligible children upon pre-retirement death.	Change the survivor assumption to those consistent with more recent U. S. Census data. Overall, there will be slight increases in the assumed percent with survivors.

We have estimated the impact of proposed assumption changes as if they were applied to the June 30, 2016 actuarial valuation. In particular, if all of the proposed economic assumption changes (as recommended in Section III of this report) were implemented, the average employer rate would have increased by 4.52% of payroll and the average member rate would have been increased by 1.21% of payroll. Of the various economic assumption changes, the most significant cost impact is from the investment return assumption change.

Furthermore, if all of the proposed demographic assumption changes (as recommended in Section IV of this report) were implemented, the average employer rate would have increased by 1.75% of payroll. The average member rate would have increased by 0.23% of payroll. Of the various demographic assumption changes, the most significant cost impact is from the mortality assumption change.

Therefore, the estimated cost impact of all proposed assumption changes (both economic and demographic) is 6.27% of payroll for the average employer rate, where the Normal Cost rate increased by 1.83%, the UAAL amortization rate increased by 4.35% and the explicit administrative expense load increased by 0.09%. The average member rate would have increased by 1.44% of payroll, including an increase in explicit administrative load of 0.01%. The cost associated with the administrative expense load has continued to be allocated to both the employer and the member based on the components of the total contribution rate (before expenses) for the employer and the member.

Section II 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 III for the economic assumptions and Section IV for the demographic assumptions. The cost impact of the proposed changes is detailed in Section V.

## II. 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 percentage of members with an eligible spouse or domestic partner, spousal age difference, leave cashouts, percent of members assumed to go on to work for a reciprocal system, reciprocal salary increases and survivor assumptions for use in the Survivor Benefit Valuation.

### 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 and drives increases in the allowances of retired members.
- **Investment Return:** Expected long term rate of return on the Association’s investments after investment 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 “across the board” real 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. These are commonly referred to as promotional and merit increases. Payments to amortize any Unfunded Actuarial Accrued Liability (UAAL) are assumed to increase each year by the price inflation rate plus any “across the board” real pay increases that are assumed.

The setting of these economic assumptions is described in Section III.

### 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”). For example, if there were 500 active employees in the 20-24 age group at the beginning of the year and 50 of them terminate 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 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, say, 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.

# III. 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 it is set using primarily historical information. Following is an analysis of 15 and 30 year moving averages of historical inflation rates:

### HISTORICAL CONSUMER PRICE INDEX – 1930 TO 2016 (U.S. City Average - All Urban Consumers)

	25 <sup>th</sup> Percentile	Median	75 <sup>th</sup> Percentile
15-year moving averages	2.5%	3.4%	4.5%
30-year moving averages	3.1%	3.9%	4.8%

The average inflation rates have continued to decline gradually over the last several years due to the relatively low inflationary period over the past two decades. Also, the later of the 15-year averages during the period are lower as they do not include the high inflation years of the mid-1970s and early 1980s.

Based on information found in the Public Plans Data website, which is produced in partnership with the National Association of State Retirement Administrators (NASRA), the median inflation assumption used by 142 large public retirement funds in their 2015 fiscal year valuations was 3.00%. In California, CalPERS, CalSTRS, Contra Costa County, Los Angeles County, and two other 1937 Act CERL systems use an inflation assumption of 2.75% while OCERS and seven other 1937 Act CERL systems use an inflation assumption of 3.00%.

SBCERA’s investment consultant, New England Pension Consultants (NEPC), anticipates an annual inflation rate of 3.25%, while the average inflation assumption provided by NEPC and seven other investment advisory firms retained by Segal’s California public sector clients was 2.30%. 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.

To find a forecast of inflation based on a longer time horizon, we referred to the 2016 report on the financial status of the Social Security program. 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 2.60%. We also compared the yields on the thirty-year inflation indexed U.S. Treasury bonds to comparable traditional U.S. Treasury bonds. As of February 2017, the difference in yields is about 2.10%, which provides a measure of market expectations of inflation.

**Based on all of the above information, we recommend that the current 3.25% annual inflation assumption be reduced to 3.00% for the June 30, 2017 actuarial valuation.**

### Retiree Cost of Living Increases

We also recommend maintaining the current assumptions to value the post-retirement COLA benefit at 2.00% per year. The current and proposed COLA assumptions are shown below:

Maximum COLA for all Tiers	Current Assumption	Proposed Assumption
2.00%	2.00%	2.00%

In developing the COLA assumption, we also considered the results of a stochastic approach that would attempt to account for the possible impact of low inflation that could occur before COLA benefits are able to be established for the member. Although the results of this type of analysis might justify the use of a lower COLA assumption, we are not recommending that at this time. The reasons for this conclusion include the following:

- The results of the stochastic modeling are significantly dependent on assuming that lower levels of inflation will persist in the early years of the projections. If this is not assumed, then the stochastic modeling will produce results similar to our proposed COLA assumptions.
- Using a lower long-term COLA assumption based on a stochastic analysis would mean that an actuarial loss would occur even when the inflation assumption of 3.00% is met in a year. We question the reasonableness of this result.

We do not see the stochastic possibility of COLAs averaging less than those predicted by the assumed rate of inflation as a reliable source of cost savings that should be anticipated in our COLA assumptions. Therefore, we continue to recommend setting the COLA assumptions based on the long-term annual inflation assumption, as we have in prior years.

### B. Investment Return

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

#### Real Rate of Investment Return

This component represents the portfolio's incremental investment market returns over inflation. Theory has it that as an investor takes a greater investment risk, the return on the investment is expected to also be greater, at least in the long run. This additional 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 association's portfolio will vary with the Board's asset allocation among asset classes.

The following is SBCERA's current target asset allocation and the assumed real rate of return assumptions by asset class. The first column of real rate of return assumptions are determined by reducing NEPC's total or "nominal" 2017 return assumptions by their assumed 3.25% inflation

rate. The second column of returns (except for International Credit, Absolute Return, Other Real Assets and Private Equity) represents the average of a sample of real rate of return assumptions, where each firm’s nominal returns have been reduced by that firm’s assumed inflation rate. The sample includes the expected annual real rate of return provided to us by NEPC and seven other investment advisory firms retained by Segal’s public sector clients. We believe these averages are a reasonable forecast of long term future market returns in excess of inflation<sup>1</sup>.

### **SBCERA’S TARGET ASSET ALLOCATION AND ASSUMED ARITHMETIC REAL RATE OF RETURN ASSUMPTIONS BY ASSET CLASS AND FOR THE PORTFOLIO**

Asset Class	Percentage of Portfolio	NEPC’s Assumed Real Rate of Return <sup>2</sup>	Average Assumed Real Rate of Return from a Sample of Consultants to Segal’s California Public Sector Clients <sup>3</sup>
Large Cap U.S. Equity	8%	5.58%	5.61%
Small Cap U.S. Equity	2%	6.39%	6.37%
Developed International Equity	6%	6.39%	6.96%
Emerging Market Equity	6%	9.47%	9.28%
U.S. Core Fixed Income	2%	0.92%	1.06%
High Yield/Credit Strategies	13%	5.61%	3.65%
Global Core Fixed Income	1%	-0.16%	0.07%
Emerging Market Debt	6%	3.75%	3.85%
Real Estate	9%	4.25%	4.37%
Cash and Equivalents	2%	-0.25%	-0.17%
International Credit	11%	6.75%	6.75% <sup>4</sup>
Absolute Return <sup>5</sup>	13%	3.56%	3.56% <sup>4</sup>
Other Real Assets	5%	6.35%	6.35% <sup>4</sup>
Private Equity	16%	8.47%	8.47% <sup>4</sup>
<b>Total</b>	<b>100%</b>	<b>5.75%</b>	<b>5.55%</b>

The above are representative of “indexed” returns and do not include any additional returns (“alpha”) from active management. This is consistent with the Actuarial Standard of Practice No. 27, Section 3.6.3.d, 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,

<sup>1</sup> 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 shorter than the time horizon encompassed by the actuarial valuation.

<sup>2</sup> Derived by reducing NEPC’s nominal rate of return assumptions by their assumed 3.25% inflation rate.

<sup>3</sup> These are based on the projected arithmetic returns provided by NEPC and seven other investment advisory firms serving the county retirement systems of San Bernardino, Ventura, Mendocino, Orange, Kern, Fresno, Contra Costa, San Diego, Alameda, Sacramento, Imperial and Sonoma, the Los Angeles City Employees’ Retirement Association, the Water and Power Employees’ Retirement Plan of the City of Los Angeles, Los Angeles Fire and Police Pension, City of Fresno and the East Bay Municipal Utility District Retirement System. These return assumptions are gross of any applicable investment expenses.

<sup>4</sup> For these asset classes, NEPC’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 NEPC’s assumption should more closely reflect the underlying investments made specifically for SBCERA.

<sup>5</sup> Includes category called “Volatility”.

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.”

The following are some observations about the returns provided above:

1. The investment consultants to our California public sector clients 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 shorter than the durations of a retirement plan’s liabilities.
2. Using a sample average of expected real rate of returns allows the SBCERA’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.
3. Therefore, we recommend that the 5.55% portfolio real rate of return be used to determine SBCERA’s investment return assumption. This is 0.04% lower than the return that was used three years ago in the review to prepare the recommended investment return assumption for the June 30, 2014 valuation. The difference is due to changes in SBCERA’s target asset allocation (+0.03%) and changes in the real rate of return assumptions provided to us by the investment advisory firms (-0.07%).

## Investment 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. SBCERA has previously adopted an explicit administrative expenses assumption and used that in the development of employer and member contributions starting with the June 30, 2014 valuation. The payment of those expenses would not result in a reduction in the net income available from investment return.

The following table provides the investment expenses in relation to the actuarial value of assets for the five years ending June 30, 2016.

## INVESTMENT EXPENSES AS A PERCENTAGE OF ACTUARIAL VALUE OF ASSETS (Dollars in 000's)

Year Ending June 30	Actuarial Value of Assets <sup>1</sup>	Investment Expenses <sup>2</sup>	Investment %
2012	\$6,789,492	\$74,962	1.10
2013	7,204,918	94,377	1.31
2014	7,751,309	124,567	1.61
2015	8,255,353	93,351	1.13
2016	8,736,959	92,084	1.05
<b>Five-Year Average</b>			<b>1.24</b>
<b>Recommendation</b>			<b>1.25</b>

(1) As of end of plan year.

(2) Excludes 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. Also, excludes County and Law Library contribution prepayment discount.

The average investment expenses percentage over this five-year period is 1.24% of the actuarial value of assets. Note that the investment expenses fluctuate depending on the actual return for the year. This is why the investment expenses for the year ending June 30, 2014 were higher than the other years. We believe that it is reasonable to set this assumption based on the experience over the five-year period. Based on this experience, we believe that an increase in the future expense assumption from 1.08% to 1.25% is reasonable.

Note related to investment expenses paid to active managers – As cited above, under Section 3.6.3.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.” For SBCERA, nearly all of the investment expenses were paid for expenses associated with active managers.

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. If necessary, we will work with the SBCERA’s staff to determine whether future studies might potentially exclude the level of investment expenses for active managers that are expected to be offset by investment returns. For now, 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. For example, 0.25% of alpha would increase the confidence level by 3% (see discussions that follow on definitions of risk adjustment and confidence level).

### Administrative Expenses

The following table provides the administrative expenses in relation to the projected payroll for each of the five years ending June 30, 2016.

## ADMINISTRATIVE EXPENSES AS A PERCENTAGE OF PROJECTED PAYROLL (Dollars in 000's)

Year Ending June 30	Projected Payroll	Administrative Expenses	Administrative Expenses as a Percent of Payroll%
2012	\$1,244,555	\$8,019	0.64
2013	1,260,309	7,830	0.62
2014	1,262,752	8,869	0.70
2015	1,267,667	8,918	0.70
2016	1,309,095	10,233	0.78
<b>Five-Year Average</b>			<b>0.69</b>
<b>Recommendation</b>			<b>0.70</b>

The average administrative expenses percentage over this five-year period is 0.69% of projected payroll, with the most recent value higher than this average. Based on this experience, we recommend increasing the current administrative expense assumption from 0.60% to 0.70% of projected payroll. This expense will be allocated to both the employer and member based on the total average contribution rates in the upcoming June 30, 2017 actuarial valuation, as determined before including the administrative expenses.

### Risk Adjustment

The real rate of return assumption for the portfolio is adjusted to reflect the potential risk of shortfalls in the return assumptions. SBCERA'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.<sup>6</sup> The 5.55% expected real rate of return developed earlier in this report was based on expected mean or average arithmetic returns. This means there is a 50% chance of the actual return in each year being at least as great as the average (assuming a symmetrical distribution of future returns). The risk adjustment is intended to increase that probability somewhat above the 50% level. This is consistent with our experience that retirement plan fiduciaries would generally prefer that returns exceed the assumed rate more often than not. Note that, based on the investment return assumptions recently adopted by systems that have been analyzed under this model, we observe a confidence level generally in the range of 50% to 60%.

Three years ago, the Board adopted an investment return assumption of 7.50%. That return implied a risk adjustment of 0.26%, reflecting a confidence level of 53% that the actual average

<sup>6</sup> This type of risk adjustment is sometimes referred to as a "margin for adverse deviation."

return over 15 years would not fall below the assumed return, assuming that the distribution of returns over that period follows the normal statistical distribution<sup>7</sup>.

In our model, the confidence level associated with a particular risk adjustment represents the likelihood that the actual average return would equal or exceed the assumed value over a 15-year period. For example, if we set our real rate of return assumption using a risk adjustment that produces a confidence level of 60%, then there would be a 60% chance (6 out of 10) that the average return over 15 years will be equal to or greater than the assumed value. 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.

If we use the same 53% confidence level from our last study to set this year’s risk adjustment, based on the current long-term portfolio standard deviation of 13.31% provided by NEPC, the corresponding risk adjustment would be 0.25%. Together with the other investment return components, this would result in an investment return assumption of 7.05%, which is lower than the current assumption of 7.50%.

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. In particular, a net investment return assumption of 7.00%, together with the other investment return components, would produce a risk adjustment of 0.30%, which corresponds to a confidence level of 53%. This is equal to the confidence level of 53% used in SBCERA’s last study for the June 30, 2014 valuation. We believe this analysis supports reducing the current assumption from 7.50% to 7.00%.

The table below shows SBCERA’s investment return assumptions and for the years when this analysis was performed, the risk adjustments and corresponding confidence levels compared to the values for prior studies.

### **HISTORICAL INVESTMENT RETURN ASSUMPTIONS, RISK ADJUSTMENTS AND CONFIDENCE LEVELS BASED ON ASSUMPTIONS ADOPTED BY THE BOARD**

<b>Year Ending June 30</b>	<b>Investment Return</b>	<b>Risk Adjustment</b>	<b>Corresponding Confidence Level</b>
2008 - 2010	8.00%	0.94%	64%
2011 - 2013	7.75%	0.38%	56%
2014 - 2016	7.50%*	0.26%	53%
2017 (Recommended)	7.00%*	0.30%	53%

\* These investment return assumptions are gross of administrative expenses.

As we have discussed in prior years, the risk adjustment model and associated confidence level is most useful as a means for comparing how SBCERA has positioned itself relative to risk over

<sup>7</sup> Based on an annual portfolio return standard deviation of 13.60% provided by NEPC in 2014. Strictly speaking, future compounded long-term investment returns will tend to follow a log-normal distribution. However, we believe the Normal distribution assumption is reasonable for purposes of setting this type of risk adjustment.



periods of time<sup>8</sup>. The use of a 53% 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.
- The confidence level is based on the standard deviation of the portfolio that is determined and provided to us by NEPC. 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.
- A confidence level of 53% is within the range of about 50% to 60% that corresponds to the risk adjustments used by most of Segal’s other California public retirement system clients. Most public retirement systems that have recently reviewed their investment return assumptions have seen decreases in their confidence level even though they adopted more conservative investment return assumptions for their valuations.
- 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 “Comparison with Other Public Retirement Systems”.

Taking into account the factors above, our recommendation is to reduce the net investment return assumption from 7.50% to 7.00%. As noted above, this return implies a 0.30% risk adjustment, reflecting a confidence level of 53% that the actual average return over 15 years would not fall below the assumed return.

### Recommended Investment Return Assumption

The following table summarizes the components of the investment return assumption developed in the previous discussion. For comparison purposes, we have also included similar values from the last study.

Assumption Component	Recommended Value	Adopted Value
	June 30, 2017	June 30, 2014
Inflation	3.00%	3.25%
Plus Average Real Rate of Return	5.55%	5.59%
Minus Expense Adjustment	(1.25%)	(1.08%)
Minus Risk Adjustment	(0.30%)	(0.26%)
<b>Total</b>	<b>7.00%</b>	<b>7.50%</b>
<b>Confidence Level</b>	<b>53%</b>	<b>53%</b>

**Based on this analysis, we recommend that the investment return assumption be decreased from 7.50% to 7.00% per annum.**

<sup>8</sup> 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.”

## 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 a 7.00% investment return assumption is becoming more common among California public sector retirement systems. In particular, three County employees retirement systems (Contra Costa, Fresno and Santa Barbara) use a 7.00% earnings assumption. Furthermore, the CalPERS Board has approved a reduction in the earnings assumption from 7.50% to 7.00% over the next three years. In addition, CalSTRS recently adopted a 7.25% earnings assumption for the 2016 valuation (down from 7.50%) and a 7.00% earnings assumption for the 2017 valuation.

The following table compares SBCERA's recommended net investment return assumption against those of the nationwide public retirement systems that participated in the National Association of State Retirement Administrators (NASRA) 2016 Public Fund Survey for 142 large public retirement funds in their 2015 fiscal year valuations:

		NASRA 2016 Public Fund Survey		
Assumption	SBCERA	Low	Median	High
Net Investment Return	7.00%	4.29%	7.50%	8.50%

The detailed survey results show that more than one-half of the systems have an investment return assumption in the range of 6.75% to 7.75%, and over half of those systems have used an assumption of 7.50%. The survey also notes that several plans have reduced their investment return assumption during the last year. State systems outside of California tend to change their economic assumptions less frequently and so may lag behind emerging practices in this area.

In summary, we believe that both the risk adjustment model and other considerations indicate a lower earnings assumption. The recommended assumption of 7.00% provides for a risk margin within the risk adjustment model consistent with recent SBCERA practice, and it is consistent with SBCERA's current practice relative to other public systems.

## C. Salary Increase

Salary increases impact plan costs in two ways: (i) by increasing members' benefits (since benefits are a function of the members' highest average pay) and future normal cost collections; and (ii) by increasing total active member payroll which in turn generates lower UAAL contribution rates. 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 are recommending that the assumed rate of inflation be reduced from 3.25% to 3.00% per annum. 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 0.6% - 0.9% 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 June 2016. In that report, real "across the board" pay increases are forecast to be 1.2% 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 SBCERA's active members, the actual average inflation plus "across the board" increase (i.e., wage inflation) over three year period ending June 30, 2016 was 0.13%.

**Considering these factors, 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 decrease from 3.75% to 3.50%.**

3. **Promotional and Merit Increases:** As the name implies, these increases come from an employee's career advances. This form of pay increase differs from the previous two, since it is specific to the individual. For SBCERA, there are service-specific promotional and merit increases.

The annual promotional and merit 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. Increases are measured separately for General and Safety members. This is accomplished by:

- a. Measuring each continuing member’s actual salary increase over each year of the experience period;
- b. Excluding any members with increases of more than 50% or decreases of more than 10% during any particular year;
- c. Categorizing these increases according to member demographics;
- d. Removing the wage inflation component from these increases (assumed to be equal to the increase in the members’ average salary during the year);
- e. Averaging these annual increases over the three-year experience period; and
- f. Modifying current assumptions to reflect some portion of these measured increases reflective of their “credibility.”

To be consistent with the other economic assumptions, these promotional and merit assumptions should be used in combination with the 3.50% assumed inflation and real “across the board” increases.

The following table shows the General members’ actual average promotional and merit increases by years of service over the three-year period from July 1, 2013 through June 30, 2016 along with the actual average increases based on the current three-year periods and those shown in the prior experience study. The current and proposed assumptions are also shown. The actual increases for the most recent three-year period 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 over the current three-year experience period (-0.1% on average).

## General Members

Years of Service	Rate (%)			
	Current Assumptions	July 1, 2013 Through June 30, 2016 Average Promotional and Merit Increases	Actual Average Increases from Current and Prior Study	Proposed Assumptions
Less than 1	10.00	22.29	20.45	11.00
1	8.00	6.30	8.31	8.00
2	4.50	5.55	5.20	4.75
3	4.00	4.97	4.73	4.25
4	3.50	4.47	4.48	3.75
5	3.00	4.55	4.27	3.25
6	2.25	4.15	3.57	2.75
7	1.75	3.18	2.73	2.25
8	1.50	3.12	2.56	2.00
9	1.25	3.11	2.36	1.75
10	1.10	2.70	2.16	1.50
11	1.00	2.39	2.07	1.40
12	0.95	2.88	2.28	1.30
13	0.90	2.52	2.04	1.20
14	0.85	2.60	2.14	1.10
15	0.85	2.82	2.14	1.00
16	0.85	2.44	1.96	1.00
17	0.85	2.72	2.11	1.00
18	0.85	2.39	1.88	1.00
19	0.85	2.24	1.86	1.00
20 & over	0.85	1.48	1.43	1.00

The following table provides the same information for Safety members. The actual average promotional and merit increases were determined by reducing the actual average total salary increases by the actual average inflation plus real “across the board” increase (i.e., wage inflation, estimated as the increase in average salaries) for each year over the three-year period (0.7% on average).

## Safety Members

Years of Service	Rate (%)			
	Current Assumption	July 1, 2013 Through June 30, 2016 Average Promotional and Merit Increases	Actual Average Increases from Current and Prior Study	Proposed Assumptions
Less than 1	10.00	32.85	39.17	11.00
1	7.50	2.81	4.91	7.00
2	4.00	1.40	1.61	4.00
3	3.75	2.87	3.04	3.75
4	3.50	2.69	3.14	3.50
5	3.25	3.43	4.08	3.25
6	3.00	3.25	3.71	3.00
7	2.50	2.42	3.66	2.50
8	1.75	1.66	1.87	1.75
9	1.50	1.45	1.83	1.50
10	1.40	1.83	2.00	1.45
11	1.30	1.87	2.03	1.40
12	1.20	1.88	1.93	1.35
13	1.15	1.52	1.90	1.30
14	1.10	2.02	2.20	1.25
15	1.05	1.53	1.72	1.20
16	1.00	1.29	1.52	1.20
17	0.95	1.69	1.73	1.20
18	0.90	1.03	1.39	1.20
19	0.85	1.90	2.01	1.20
20 & over	0.80	2.61	2.29	1.20

Charts 1 and 2 provide a graphical comparison of the actual promotional and merit increases, compared to the proposed and current assumptions. The charts also show the actual promotional and merit increases based on an average of both the current and previous three-year experience periods. This is discussed below. Chart 1 shows this information for General members and Chart 2 for Safety members.

We realize that the most recent and the prior experience study period may not be indicative of typical future long-term promotional and merit salary increases. This appears to be the case for both General and Safety members as they received virtually no “across the board” salary increases (based on the very low or negative increase in average wages). In this situation, our model may lead to higher estimated promotional and merit increases. Therefore, we also examined the promotional and merit salary experiences used in the prior study. We believe that when the experiences from the last two studies are combined into an average result, it provides a representation of potential future promotional and merit salary increases over the long term. However, in our proposed changes to the promotional and merit increases, we have given relatively less weight to the actual average increases experience during the last two studies.

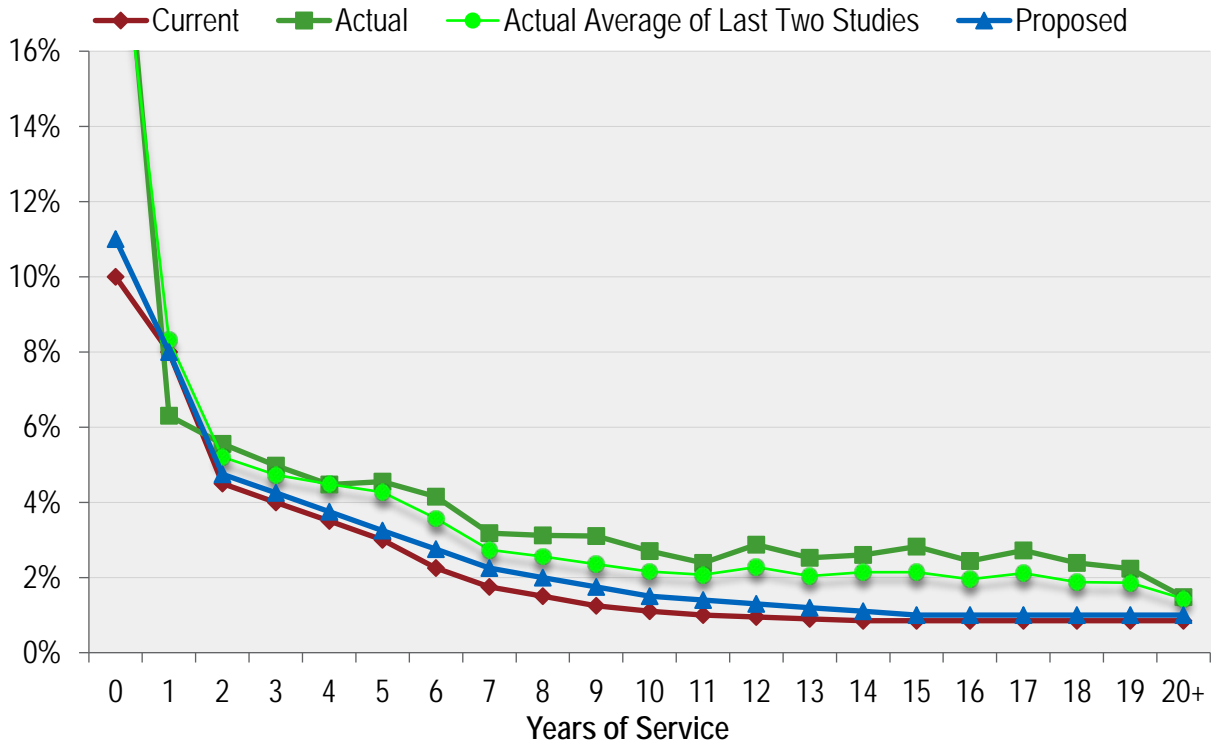
**Based on this experience, we are proposing overall increases in the promotional and merit salary increases for both General and Safety members. Overall, salary increases are assumed to be slightly higher for General members and slightly lower for Safety members due to the lower price inflation assumption.**

### **Active Member Payroll**

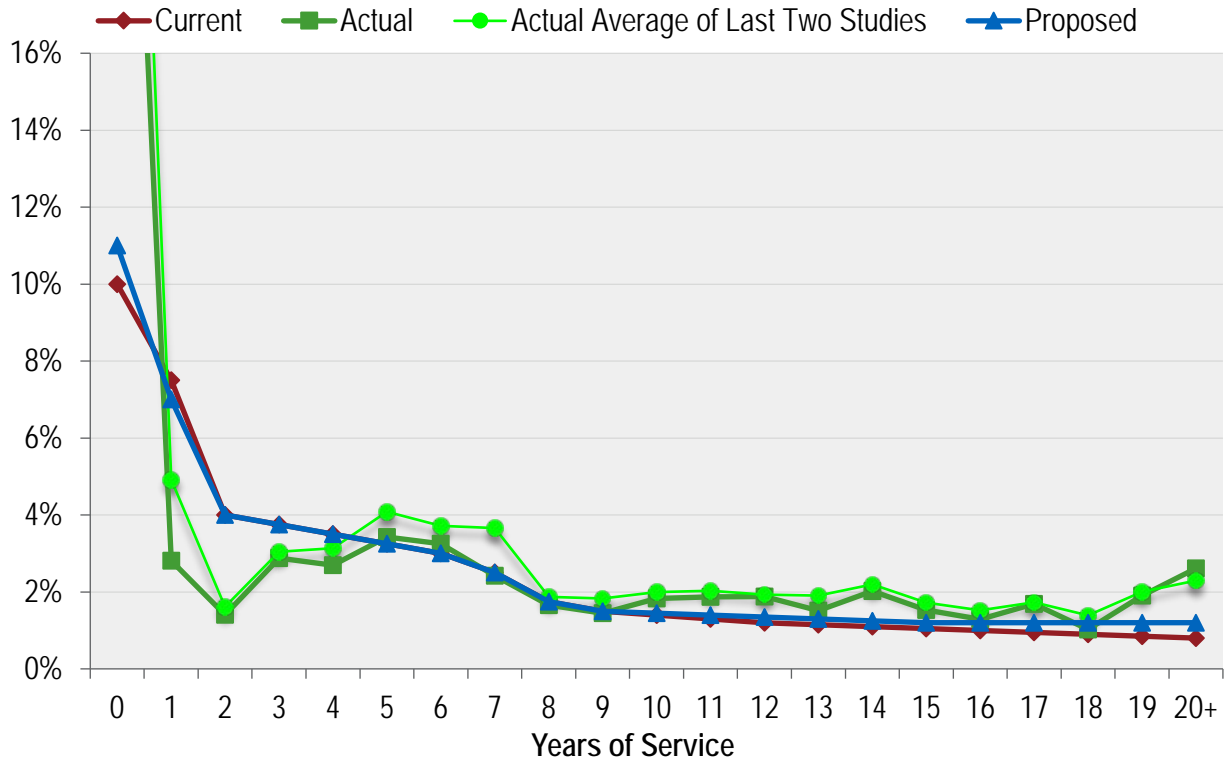
Projected active member payrolls are used to develop the UAAL contribution rate. Future values are determined as a product of the number of employees in the workforce and the average pay for all employees. The average pay for all employees increases only by inflation and real “across the board” pay increases.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

**We recommend that the active member payroll increase assumption be decreased from 3.75% to 3.50% annually, consistent with the combined inflation plus real “across the board” salary increase assumptions.**

**CHART 1: PROMOTIONAL AND MERIT SALARY INCREASE RATES  
GENERAL MEMBERS**



**CHART 2: PROMOTIONAL AND MERIT SALARY INCREASE RATES  
SAFETY MEMBERS**





## IV. Demographic Assumptions

---

### A. 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.

The table on the following page shows the observed service retirement rates for General Tier 1 members based on the actual experience over the past three years. The observed service retirement rates were determined by comparing those members who actually retired from service to those eligible to retire from service. This same methodology is followed throughout this report and was described in Section II. Also shown are the current rates assumed and the rates we propose:

## General Tier 1

Age	Rate of Retirement (%)		
	Current Rate	Actual Rate	Proposed Rate
Under 49*	0.00	50.00	0.00
49*	0.00	80.00	50.00
50	2.50	3.08	2.50
51	2.50	1.50	2.00
52	3.50	3.30	3.25
53	3.50	2.78	3.25
54	4.00	2.51	3.25
55	5.00	4.70	5.00
56	6.00	5.23	6.00
57	6.00	5.91	6.00
58	8.00	7.51	8.00
59	12.00	10.66	11.00
60	15.00	14.77	15.00
61	17.00	13.94	16.00
62	19.00	16.45	18.00
63	19.00	16.54	18.00
64	25.00	26.93	25.00
65	35.00	42.99	40.00
66	30.00	32.22	30.00
67	30.00	23.91	25.00
68	30.00	21.88	25.00
69	30.00	27.59	25.00
70	30.00	19.10	25.00
71	20.00	26.09	20.00
72	20.00	22.22	20.00
73	20.00	21.21	20.00
74	20.00	20.00	20.00
75 & Over	100.00	26.32	100.00

\* These rates are applicable to General Tier 1 members with 30 or more years of service.

**As shown above, we anticipate General Tier 1 members will retire slightly later than under the current assumptions (excluding rates under age 50) and are recommending decreases in many of the retirement rates.**

Chart 3 that follows later in this section compares actual experience with the current and proposed rates of retirement for General Tier 1 members.

The following table shows the observed retirement rates for Safety Tier 1 members over the past three years. Also shown are the current rates assumed and the rates we propose:

## Safety Tier 1

Age	Rate of Retirement (%)		
	Current Rate	Actual Rate	Proposed Rate
Under 45*	0.00	1.20	0.00
45*	1.00	0.00	1.00
46*	1.50	2.63	2.00
47*	2.00	3.85	2.50
48*	2.00	1.72	2.00
49*	8.00	11.81	9.00
50	10.00	10.73	10.00
51	8.00	11.59	9.00
52	12.00	10.06	11.00
53	13.00	18.75	13.00
54	13.00	11.40	13.00
55	22.00	18.56	20.00
56	20.00	16.22	18.00
57	20.00	22.03	20.00
58	20.00	17.95	20.00
59	20.00	3.57	15.00
60	25.00	29.17	25.00
61	25.00	23.53	25.00
62	25.00	33.33	25.00
63	30.00	10.00	25.00
64	30.00	16.67	25.00
65 & Over	100.00	23.81	100.00

\* These rates are applicable to Safety Tier 1 members with 20 or more years of service.

**As shown above, we anticipate Safety Tier 1 members will retire slightly later overall than under the current assumptions (excluding rates under age 50) and are recommending decreases in some of the retirement rates.**

Chart 4 compares actual experience with the current and proposed rates for Safety Tier 1 members.

On January 1, 2013, new PEPRA formulas were implemented for General and Safety Tier 2. For those new tiers, we do not have credible experience from the past three years to propose new rates based on actual retirements from members of those tiers. However, we have based our recommended rates for General and Safety Tier 2 on a combination of the current Tier 2 assumptions and the lower than expected actual retirement experience that occurred for General and Safety Tier 1 members. This is because the retirement rates for General and Safety Tier 1 were partially developed based on the then current Tier 1 retirement rates when those new tiers were first established. No changes are being recommended for Safety Tier 2.

The following are the current and proposed rates of retirement for General and Safety Tier 2 members:

## General and Safety Tier 2

Age	Rate of Retirement (%)			
	Current General Tier 2	Proposed General Tier 2	Current Safety Tier 2	Proposed Safety Tier 2
50	0.00	0.00	4.00	4.00
51	0.00	0.00	3.00	3.00
52	2.00	2.00	4.00	4.00
53	2.00	2.00	5.00	5.00
54	2.00	2.00	10.00	10.00
55	4.50	4.50	20.00	20.00
56	4.50	4.50	20.00	20.00
57	6.00	6.00	22.00	22.00
58	7.00	7.00	25.00	25.00
59	8.00	8.00	25.00	25.00
60	9.00	9.00	25.00	25.00
61	12.00	12.00	25.00	25.00
62	20.00	20.00	25.00	25.00
63	20.00	20.00	25.00	25.00
64	20.00	20.00	25.00	25.00
65	25.00	25.00	100.00	100.00
66	30.00	30.00	100.00	100.00
67	30.00	30.00	100.00	100.00
68	30.00	25.00	100.00	100.00
69	30.00	25.00	100.00	100.00
70	50.00	40.00	100.00	100.00
71	50.00	40.00	100.00	100.00
72	50.00	40.00	100.00	100.00
73	50.00	40.00	100.00	100.00
74	50.00	40.00	100.00	100.00
75 & Over	100.00	100.00	100.00	100.00

Chart 5 compares the current rates with the proposed rates of retirement for General Tier 2 members.

Chart 6 compares the current rates with the proposed rates of retirement for Safety Tier 2 members.

## Deferred Vested Members

In prior valuations, deferred vested General and Safety members were assumed to retire at age 58 and 52, respectively. The average age at retirement over the prior three years was 59.3 for General and 53.2 for Safety. We recommend increasing the current retirement age assumption for General deferred vested members to age 59 and Safety deferred vested members to age 53.

## Reciprocity

It is also currently assumed that 40% of inactive General and 50% of inactive Safety deferred vested participants would be covered under a reciprocal retirement system and receive 5.25% annual salary increases from termination until their date of retirement. As of June 30, 2016, about 40% of the total General deferred vested and 64% of the total Safety deferred vested members have gone on to be covered by a reciprocal retirement system. Therefore, we recommend maintaining the reciprocal assumption at 40% for General members and increasing the assumption to 60% for Safety members. This recommendation takes into account the experience of all deferred vested members as of June 30, 2016 instead of just new deferred vested members during the three-year period. This is because there is about an eight-month 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 4.50% and 4.70% annual salary increase assumptions for General and Safety members, respectively, be utilized to anticipate salary increases from the date of termination from SBCERA to the expected date of retirement for deferred vested members covered by a reciprocal retirement system. These assumptions are based on the ultimate 1.00% and 1.20% promotional and merit salary increase assumptions for General and Safety members, respectively, together with the 3.00% inflation and 0.50% real "across the board" salary increase assumptions that are recommended earlier in Section III of this report.

## Form of Payment and Survivor Continuance under the Unmodified Option

In prior valuations, it was assumed that all members would select the unmodified option at retirement. Actual experience for recent new retirees shows that around 90% select the unmodified option. Note that other forms of payment are generally actuarially equivalent to the unmodified option. Therefore, we recommend maintaining the assumption that all members will elect the unmodified option at retirement.

It was also assumed that 70% of all active male members and 55% of all active female members who selected the unmodified option would be married or have an eligible domestic partner when they retired. We reviewed experience for new retirees during the three-year period and determined the actual percentage of these new retirees that had an eligible spouse or eligible domestic partner and selected the unmodified option at the time of retirement. The results of that analysis are shown below.

New Retirees – Actual Percent with Eligible Spouse or Domestic Partner and Selected Unmodified Option		
Year Ending June 30	Male	Female
2014	64%	53%
2015	65%	53%
2016	62%	51%
<b>Total</b>	<b>64%</b>	<b>52%</b>

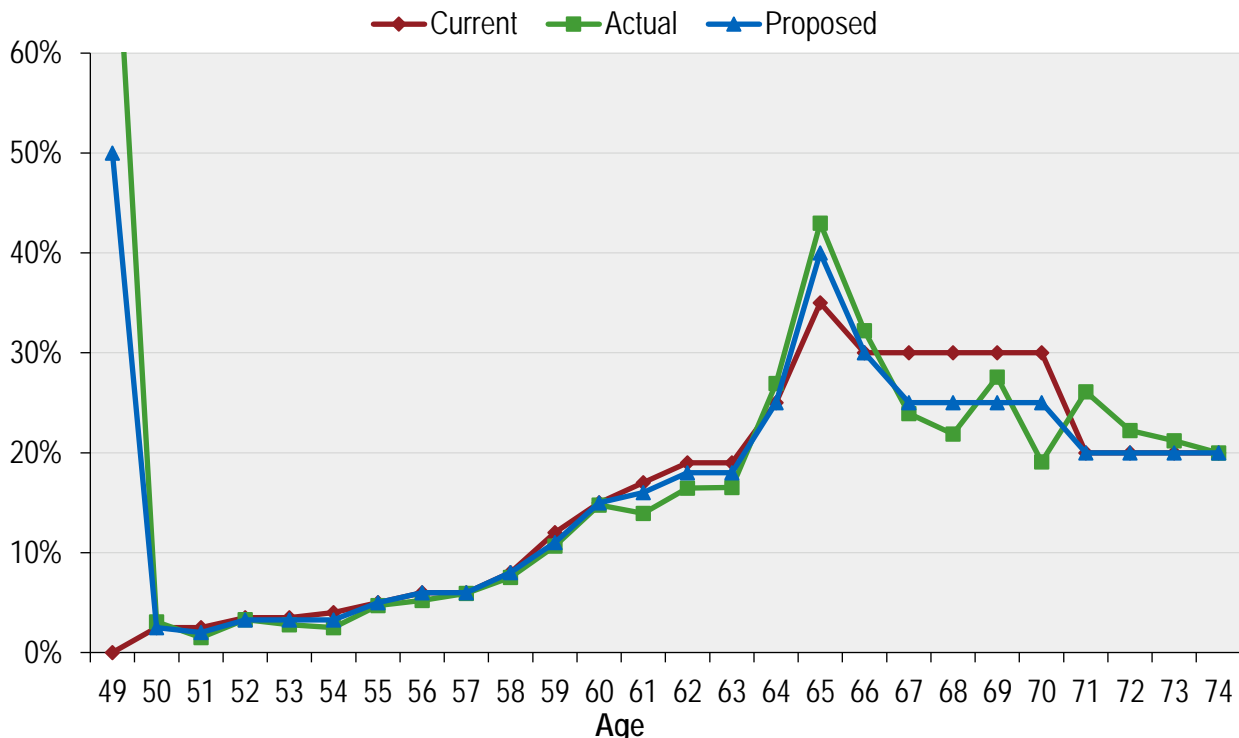
According to experience of members who retired during the last three years, about 64% of all male members and 52% of all female members who selected the unmodified option were married or had a domestic partner at retirement. We recommend decreasing the assumption to 65% for male members and maintaining the assumption at 55% for female members.

Since the value of the survivor’s benefit is dependent on the survivor’s age and sex, we must also have assumptions for the age and sex of the survivor. Based on the experience during the three-year period and studies done for other retirement systems, we recommend the following:

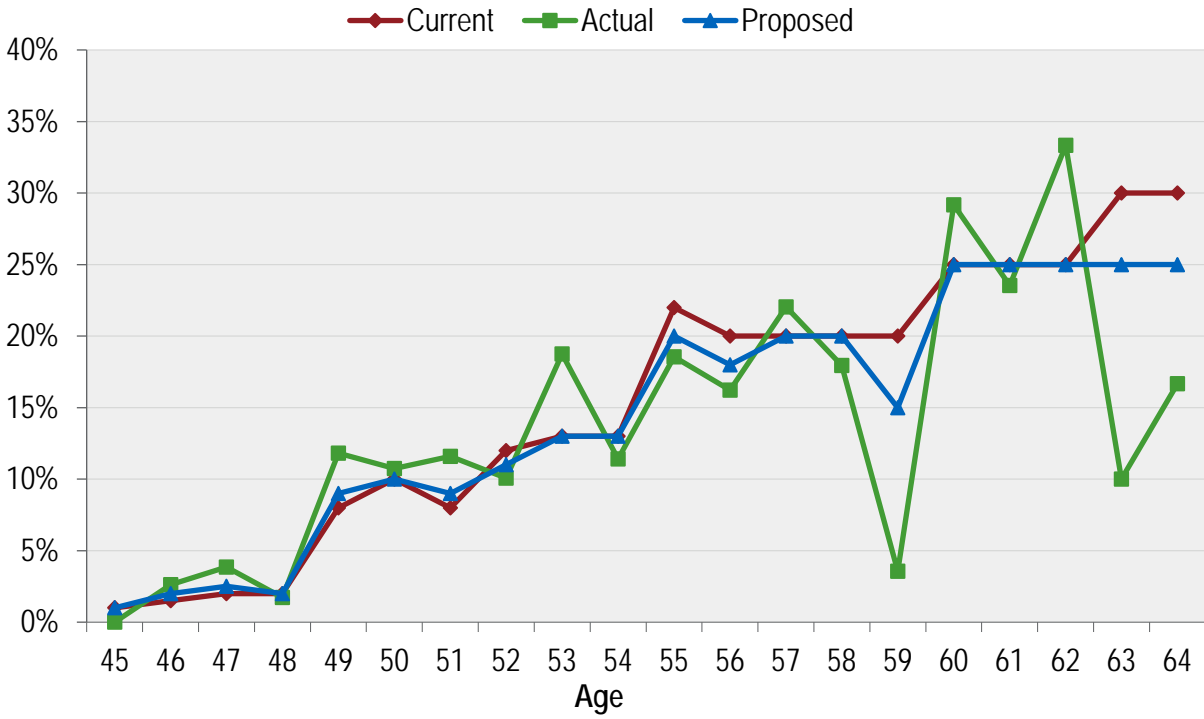
1. Since most the survivors are actually the opposite sex, even with the inclusion of domestic partners, we will continue to assume that the survivor’s sex is the opposite of the member.
2. The current and proposed assumption for the age of the survivor are shown below. These assumptions will continue to be monitored in future experience studies.

Survivor’s Age as Compared to Member’s Age			
Beneficiary Sex	Current Assumption	Actual Experience	Proposed Assumption
Male	3 years older	1.6 years older	2 years older
Female	3 years younger	3.4 years younger	3 years younger

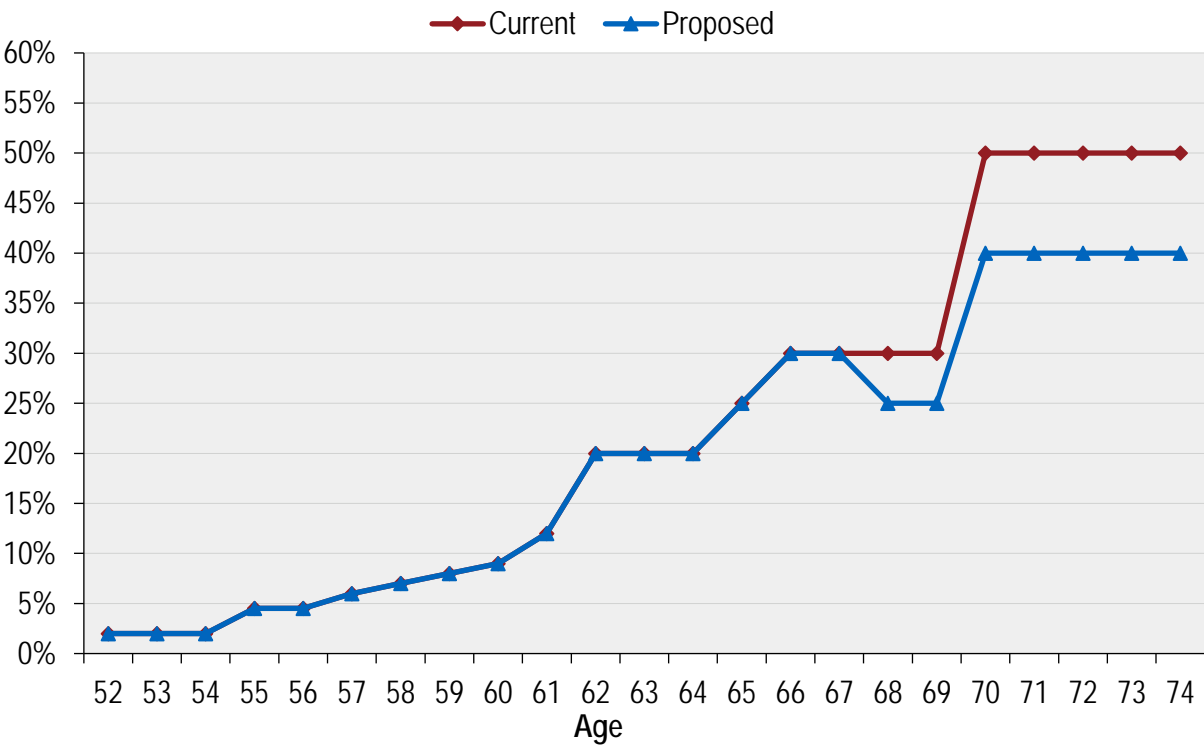
**CHART 3: RETIREMENT RATES  
GENERAL TIER 1 MEMBERS**



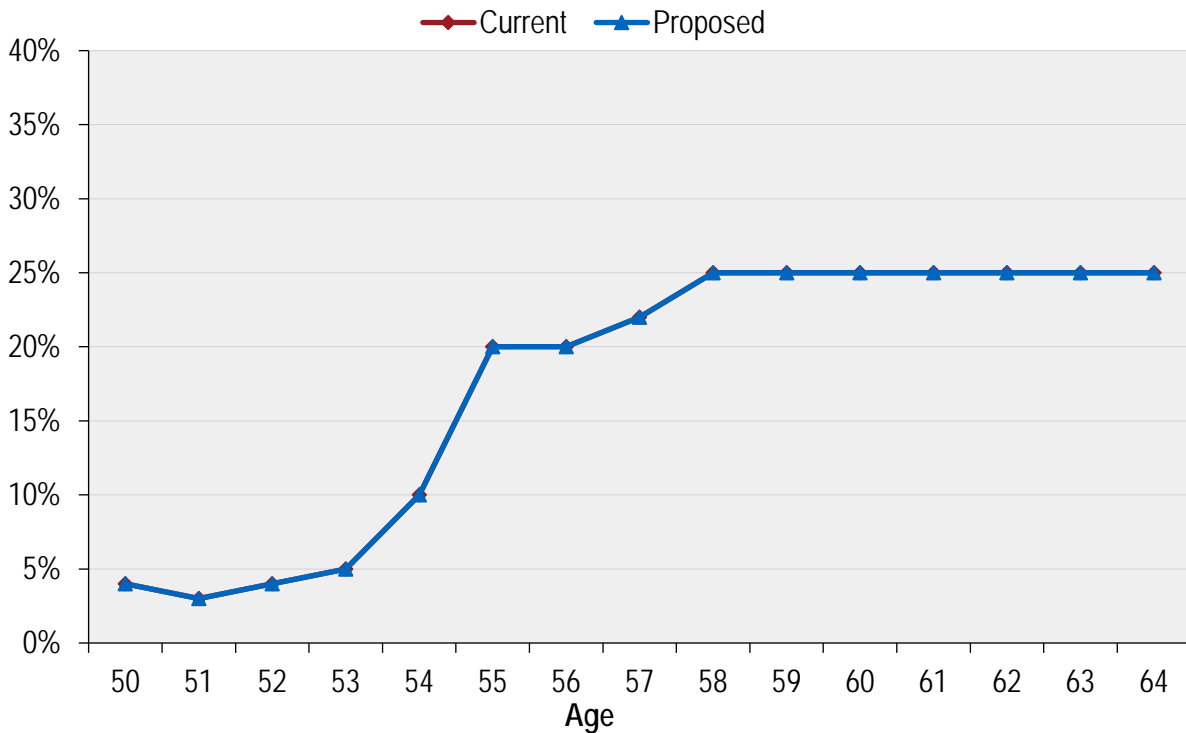
**CHART 4: RETIREMENT RATES  
SAFETY TIER 1 MEMBERS**



**CHART 5: RETIREMENT RATES  
GENERAL TIER 2 MEMBERS**



**CHART 6: RETIREMENT RATES  
SAFETY TIER 2 MEMBERS**



## B. 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 mortality rates project what proportion of members will die before retirement. For General members, the table currently being used for post-service retirement mortality rates is the RP-2000 Combined Healthy Mortality Table (separate tables for males and females) projected with Scale BB to 2020 with no age adjustments. For Safety members, the table currently being used for post-service retirement mortality rates is the RP-2000 Combined Healthy Mortality Table (separate tables for males and females) projected with Scale BB to 2020 with ages set back two years for males and set back one year for females. Beneficiaries are assumed to have the same mortality of a General member of the opposite sex who has taken a service (non-disabled) retirement.

The Society of Actuaries (SOA) has published the RP-2014 family of mortality tables and associated mortality improvement scales. Within that family of mortality tables, there are mortality rates developed for annuitants on a “headcount” weighted basis that weight all retirees at the same age the same way without regard to the level of benefits those annuitants are receiving from a retirement plan. Mortality rates are also developed for annuitants on a “benefit” weighted basis, with higher credibility assigned to experience from annuitants receiving larger benefits. The headcount-weighted basis is the more common practice currently and is the approach used by Segal in the past for its California public system clients (including SBCERA) and by other public sector actuaries in California.



As for the mortality improvement scales, they can be applied in one of two ways. Historically, the more common application is to use a “static” approach to anticipate a fixed level of mortality improvement for all annuitants receiving benefits from a retirement plan. This is in contrast to a “generational” approach where each future year has its own mortality table that reflects the forecasted improvements, using the published improvement scales. While the static approach is still used by some of Segal’s California public system clients, the “generational” approach is the emerging practice within the actuarial profession.

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. This is in contrast to updating a static mortality assumption with each experience study as we have proposed in prior experience studies.

The SOA is in the process of collecting data from public sector plans so that they can develop mortality tables based on public sector experience comparable to the RP-2014 mortality tables developed using data collected from private and multi-employer plans. Furthermore, after publishing the two-dimensional MP-2014 life expectancy improvement scale, the SOA replaced it with the two-dimensional MP-2015 life expectancy improvement scales to remove some of the conservatism built into the MP-2014 scale and to better reflect the most recent data of mortality improvement from the Social Security Administration. We understand that the Retirement Plans Experience Committee of the Society of Actuaries (RPEC) intends to publish annual updates to the “RPEC\_2014” mortality table model and corresponding mortality improvement scales. Improvement scale MP-2016 is based on the 2016 version of the RPEC\_2014 model including the RPEC-selected assumption set for 2016, and is the latest improvement scale available.

We recommend that given the trend in the retirement industry to move towards generational mortality, it would be reasonable for the Board to adopt the Headcount-Weighted RP-2014 mortality table (adjusted for SBCERA experience), and project the mortality improvement generationally using the MP-2016 mortality improvement scale. Once the SOA has included data from public sector plans in developing the new tables, we will also include a discussion with the Board on whether to consider the benefit weighted mortality rates in a future experience study.

Note that in order to use more actual SBCERA experience in our analysis, we have used experience for a six-year period from both the current and the prior experience study periods to study this assumption.

In the table below, we have provided the approximate increase in the total employer and member contribution rates based on the different approaches to build in margin for future mortality improvements.

	Employer and Member Contribution Rate Impact Combined
Headcount Weighted RP-2014 Family of Tables – Static Approach with Increased Margin	1.9% of payroll
Benefit Weighted RP-2014 Family of Tables – Static Approach without Increased Margin	2.9% of payroll
Headcount Weighted RP-2014 Family of Tables – Generational Approach	2.4% of payroll
Benefit Weighted RP-2014 Family of Tables – Generational Approach	3.4% of payroll

**Pre-Retirement Mortality**

In prior experience studies, the pre-retirement mortality rates for active members were set equal to the post-retirement mortality rates for retirees since the actual number of deaths among active members was not large enough to provide a statistically creditable analysis. However, this approach is not compatible with our current proposal because the post-retirement RP-2014 Healthy Annuitant table does not include rates for ages below 50.

From the RP-2014 family of tables, we recommend that pre-retirement mortality follow the Headcount-Weighted RP-2014 Employee Mortality Table (separate tables for males and females) times 90%, projected generationally with the two-dimensional scale MP-2016, all to account for the lower incidences of observed pre-retirement death on the combined General and Safety workforce. All pre-retirement deaths are assumed to be ordinary (non-service connected).

**Post-Retirement Mortality (Service Retirements)**

Our analysis starts with a table that shows, among all retired members, the actual deaths compared to the expected deaths under the current assumptions for the last six years. We also show the deaths under proposed assumptions. In prior years we have generally set the mortality assumption using a static mortality projection so that actual deaths will be at least 10% greater than those assumed. As noted above, we are recommending the use of a generational mortality table rather than static mortality. A generational mortality table 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. That is why the current actual to expected ratio shown in the table below for General and Safety is 98% and 97%, respectively. In future years these ratios would remain around 100%, as long as actual mortality improved at the same rates as anticipated in the generational mortality tables. The actual deaths compared to the expected deaths under the current and proposed assumptions for the last six years are as follows:

	General – Healthy			Safety – Healthy		
	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	406	475	485	44	58	60
Female	477	502	508	3	4	4
<b>Total</b>	<b>883</b>	<b>977</b>	<b>993</b>	<b>47</b>	<b>62</b>	<b>64</b>
Actual / Expected	111%		98%	131%		97%

For General members, the ratio of actual to expected deaths was 111%. We recommend updating the current table to the RP-2014 Headcount-Weighted Healthy Annuitant Mortality Table (separate tables for males and females) set forward one year for males, projected generationally with the two-dimensional mortality improvement scale MP-2016. This will bring the actual to expected ratio to 98%.

For Safety members, the ratio of actual to expected deaths was 131%. We recommend updating the current table to the RP-2014 Headcount-Weighted Healthy Annuitant Mortality Table (separate tables for males and females) with ages set back one year, projected generationally with the two-dimensional mortality improvement scale MP-2016. This will bring the actual to expected ratio to 97%.

All of this is consistent with ASOP 35 as we anticipate expected future improvement in life expectancy using the generational approach.

Chart 7 compares actual to expected deaths for General members under the current and proposed assumptions over the past six years. Experience shows that there were more deaths than predicted by the current table.

Chart 8 has the same comparison for Safety members. Experience shows that there were more deaths than predicted by the current table.

Chart 9 shows the life expectancies (i.e., expected future lifetime) under the current and the proposed tables for General members.

Chart 10 shows the same information for Safety members.

The expected deaths (Charts 7 and 8) and life expectancies (Charts 9 and 10) under the proposed generational mortality table are based on mortality rates from 2014 which is the base year of the table. In practice, life expectancies will be increased after applying the mortality improvement scale.

## **Mortality Table for Member Contributions, Optional Forms of Payment and Reserves**

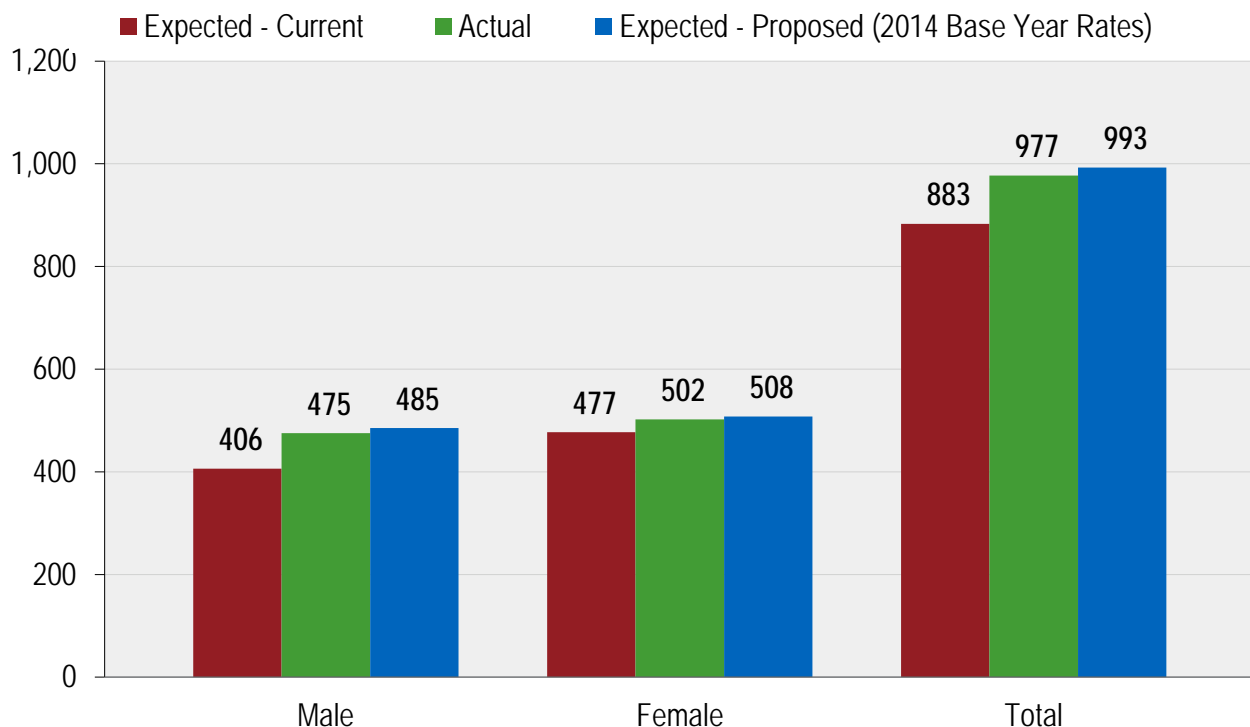
There are administrative reasons why a generational mortality table is more difficult to implement for determining member contributions for legacy tiers (i.e., Tier 1), optional forms of payment and reserves. One emerging practice is to approximate the use of a generational mortality table by the use of a static table with projection of the mortality improvement over a

period that is close to the duration of the benefit payments for active members. We would recommend the use of this approximation.

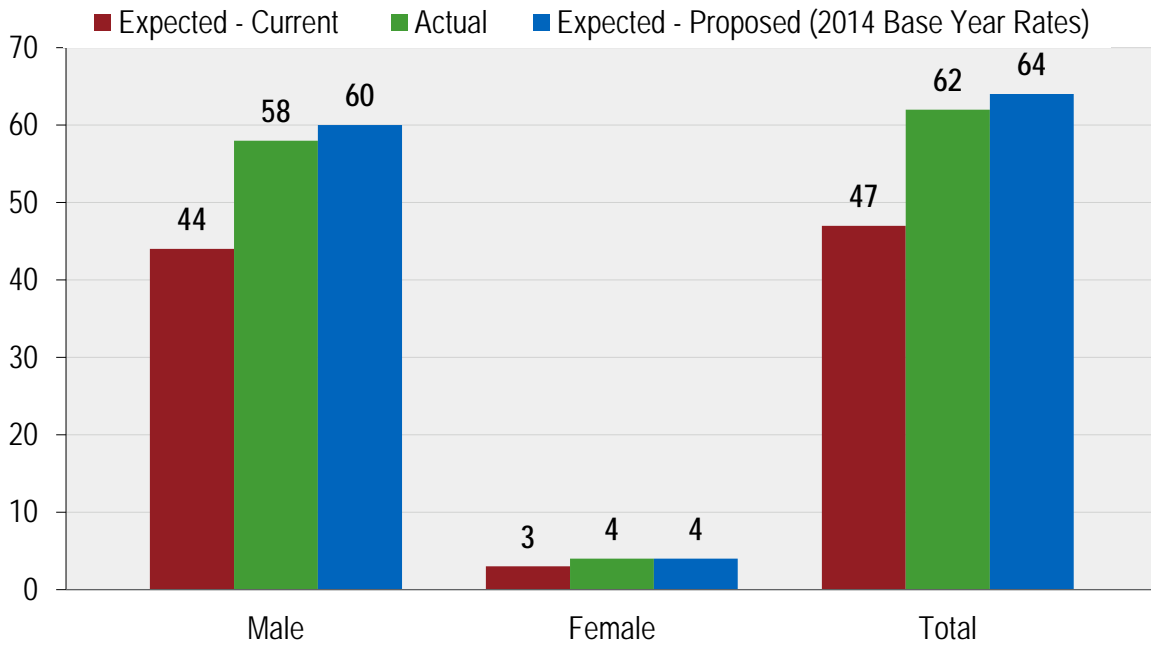
We recommend that the mortality table used for determining contributions for General members be updated from the RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 with no age adjustments weighted 30% male and 70% female to the RP-2014 Headcount-Weighted Healthy Annuitant Mortality Table projected to 2034 with the two-dimensional mortality improvement scale MP-2016 set forward one year for males, weighted 30% male and 70% female. This is based on the proposed valuation mortality table for General members and the actual sex distribution of General members.

For Safety members, we recommend the mortality table be changed from the RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 set back two years for males and one year for females weighted 85% male and 15% female to the RP-2014 Headcount-Weighted Healthy Annuitant Mortality Table projected to 2034 with the two-dimensional mortality improvement scale MP-2016 set back one year, weighted 90% male and 10% female. This is based on the proposed valuation mortality table for Safety members and the actual sex distribution of Safety members.

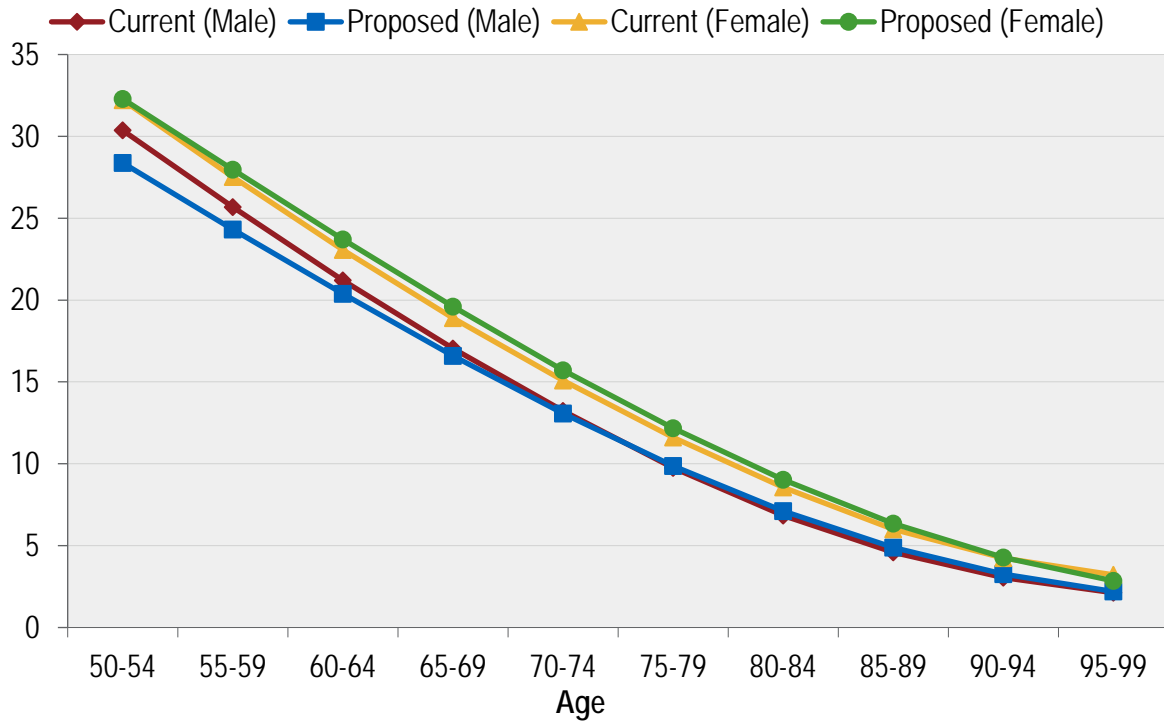
**CHART 7: POST-RETIREMENT DEATHS  
NON-DISABLED GENERAL MEMBERS  
(JULY 1, 2010 THROUGH JUNE 30, 2016)**



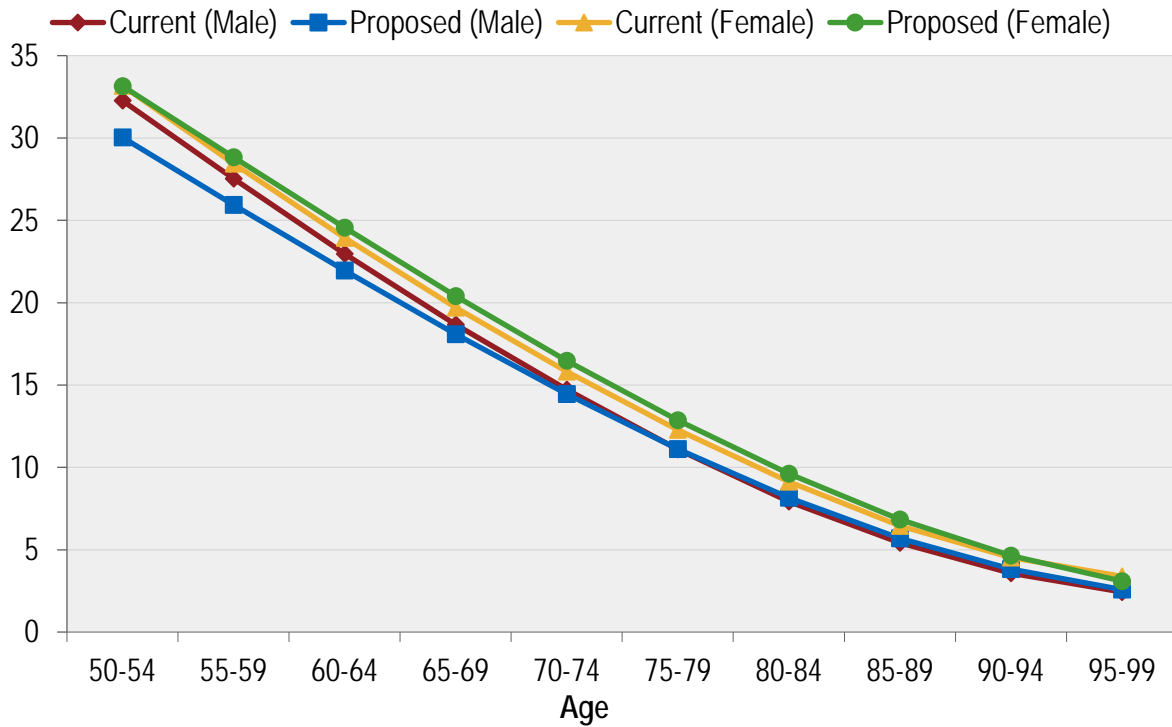
**CHART 8: POST-RETIREMENT DEATHS  
NON-DISABLED SAFETY MEMBERS  
(JULY 1, 2010 THROUGH JUNE 30, 2016)**



**CHART 9: LIFE EXPECTANCIES  
NON-DISABLED GENERAL MEMBERS**



**CHART 10: LIFE EXPECTANCIES  
NON-DISABLED SAFETY MEMBERS**



**C. Mortality Rates - Disabled**

Since mortality rates for disabled members can vary from those of healthy members, a different mortality assumption is often used. For General members, the table currently being used is the RP-2000 Combined Healthy Mortality Table (separate tables for males and females) projected with Scale BB to 2020 with ages set forward seven years for males and set forward eight years for females. For Safety members, the table currently being used is the RP-2000 Combined Table (separate tables for males and females) projected with Scale BB to 2020 with ages set forward two years.

The number of actual deaths compared to the number expected under the current and proposed assumption for the last six years are as provided in the table below.

	General – Disabled			Safety - Disabled		
	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	80	80	82	46	43	43
Female	84	81	83	3	3	4
<b>Total</b>	<b>164</b>	<b>161</b>	<b>165</b>	<b>49</b>	<b>46</b>	<b>47</b>
Actual / Expected	98%		98%	94%		98%

Based on the actual experience, we recommend changing the mortality table for General disabled members to the RP-2014 Headcount-Weighted Healthy Annuitant Mortality Table (separate tables for males and females) set forward seven years, projected generationally with the two-dimensional mortality improvement scale MP-2016. This will bring the actual to expected ratio to 98%.

Likewise, based on the actual experience, we recommend changing the mortality table for Safety disabled members to the RP-2014 Headcount-Weighted Healthy Annuitant Mortality Table (separate tables for males and females) set back one year, projected generationally with the two-dimensional mortality improvement scale MP-2016. This will also bring the actual to expected ratio to 98%.

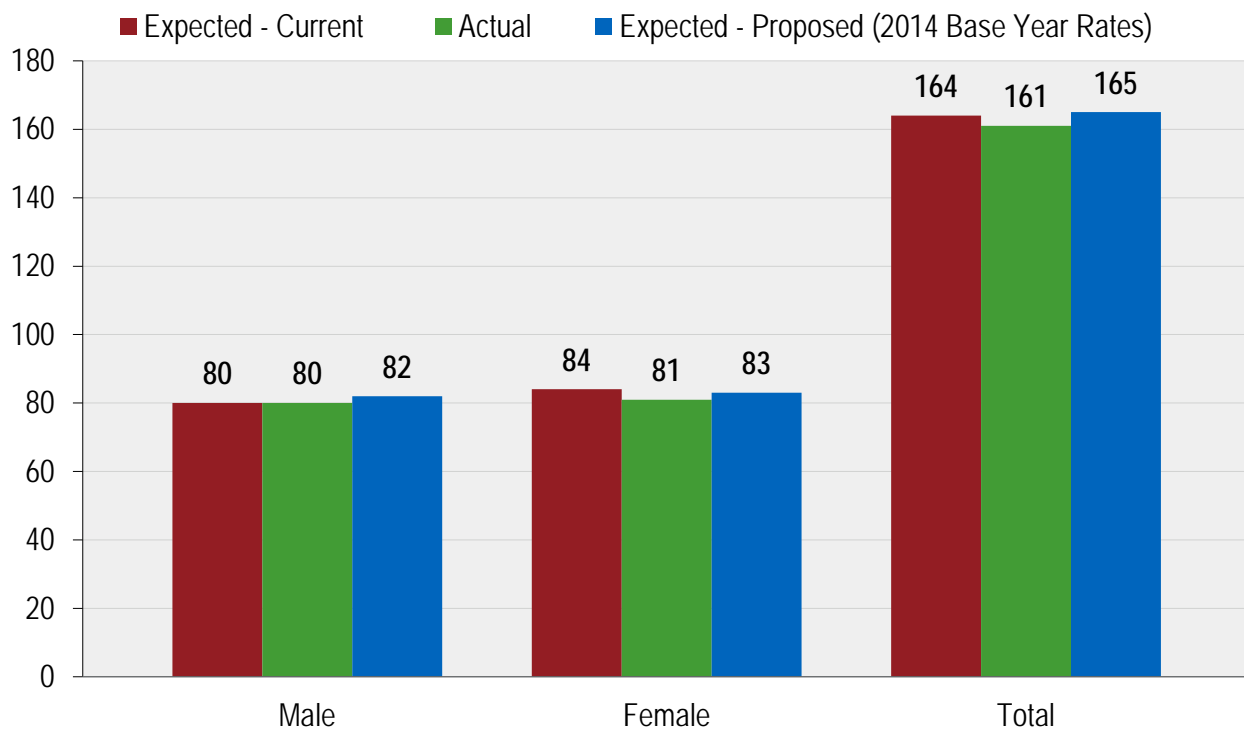
Chart 11 compares actual to expected deaths under both the current and proposed assumptions for disabled General members over the last six years. Experience shows that there were slightly fewer deaths than predicted by the current table.

Chart 12 has the same comparison for Safety members. Experience shows that there were slightly fewer deaths than predicted by the current table.

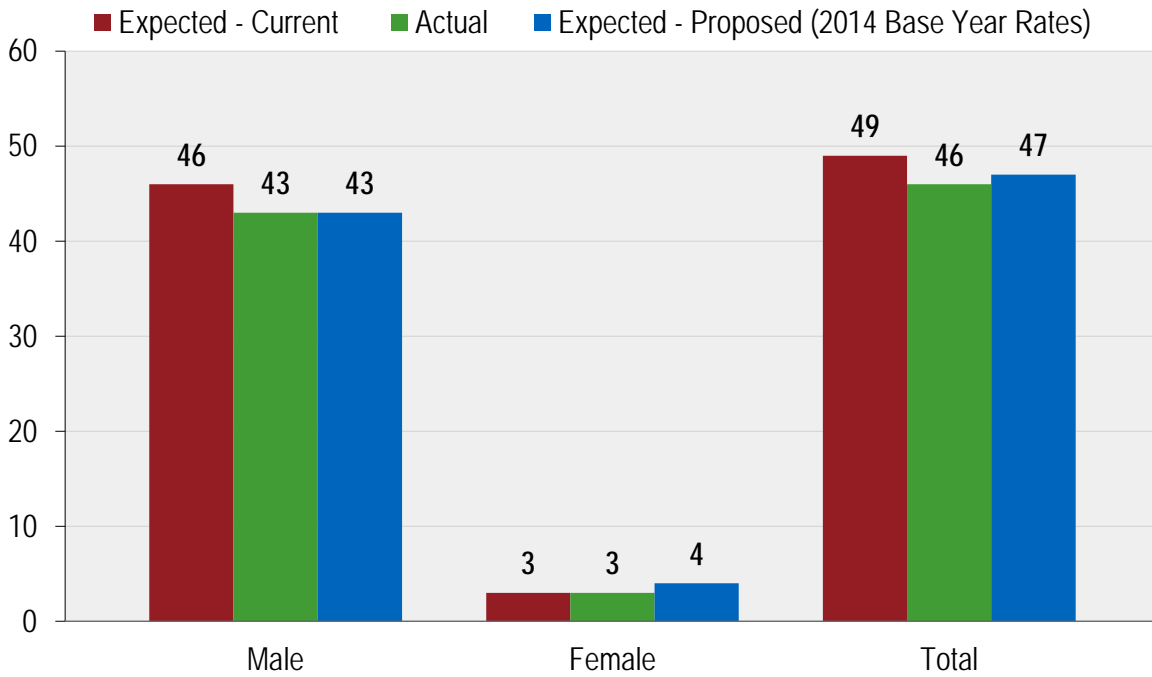
Chart 13 shows the life expectancies under both the current and proposed tables for General members.

Chart 14 shows the same information for Safety members.

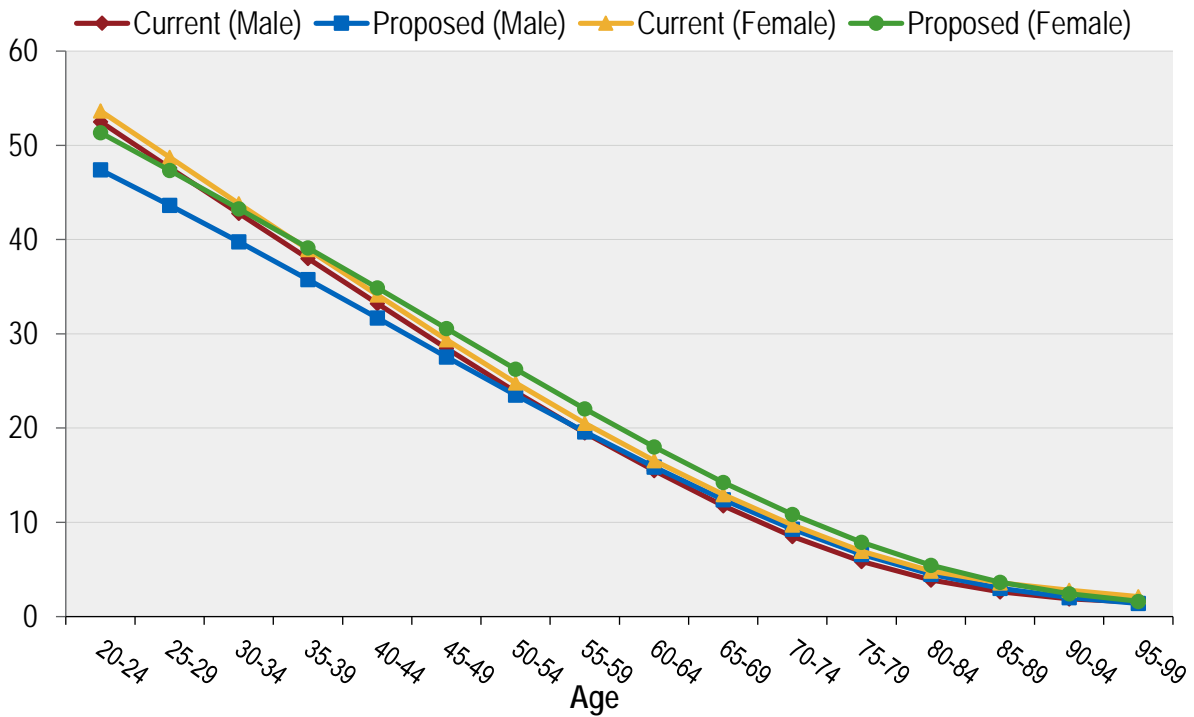
**CHART 11: POST-RETIREMENT DEATHS  
DISABLED GENERAL MEMBERS  
(JULY 1, 2010 THROUGH JUNE 30, 2016)**



**CHART 12: POST-RETIREMENT DEATHS  
DISABLED SAFETY MEMBERS  
(JULY 1, 2010 THROUGH JUNE 30, 2016)**

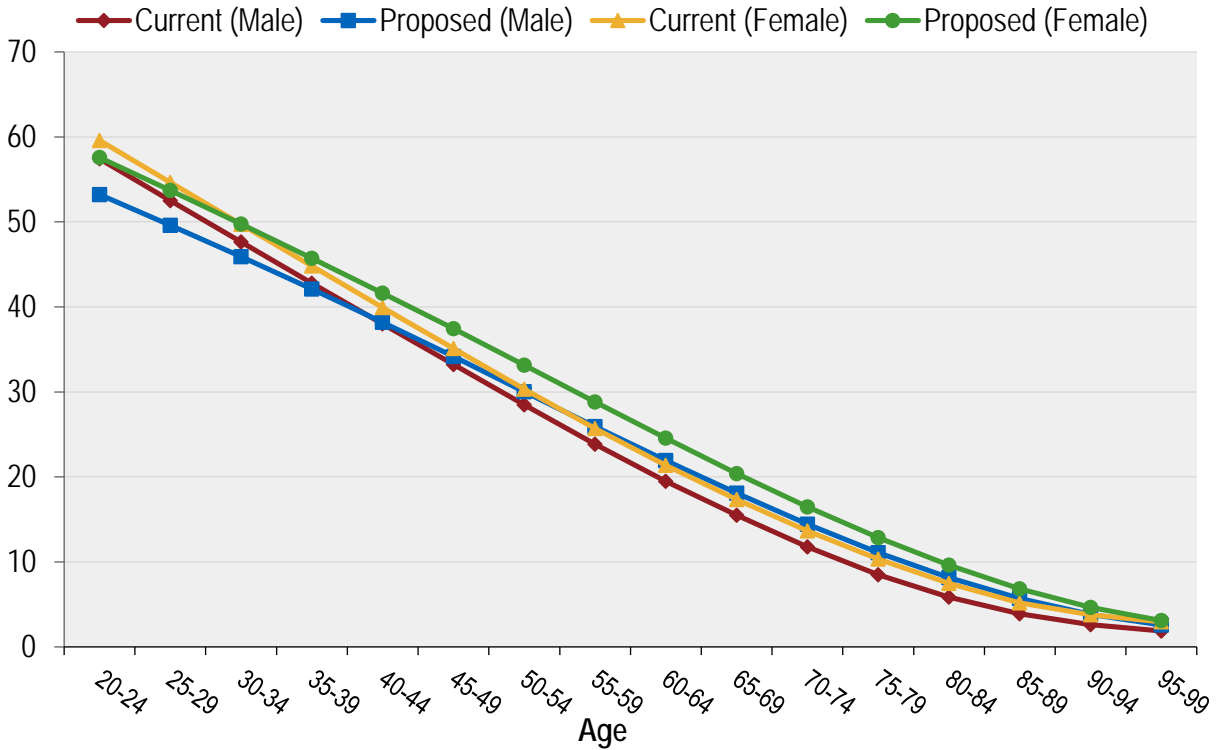


**CHART 13: LIFE EXPECTANCIES  
DISABLED GENERAL MEMBERS**





**CHART 14: LIFE EXPECTANCIES  
DISABLED SAFETY MEMBERS**



#### D. Termination Rates

Termination rates include all terminations for reasons other than death, disability, or retirement. Under the current assumptions there is an overall incidence of termination assumed, combined with assumptions, based on the plan membership, refund election and years of service, that a terminated vested member will choose a deferred vested benefit or will choose a refund of contributions. With this study, we continue to recommend that this same assumption structure be used.

The termination experience over the last three years for General and Safety members is shown by years of service in the following tables. Please note that we have excluded any members that were eligible for retirement. We also show the current and proposed assumptions.

## Rates of Termination – General

Years of Service	Termination Rate (%)		
	Current Rate	Observed Rate	Proposed Rate
Less than 1	15.00	15.23	15.00
1	10.00	12.06	11.00
2	8.00	11.77	9.00
3	7.00	9.36	7.50
4	5.00	7.94	5.50
5	4.75	7.59	5.25
6	4.50	5.75	5.00
7	4.25	5.17	4.50
8	4.00	4.97	4.25
9	3.75	4.14	4.00
10	3.75	5.19	4.00
11	3.75	5.24	4.00
12	3.50	4.37	3.75
13	3.50	4.74	3.75
14	3.25	4.37	3.50
15	3.25	3.57	3.50
16	3.00	4.35	3.25
17	3.00	3.65	3.25
18	2.75	3.28	3.00
19	2.75	3.90	3.00
20 or more	2.50	4.91	3.00

## Rates of Termination – Safety

Years of Service	Termination Rate (%)		
	Current Rate	Observed Rate	Proposed Rate
Less than 1	4.25	7.27	5.00
1	3.50	12.84	4.50
2	3.25	6.91	3.50
3	2.50	4.55	2.75
4	2.00	3.16	2.25
5	1.75	2.47	2.00
6	1.50	3.15	1.75
7	1.40	1.81	1.60
8	1.30	2.16	1.50
9	1.20	1.17	1.25
10	1.20	1.52	1.25
11	1.10	1.05	1.00
12	1.10	0.83	1.00
13	1.00	1.11	1.00
14	1.00	2.03	1.00
15	1.00	1.46	1.00
16	1.00	0.00	1.00
17	1.00	0.00	1.00
18	1.00	0.00	1.00
19	1.00	0.00	1.00
20 or more	1.00	87.50	1.00

It is important to note that not every service category has enough exposures and/or decrements such that the results in that category are statistically credible. This is mainly the case at the highest service categories since most members in those categories are eligible to retire and so have been excluded from our review of this experience. It is also the case in the tables that follow due to the even more limited experience regarding actual terminations.

The next two tables show the refund election experience over the last three years for General and Safety members. We have utilized the Refundable Code provided by SBCERA indicating whether the member has elected refundable or non-refundable contributions as of the valuation date. Please note that this refundable code may change year by year depending on the member's election for that year.

## General

Rates of Electing a Refund of Contributions upon Termination (%)						
Years of Service*	Current Rate if Elected Refundable Contribution	Observed Rate if Elected Refundable Contribution	Proposed Rate if Elected Refundable Contribution	Current Rate if Elected Non-refundable Contribution	Observed Rate if Elected Non-refundable Contribution	Proposed Rate if Elected Non-refundable Contribution
5	40.00	46.75	40.00	20.00	15.38	20.00
6	40.00	50.32	40.00	20.00	55.56	20.00
7	40.00	38.13	40.00	20.00	14.29	20.00
8	40.00	36.51	40.00	20.00	16.67	20.00
9	40.00	32.43	40.00	20.00	20.00	20.00
10	40.00	29.17	40.00	20.00	0.00	20.00
11	40.00	37.74	40.00	20.00	100.00	20.00
12	40.00	40.38	40.00	20.00	20.00	20.00
13	40.00	32.26	40.00	20.00	50.00	20.00
14	40.00	31.11	40.00	20.00	42.86	20.00
15	40.00	38.71	40.00	20.00	25.00	20.00
16	40.00	16.13	20.00	20.00	50.00	10.00
17	40.00	23.53	20.00	20.00	33.33	10.00
18	40.00	25.00	20.00	20.00	0.00	10.00
19	40.00	20.00	20.00	20.00	33.33	10.00
20 or more	20.00	22.03	20.00	10.00	15.38	10.00

\* All members with less than 5 years of service are assumed to elect a refund of contributions

## Safety

Rates of Electing a Refund of Contributions upon Termination (%)						
Years of Service*	Current Rate if Elected Refundable Contribution	Observed Rate if Elected Refundable Contribution	Proposed Rate if Elected Refundable Contribution	Current Rate if Elected Non-refundable Contribution	Observed Rate if Elected Non-refundable Contribution	Proposed Rate if Elected Non-refundable Contribution
5	25.00	0.00	25.00	12.50	100.00	12.50
6	25.00	50.00	25.00	12.50	0.00	12.50
7	25.00	16.67	25.00	12.50	0.00	12.50
8	25.00	44.44	25.00	12.50	0.00	12.50
9	25.00	25.00	25.00	12.50	0.00	12.50
10	25.00	100.00	25.00	12.50	100.00	12.50
11	25.00	50.00	25.00	12.50	0.00	12.50
12	15.00	0.00	15.00	7.50	0.00	7.50
13	15.00	33.33	15.00	7.50	0.00	7.50
14	15.00	40.00	15.00	7.50	0.00	7.50
15	15.00	66.67	15.00	7.50	0.00	7.50
16	10.00	0.00	10.00	5.00	0.00	5.00
17	10.00	0.00	10.00	5.00	0.00	5.00
18	5.00	0.00	5.00	2.50	0.00	2.50
19	5.00	0.00	5.00	2.50	0.00	2.50
20 or more	0.00	0.00	0.00	0.00	0.00	0.00

\* All members with less than 5 years of service are assumed to elect a refund of contributions

Chart 15 compares actual to expected terminations over the past three years for both the current and proposed assumptions for General members.

Chart 16 graphs the same information as Chart 15, but for Safety members.

Chart 17 shows the actual termination rates over the past three years compared to the current and proposed assumptions for General members.

Chart 18 shows the same information as Chart 17, but for Safety members.

Chart 19 shows the actual rates of electing a refund of contributions compared to the current and proposed assumptions for General members who elected refundable contributions.

Chart 20 shows the actual rates of electing a refund of contributions compared to the current and proposed assumptions for General members who elected non-refundable contributions.

Chart 21 shows the same information as Chart 19, but for Safety members.

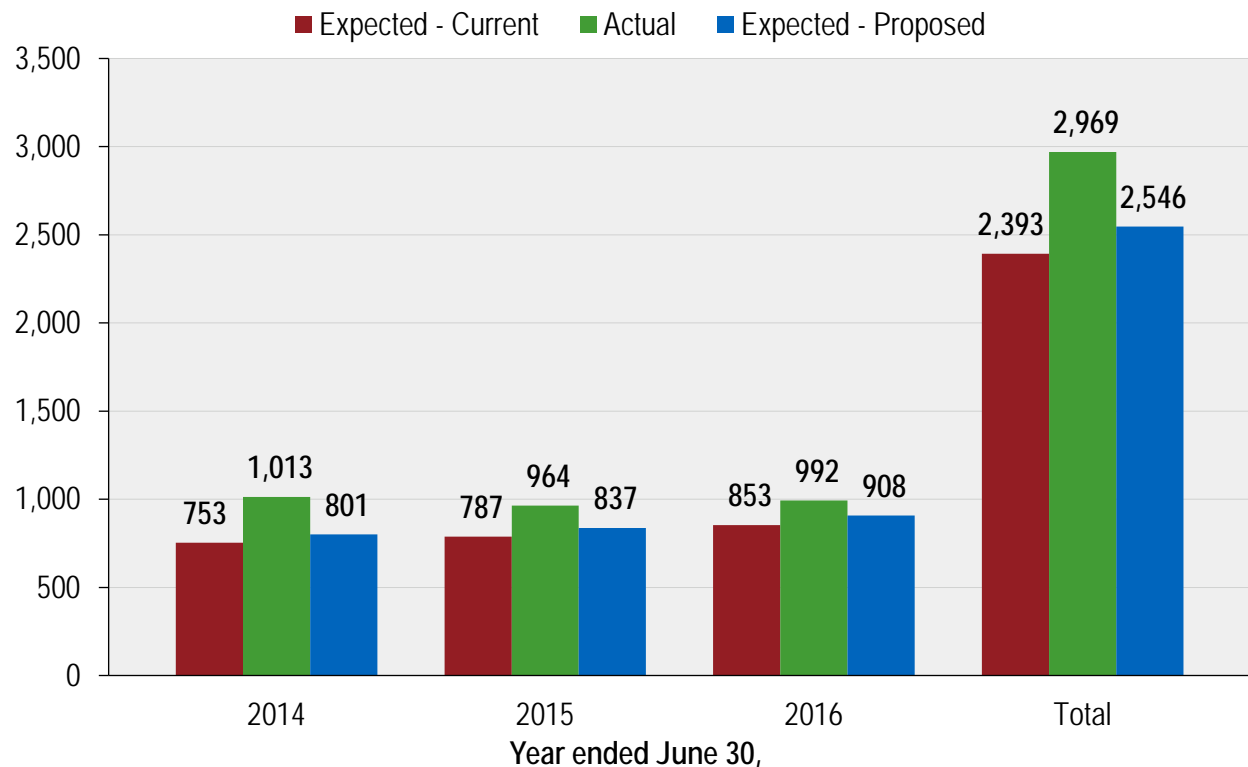
Chart 22 shows the same information as Chart 20, but for Safety members.

Based upon the recent experience, we have increased the termination rates for most service categories for both General and Safety members.

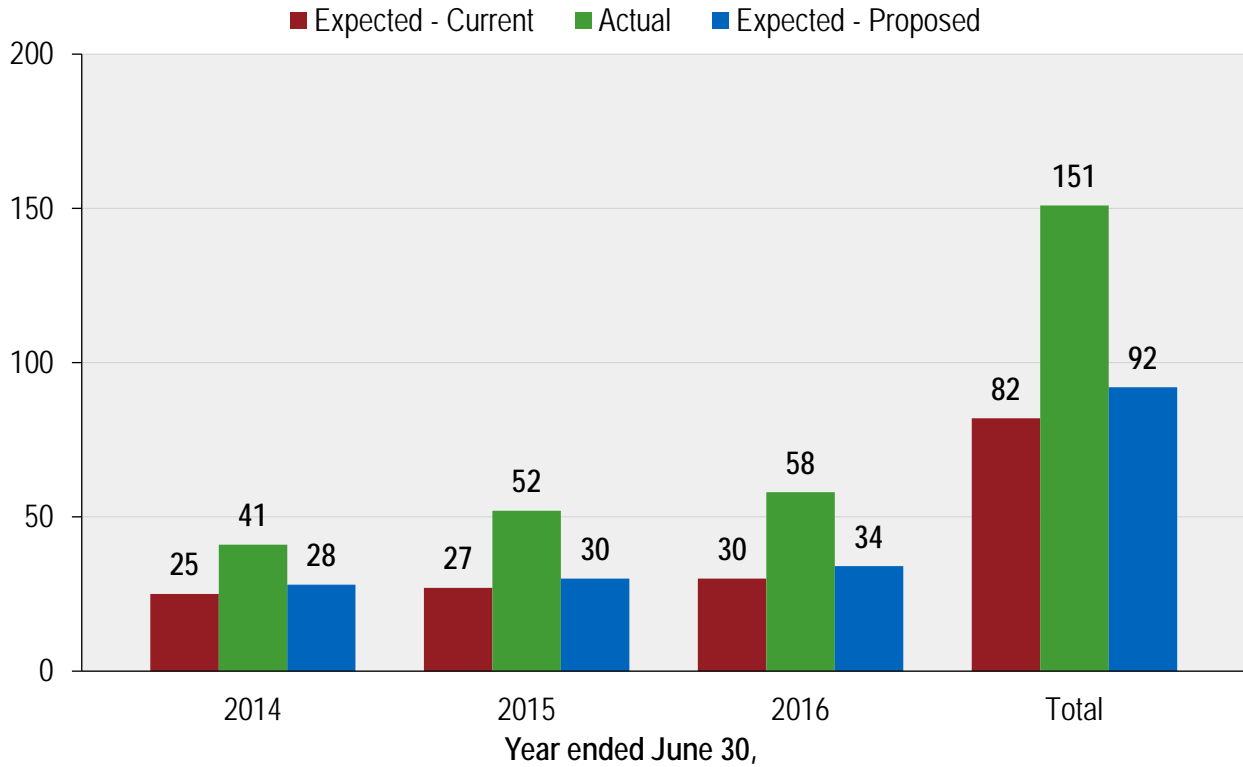
For both General and Safety members, the actual rates for electing a refund of contributions are overall comparable to the current assumptions for the past three years. We have decreased the rates of electing a refund of contributions for General members with more than 15 years of services. The rates for those members that have elected non-refundable contributions are generally half the rates for members that elected refundable contributions.

We will also continue to assume that termination rates are zero at any age where members are assumed to retire. In other words, at those ages, members will either retire in accordance with the retirement rate assumptions or continue working, rather than terminate and defer their benefit.

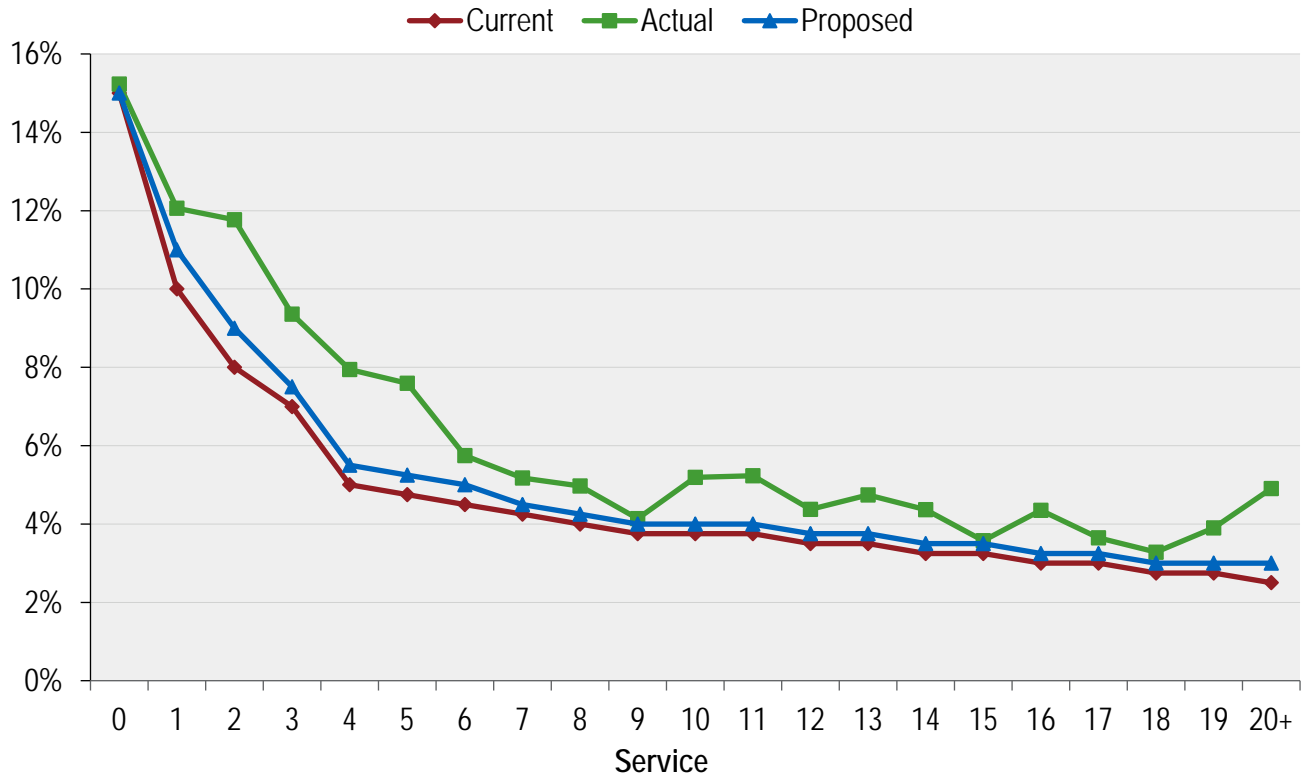
**CHART 15: ACTUAL NUMBER OF TERMINATIONS COMPARED TO EXPECTED – GENERAL MEMBERS**



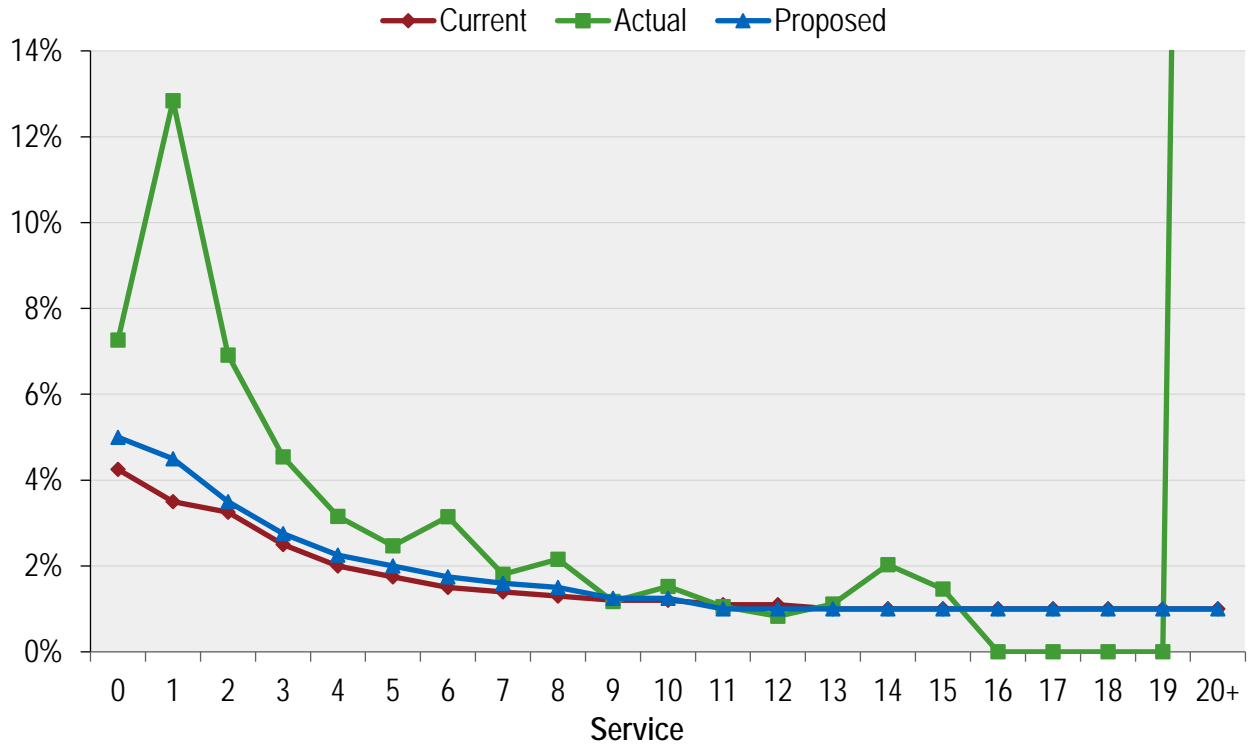
**CHART 16: ACTUAL NUMBER OF TERMINATIONS COMPARED TO EXPECTED – SAFETY MEMBERS**



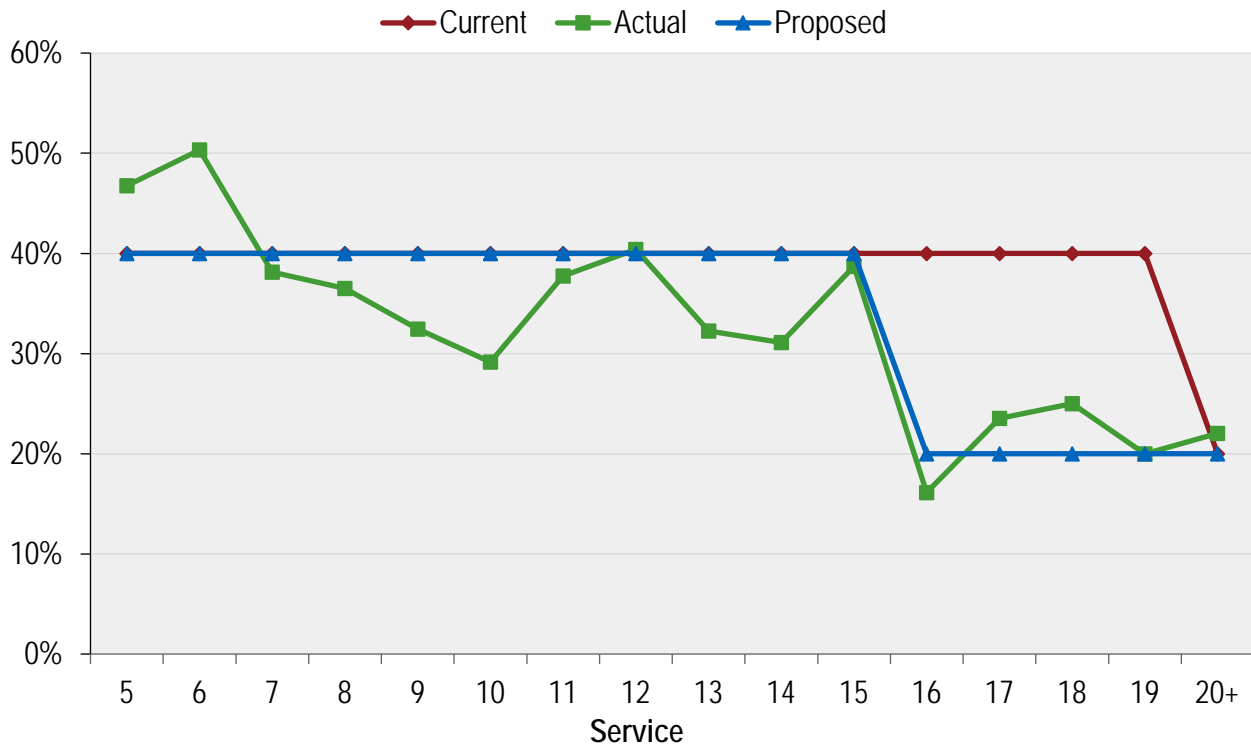
**CHART 17: TERMINATION RATES – GENERAL MEMBERS**



**CHART 18: TERMINATION RATES – SAFETY MEMBERS**

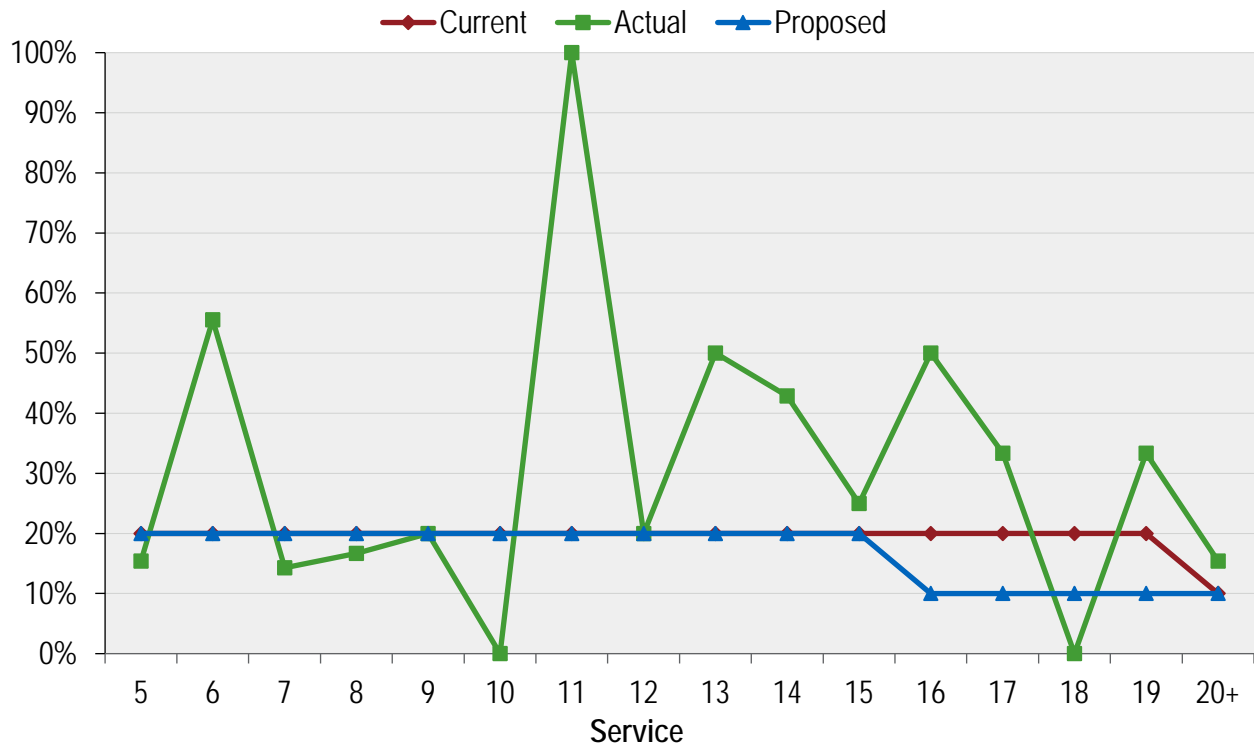


**CHART 19: RATES OF ELECTING A REFUND – GENERAL MEMBERS ELECTED REFUNDABLE CONTRIBUTIONS**

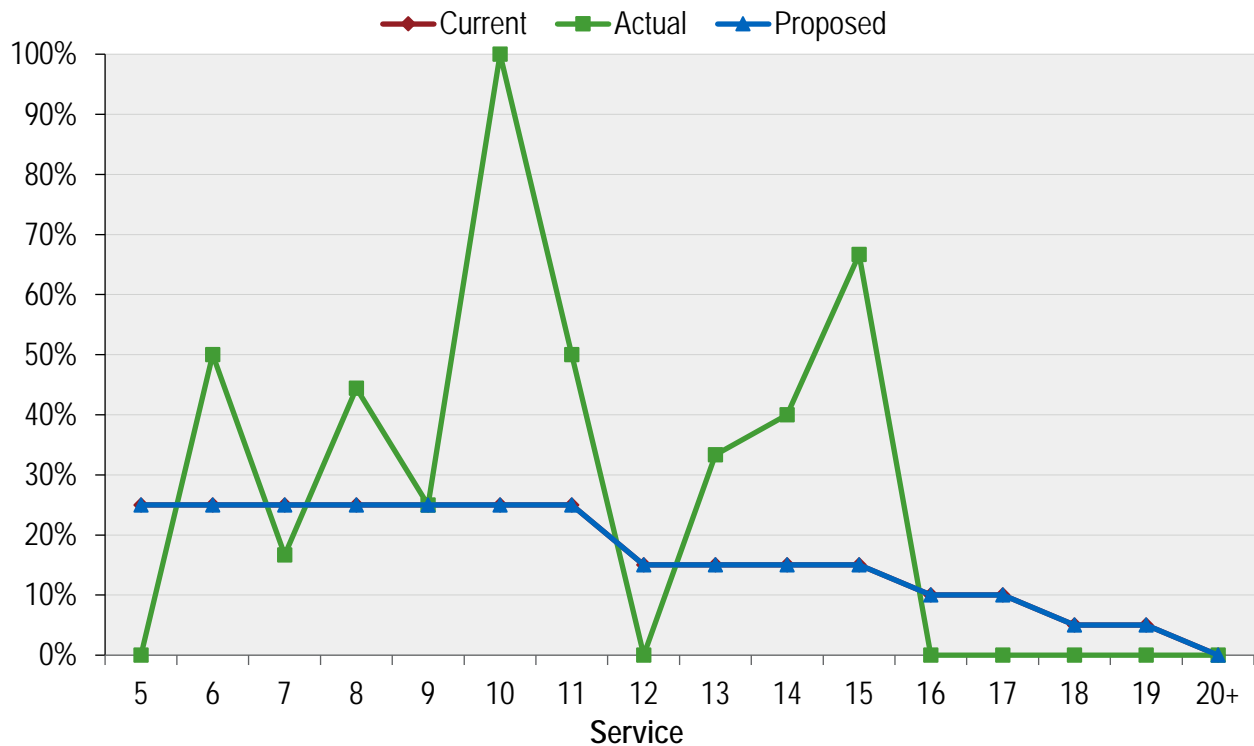




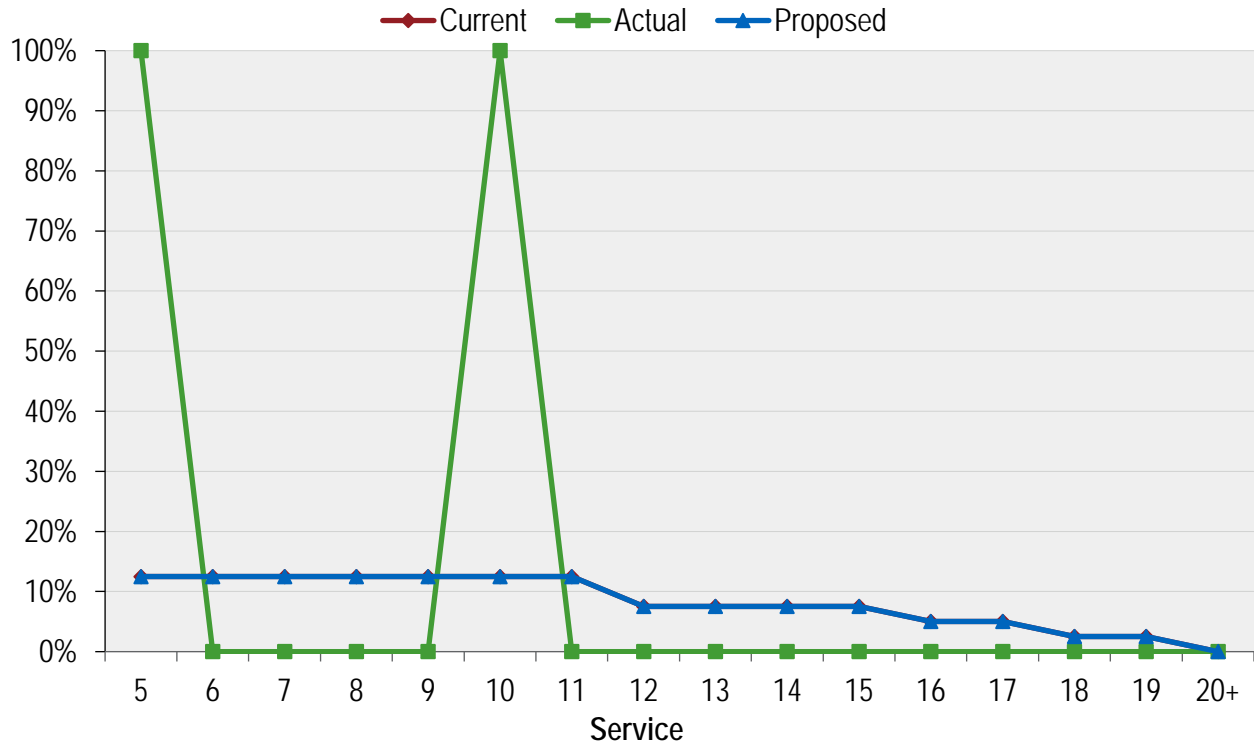
**CHART 20: RATES OF ELECTING A REFUND – GENERAL MEMBERS ELECTED NON-REFUNDABLE CONTRIBUTIONS**



**CHART 21: RATES OF ELECTING A REFUND – SAFETY MEMBERS ELECTED REFUNDABLE CONTRIBUTIONS**



**CHART 22: RATES OF ELECTING A REFUND – SAFETY MEMBERS ELECTED NON-REFUNDABLE CONTRIBUTIONS**



### E. 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 summarizes the actual incidence of combined service and non-service connected disabilities over the past three years compared to the current and proposed assumptions for both service connected and non-service connected disability incidence:

## Rates of Disability Incidence - General

Age	Disability Incidence Rate* (%)		
	Current Rate	Observed Rate	Proposed Rate
20 – 24	0.02	0.00	0.02
25 – 29	0.03	0.00	0.02
30 – 34	0.05	0.00	0.04
35 – 39	0.08	0.01	0.06
40 – 44	0.10	0.07	0.10
45 – 49	0.25	0.13	0.20
50 – 54	0.35	0.29	0.32
55 – 59	0.50	0.21	0.40
60 – 64	0.75	0.59	0.70
65 – 69	1.20	0.58	1.00
70 – 74	1.30	1.54	1.40

\* Total rate for service and non-service connected disabilities.

## Rates of Disability Incidence - Safety

Age	Disability Incidence Rate* (%)		
	Current Rate	Observed Rate	Proposed Rate
20 – 24	0.20	0.00	0.20
25 – 29	0.30	0.00	0.25
30 – 34	0.30	0.37	0.35
35 – 39	0.60	0.35	0.45
40 – 44	0.80	0.27	0.60
45 – 49	1.10	1.12	1.05
50 – 54	2.75	2.96	2.85
55 – 59	6.00	7.83	7.00
60 – 64	7.00	8.79	8.00

\* Total rate for service and non-service connected disabilities.

Chart 23 compares the actual number of non-service connected and service connected disabilities over the past three years to that expected under both the current and proposed assumptions.

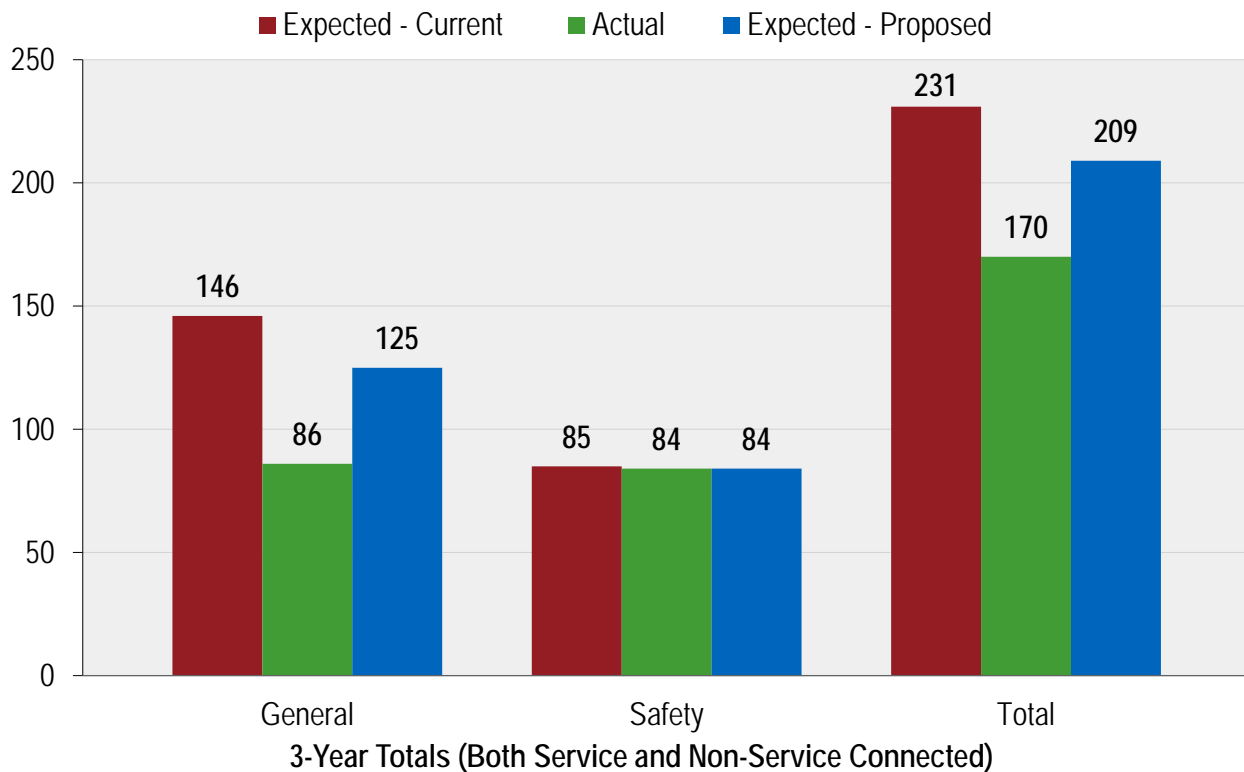
The actual number of disabilities for General members during the most recent experience study period were significantly lower than expected and may not be indicative of future long-term disability incidence experience. We have given relatively less weight to the actual experience during the last three years in our proposed assumptions for General members. Overall, the proposed disability rates were lowered for both General and Safety members to reflect some of the past three years' experience.

Chart 24 shows actual disability incidence rates, compared to the assumed and proposed rates for General members. Since 42% of disabled General members received a service connected disability, we recommend maintaining the current assumption that 50% of disabilities will receive a service connected disability retirement. The remaining 50% of disabled General members are assumed to receive a non-service connected disability.

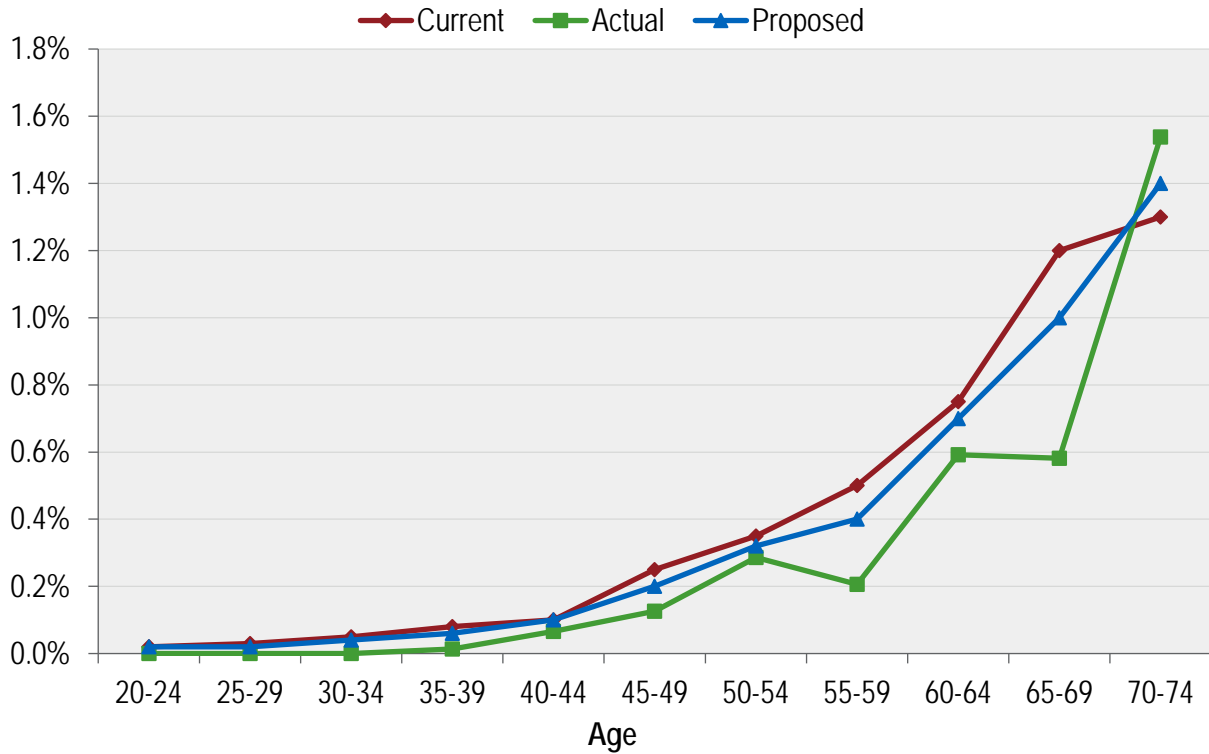
Chart 25 graphs the same information as Chart 24, but for Safety members. Since 98% of disabled Safety members received a service connected disability, we recommend maintaining the current assumption that 100% of disabilities will receive a service connected disability retirement. This means that no non-service connected disabilities will be assumed for Safety members.

In prior valuations, it was assumed that 30% of future General service connected disableds would be eligible for the Supplemental Disability benefit and 75% of future General non-service connected disableds would be eligible for the Supplemental Disability benefit. Based on the last three years of experience, about 36% of General service connected disableds (37% in the last study) and 68% of General non-service connected disableds (78% in the last study) received this benefit. We recommend increasing the assumption to 35% for General service connected disableds and maintaining the assumption at 75% for General non-service connected disableds.

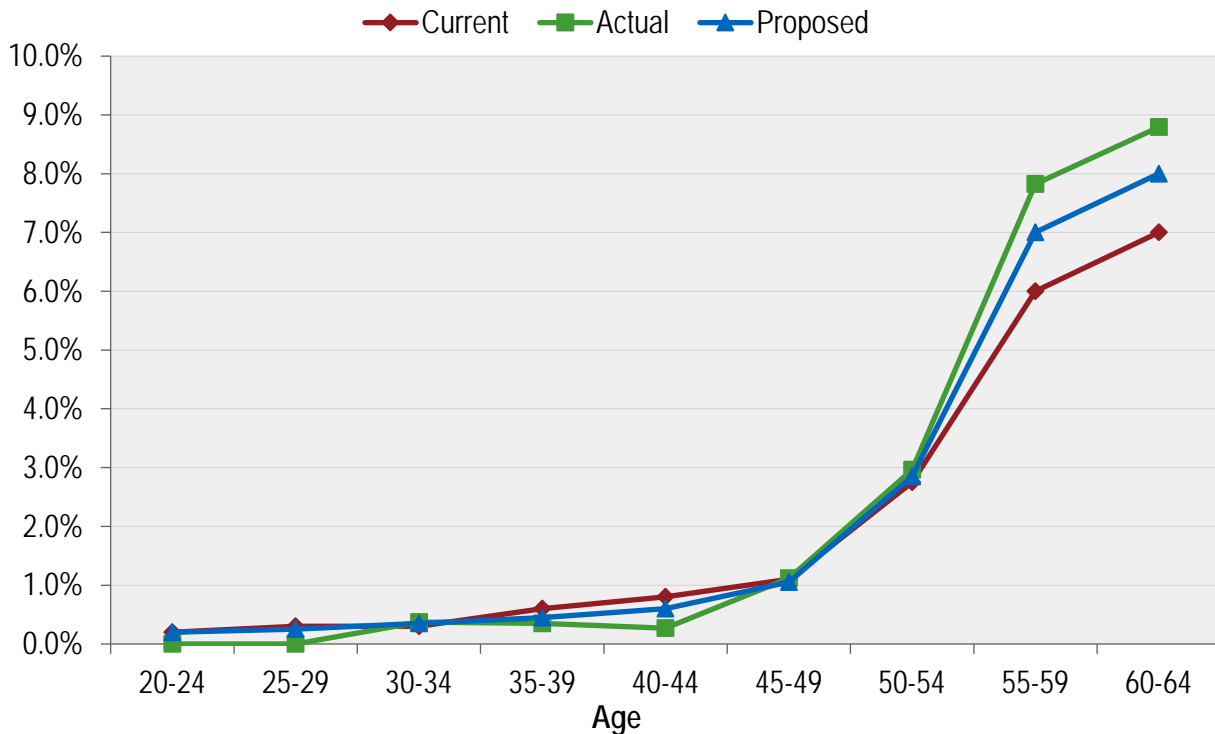
**CHART 23: ACTUAL NUMBER OF DISABILITIES COMPARED TO EXPECTED**



**CHART 24: DISABILITY INCIDENCE RATES  
GENERAL MEMBERS**



**CHART 25: DISABILITY INCIDENCE RATES  
SAFETY MEMBERS**



## F. Leave Cashouts

Certain SBCERA Tier 1 members are eligible to cashout various leave time on an annual basis. These cashouts are included as part of a member's Earnable Compensation at retirement. There are two categories within which these leave cashouts may fall:

- Ongoing Pay Elements – Those that are expected to be received relatively uniformly over a member's employment years; and
- Terminal Pay Elements – Those that are expected to be received only 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. Any year to year fluctuation in the amount of leave cashouts would be incorporated in the salary scale assumptions discussed in the prior section of this report. The second category may require a separate actuarial assumption to anticipate its impact on a member's retirement benefit.

SBCERA has provided us the most recent maximum allowable annual leave cashout hours that various bargaining units of County Tier 1 members are allowed to cashout. The information provided to us is summarized in the table below. The data shown is for County Tier 1 members only and it covers a large portion of the total SBCERA active Tier 1 membership (about 82%) as of June 30, 2016.

County Maximum Leave Cashouts by Classification Group	
# of Members	Maximum Cashout (Hours)
1,045	80
8,147	120
1,356	160
427	200
243	240
223	272
691	352
273	379
12	475

The data shows that most of the County Tier 1 members can cashout a significant amount (at least 120 hours) of leave on an annual basis. However, it is still unknown how much additional leave is cashed out in the last year before retirement as compared to what is cashed out in earlier years of service (i.e., how much is only in the terminal pay elements).

We also obtained some data on the maximum allowable annual leave cashouts for certain Tier 1 members of the other employers in SBCERA. This data showed that most of these members can cashout significant amounts (greater than 200 hours) of leave on an annual basis. Again, the data did not indicate how much additional leave has actually been cashed out only in the last year before retirement.

Based on the uncertainty surrounding how much additional leave is cashed out in the last year before retirement as compared to previous years and the lack of the actual data, we recommend continuing the current practice of assuming that no leave cashouts occur during the member's final average earnings period above what the member cashes out on an annual basis.

However, we have observed that there is an upward trend in maximum cashouts allowable and more members became eligible for cashouts compared to last study. We will work with SBCERA to track the actual leave cashouts before retirement so that the data can be used in future experience studies.

In addition, if there is a future recommendation to include a leave cashout assumption in the valuation, then a determination will have to be made by SBCERA and the Retirement Board regarding whether this assumption would impact only employer or both employer and member contribution rates.

## G. Survivor Assumptions for Survivor Benefit Valuation

Additional assumptions concerning the probability of being married or having eligible children upon pre-retirement death are needed for the Survivor Benefit Valuation. The current assumptions are based on the 2013 U.S. Census data. We have proposed changes to these assumptions that reflect the 2016 U.S. Census data. The proposed assumptions are shown at the end of Appendix B. Overall, the proposed assumptions reflect increases in the percent with survivors.

## V. Cost Impact

The tables below show the changes in the employer and member contribution rates due to the proposed assumption changes as if they were applied to the June 30, 2016 actuarial valuation. If all of the proposed assumption changes (both economic and demographic) were implemented, the average employer rate would have increased by 6.27% of payroll. The average member rate would have increased by 1.44% of payroll. The UAAL would have increased by \$884 million. The results include the change of the administrative expense load from 0.6% to 0.7% of payroll. The cost associated with the administrative expense load has continued to be allocated to both the employer and the member based on the components of the total contribution rate (before expenses) for the employer and the member.

Tier 1 Employer Contribution Rate Impact (% of Compensation)						
Contributions	County General	County Safety	Superior Court	SCAQMD	Other General	Other Safety All Service
Normal Cost	1.80%	2.74%	1.80%	1.58%	1.79%	2.62%
UAAL	3.90%	6.69%	3.79%	5.19%	3.45%	6.86%
<b>Total</b>	<b>5.70%</b>	<b>9.43%</b>	<b>5.59%</b>	<b>6.77%</b>	<b>5.24%</b>	<b>9.48%</b>

Tier 2 Employer Contribution Rate Impact (% of Compensation)							
Contributions	County General	County Safety	Superior Court	SCAQMD	Other General	Other Safety All Service	Tier 1 and Tier 2 Combined
Normal Cost	1.35%	2.16%	1.35%	1.16%	1.25%	1.94%	1.85%
UAAL	3.90%	6.69%	3.79%	5.19%	3.45%	6.86%	4.42%
<b>Total</b>	<b>5.25%</b>	<b>8.85%</b>	<b>5.14%</b>	<b>6.35%</b>	<b>4.70%</b>	<b>8.80%</b>	<b>6.27%</b>

Total Employer Contribution Rate Impact (Estimated Annual Dollar Amounts in Thousands)							
Contributions	County General	County Safety	Superior Court	SCAQMD	Other General	Other Safety All Service	Overall
Total	\$52,774	\$20,678	\$3,749	\$4,836	\$2,302	\$299	\$84,638



Refundable Tier 1 Member Contribution Rate Impact at Sample Entry Ages (Annual Amounts in Dollars)								
	General Tier 1				Safety Tier 1			
Entry Age	Current	Proposed	Difference	Annual Amount*	Current	Proposed	Difference	Annual Amount*
25	9.77%	11.29%	1.52%	\$912	12.77%	14.42%	1.65%	\$1,568
30	10.61%	12.12%	1.51%	\$906	13.95%	15.41%	1.46%	\$1,387
35	11.51%	13.06%	1.55%	\$930	15.19%	16.55%	1.36%	\$1,292
40	12.57%	14.14%	1.57%	\$942	16.55%	17.84%	1.29%	\$1,226
45	13.78%	15.27%	1.49%	\$894	17.35%	18.60%	1.25%	\$1,188

Refundable Tier 2 Member Contribution Rate Impact (Annual Amounts in Dollars)				
	Tier 2			
	Current	Proposed	Difference	Annual Amount*
County General and Superior Court	8.45%	9.80%	1.35%	\$810
County Safety	15.15%	17.31%	2.16%	\$2,052
SCAQMD	7.66%	8.82%	1.16%	\$696
Other General	8.74%	9.99%	1.25%	\$750
Other Safety	13.06%	15.00%	1.94%	\$1,843

*\*Based on annual compensation of \$60,000 for General members and \$95,000 for Safety members.*

The total estimated annual dollar increase in member contributions is about \$19 million.

Considered separately, the changes in economic assumptions accounted for about three-quarters of the overall cost impact to the plan. Of the various economic assumption changes, the most significant cost impact is from the investment return assumption change. Of the various demographic assumption changes, the most significant cost impact is from the mortality assumption change.

In particular, if all of the proposed economic assumptions changes (as recommended in Section III of this report) were implemented, the average employer rate would have increased by 4.52% of payroll and the average member rate would have been increased by 1.21% of payroll. Of the various economic assumption changes, the most significant cost impact is from the investment return assumption change.

Furthermore, if all of the proposed demographic assumption changes (as recommended in Section IV of this report) were implemented, the average employer rate would have increased by 1.75% of payroll. The average member rate would have increased by 0.23% of payroll. Of the various demographic assumption changes, the most significant cost impact is from the mortality assumption change.

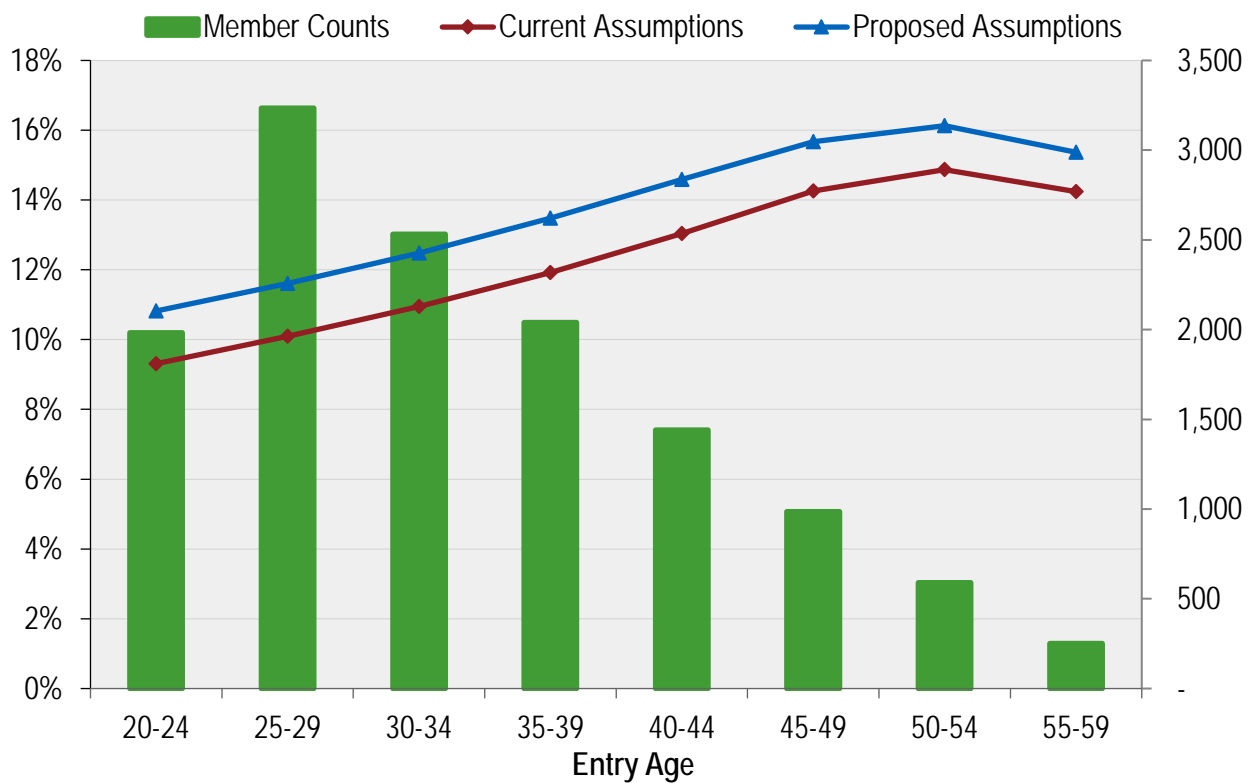
Therefore, as noted above, the estimated cost impact of all proposed assumption changes (both economic and demographic) is 6.27% of payroll for the average employer rate, where the

Normal Cost rate increased by 1.83%, the UAAL amortization rate increased by 4.35% and the explicit administrative expense load increased by 0.09%. The average member rate would have increased by 1.44% of payroll, including an increase in explicit administrative load of 0.01%.

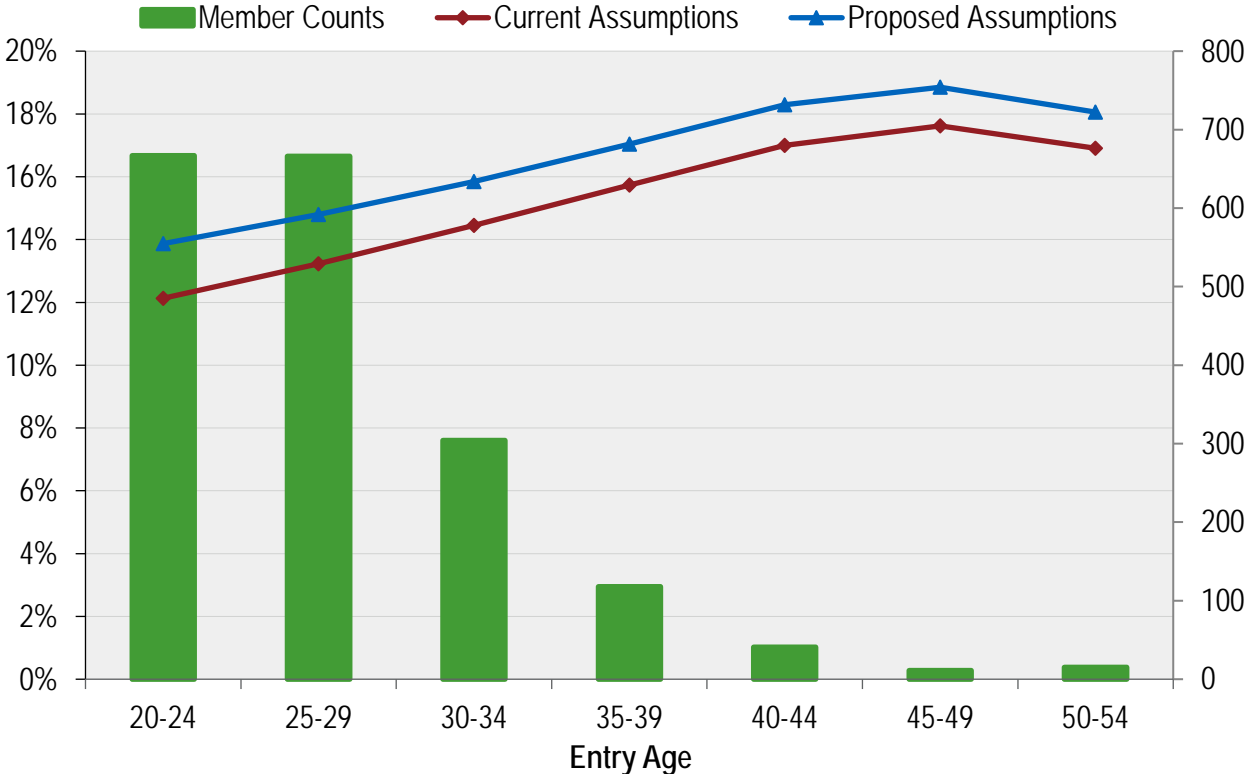
We also note that the survivor benefit contribution rate for each of the employer and the member would have decreased by \$0.22 per biweekly pay period. The surplus of assets over liabilities would have increased by \$53,000 with the new assumptions.

Charts 26 and 27 provide a graphical comparison of the current and proposed member contribution rates for Tier 1. Information on the number of active members as of June 30, 2016 in each entry age category is also shown. Chart 26 shows this information for General Tier 1 members and Chart 27 for Safety Tier 1 members.

**CHART 26: REFUNDABLE GENERAL TIER 1 MEMBER CONTRIBUTION RATES**



**CHART 27: REFUNDABLE SAFETY TIER 1 MEMBER CONTRIBUTION RATES**



# Appendix A: Current Actuarial Assumptions

---

## Economic Assumptions

<b>Net Investment Return:</b>	7.50%, net of investment expenses.
<b>Administrative Expenses:</b>	0.60% of payroll allocated to both the employer and member based on the components of the total contribution rate (before expenses) for the employer and member.
<b>Employee Contribution Crediting Rate:</b>	3.25% (Actual rate is based on six-month Treasury rate).
<b>Consumer Price Index:</b>	Increase of 3.25% per year; retiree COLA increases due to CPI are limited to maximum of 2.00% per year.
<b>Payroll Growth:</b>	Inflation of 3.25% per year plus “across the board” real salary increases of 0.50% per year.
<b>Increases in Internal Revenue Code Section 401(a)(17) Compensation Limit:</b>	Increase of 3.25% per year from the valuation date.
<b>Increase in Section 7522.10 Compensation Limit:</b>	Increase of 3.25% per year from the valuation date.

## Individual Salary Increases

Annual Rate of Compensation Increase (%)		
Inflation: 3.25% per year; plus "across the board" real salary increases of 0.50% per year; plus the following promotional and merit increases:		
Years of Service	General	Safety
Less than 1	10.00	10.00
1	8.00	7.50
2	4.50	4.00
3	4.00	3.75
4	3.50	3.50
5	3.00	3.25
6	2.25	3.00
7	1.75	2.50
8	1.50	1.75
9	1.25	1.50
10	1.10	1.40
11	1.00	1.30
12	0.95	1.20
13	0.90	1.15
14	0.85	1.10
15	0.85	1.05
16	0.85	1.00
17	0.85	0.95
18	0.85	0.90
19	0.85	0.85
20 and Over	0.85	0.80

## Demographic Assumptions

### Mortality Rates – Healthy

- **General Members:** RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020
- **Safety Members:** RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 with ages set back two years for males and set back one year for females

## Mortality Rates – Disabled

- **General Members:** RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 with ages set forward seven years for males and set forward eight years for females
- **Safety Members:** RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 with ages set forward two years

## Mortality Rates – Beneficiaries

- **Beneficiaries:** Beneficiaries are assumed to have the same mortality as a General Member of the opposite sex who is receiving a service (non-disability) retirement.

## Member Contribution Rates

- **General Members:** RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 weighted 30% male and 70% female
- **Safety Members:** RP-2000 Combined Healthy Mortality Table projected with Scale BB to 2020 with ages set back two years for males and set back one year for females weighted 85% male and 15% female

The RP-2000 mortality tables projected with Scale BB to 2011 and adjusted as shown above reasonably reflects the projected future mortality experience as of the measurement date. The additional projection to 2020 is a provision for future mortality improvement.

## Mortality Rates Before Retirement

Age	Rate (%)			
	General		Safety	
	Male	Female	Male	Female
25	0.04	0.02	0.04	0.02
30	0.04	0.02	0.04	0.02
35	0.07	0.04	0.06	0.04
40	0.10	0.07	0.09	0.06
45	0.14	0.11	0.12	0.10
50	0.20	0.16	0.18	0.15
55	0.34	0.25	0.27	0.22
60	0.59	0.41	0.48	0.37
65	1.00	0.76	0.82	0.68
70	1.64	1.32	1.32	1.17

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

## Disability Incidence Rates

Age	Rate (%)	
	General <sup>1</sup>	Safety <sup>2</sup>
20	0.02	0.20
25	0.03	0.26
30	0.04	0.30
35	0.07	0.48
40	0.09	0.72
45	0.19	0.98
50	0.31	2.09
55	0.44	4.70
60	0.65	6.60
65	1.02	0.00
70	1.26	0.00

<sup>1</sup> 50% of General disabilities are assumed to be service connected (duty) disabilities and the other 50% are assumed to be non-service connected (ordinary) disabilities.

<sup>2</sup> 100% of Safety disabilities are assumed to be service connected (duty) disabilities.

## Withdrawal Rates<sup>1</sup>

Years of Service	Rate (%)	
	General	Safety
Less than 1	15.00	4.25
1	10.00	3.50
2	8.00	3.25
3	7.00	2.50
4	5.00	2.00
5	4.75	1.75
6	4.50	1.50
7	4.25	1.40
8	4.00	1.30
9	3.75	1.20
10	3.75	1.20
11	3.75	1.10
12	3.50	1.10
13	3.50	1.00
14	3.25	1.00
15	3.25	1.00
16	3.00	1.00
17	3.00	1.00
18	2.75	1.00
19	2.75	1.00
20 or more	2.50	1.00

<sup>1</sup> Refer to the next table that contains rates for electing a refund of contributions upon withdrawal. No withdrawal is assumed after a member is first assumed to retire.



### Electing a Refund of Contributions upon Termination

Years of Service	Rate (%)			
	General		Safety	
	Rate if Elected Refundable Contribution	Rate if Elected Non-Refundable Contribution	Rate if Elected Refundable Contribution	Rate if Elected Non-Refundable Contribution
Less than 5	100.00	100.00	100.00	100.00
5	40.00	20.00	25.00	12.50
6	40.00	20.00	25.00	12.50
7	40.00	20.00	25.00	12.50
8	40.00	20.00	25.00	12.50
9	40.00	20.00	25.00	12.50
10	40.00	20.00	25.00	12.50
11	40.00	20.00	25.00	12.50
12	40.00	20.00	15.00	7.50
13	40.00	20.00	15.00	7.50
14	40.00	20.00	15.00	7.50
15	40.00	20.00	15.00	7.50
16	40.00	20.00	10.00	5.00
17	40.00	20.00	10.00	5.00
18	40.00	20.00	5.00	2.50
19	40.00	20.00	5.00	2.50
20 or more	20.00	10.00	0.00	0.00

**Retirement Rates**

Age	Rate (%)			
	General		Safety	
	Tier 1	Tier 2	Tier 1	Tier 2
45	0.00	0.00	1.00	0.00
46	0.00	0.00	1.50	0.00
47	0.00	0.00	2.00	0.00
48	0.00	0.00	2.00	0.00
49	0.00	0.00	8.00	0.00
50	2.50	0.00	10.00	4.00
51	2.50	0.00	8.00	3.00
52	3.50	2.00	12.00	4.00
53	3.50	2.00	13.00	5.00
54	4.00	2.00	13.00	10.00
55	5.00	4.50	22.00	20.00
56	6.00	4.50	20.00	20.00
57	6.00	6.00	20.00	22.00
58	8.00	7.00	20.00	25.00
59	12.00	8.00	20.00	25.00
60	15.00	9.00	25.00	25.00
61	17.00	12.00	25.00	25.00
62	19.00	20.00	25.00	25.00
63	19.00	20.00	30.00	25.00
64	25.00	20.00	30.00	25.00
65	35.00	25.00	100.00	100.00
66	30.00	30.00	100.00	100.00
67	30.00	30.00	100.00	100.00
68	30.00	30.00	100.00	100.00
69	30.00	30.00	100.00	100.00
70	30.00	50.00	100.00	100.00
71	20.00	50.00	100.00	100.00
72	20.00	50.00	100.00	100.00
73	20.00	50.00	100.00	100.00
74	20.00	50.00	100.00	100.00
75	100.00	100.00	100.00	100.00

<b>Retirement Age and Benefit for Deferred Vested Members:</b>	<p>For current and future deferred vested members, retirement age assumptions are as follows:</p> <p style="padding-left: 40px;">General Age:           58</p> <p style="padding-left: 40px;">Safety Age:             52</p> <p>We assume that 40% of future General and 50% of future Safety deferred vested members will continue to work for a reciprocal employer. For reciprocal members, we assume 5.25% compensation increases per annum.</p>
<b>Future Benefit Accruals:</b>	1.0 year of service per year.
<b>Unknown Data for Members:</b>	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
<b>Definition of Active Members:</b>	All active members of SBCERA as of the valuation date.
<b>Form of Payment:</b>	All members are assumed to elect the unmodified option at retirement.
<b>Percent Married:</b>	70% of male members and 55% of female members are assumed to be married at pre-retirement death or retirement.
<b>Age of Spouse:</b>	Female (or male) spouses are 3 years younger (or older) than their spouses.
<b>Supplemental Disability Benefit:</b>	30% of future General service connected (duty) disableds are assumed to be eligible for this benefit; 75% of future General non-service connected (ordinary) disableds are assumed to be eligible for this benefit.
<b>Leave Cashouts:</b>	No leave cashouts are assumed to occur during the member's final average earnings period above what the member cashes out on an annual basis.

## Survivor Assumptions for Survivor Benefit Valuation

Member's Age at Death	Percent Married	Not Married No Child	Not Married One Child	Not Married 2+ Child	Married No Child	Married One Child	Married 2+ Child	Child 1 Age	Child 2 Age
Under 25	18%	65%	11%	6%	8%	6%	4%	3	1
25-34	49%	34%	7%	10%	15%	12%	22%	6	4
35-44	65%	21%	6%	8%	12%	15%	38%	10	8
45-54	64%	30%	4%	2%	34%	15%	15%	14	12
55-59	61%	38%	1%	0%	55%	4%	2%	18	16
60-64	61%	38%	1%	0%	55%	4%	2%	21	19
65-74	61%	40%	0%	0%	59%	1%	0%	N/A	N/A
75+	40%	60%	0%	0%	40%	0%	0%	N/A	N/A
Total	56%	26%	4%	4%	33%	9%	14%	N/A	N/A

Note 1: Derived from 2013 U.S. Census data.

Note 2: Child payments are assumed to end when the child reaches age 22.

Note 3: Widows or widowers are assumed to start payment at age 62 (or later if they are caring for an eligible child).

# Appendix B: Proposed Actuarial Assumptions

---

## Economic Assumptions

<b>Net Investment Return:</b>	7.00%, net of investment expenses.
<b>Administrative Expenses:</b>	0.70% of payroll allocated to both the employer and member based on the components of the total contribution rate (before expenses) for the employer and member.
<b>Employee Contribution Crediting Rate:</b>	3.00% (Actual rate is based on six-month Treasury rate).
<b>Consumer Price Index:</b>	Increase of 3.00% per year; retiree COLA increases due to CPI are limited to maximum of 2.00% per year.
<b>Payroll Growth:</b>	Inflation of 3.00% per year plus “across the board” real salary increases of 0.50% per year.
<b>Increases in Internal Revenue Code Section 401(a)(17) Compensation Limit:</b>	Increase of 3.00% per year from the valuation date.
<b>Increase in Section 7522.10 Compensation Limit:</b>	Increase of 3.00% per year from the valuation date.

## Individual Salary Increases

Annual Rate of Compensation Increase (%)		
Inflation: 3.00% per year; plus "across the board" real salary increases of 0.50% per year; plus the following promotional and merit increases:		
Years of Service	General	Safety
Less than 1	11.00	11.00
1	8.00	7.00
2	4.75	4.00
3	4.25	3.75
4	3.75	3.50
5	3.25	3.25
6	2.75	3.00
7	2.25	2.50
8	2.00	1.75
9	1.75	1.50
10	1.50	1.45
11	1.40	1.40
12	1.30	1.35
13	1.20	1.30
14	1.10	1.25
15	1.00	1.20
16	1.00	1.20
17	1.00	1.20
18	1.00	1.20
19	1.00	1.20
20 and Over	1.00	1.20

## Demographic Assumptions

### Mortality Rates – Healthy

- **General Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward one year for males, projected generationally with the two-dimensional MP-2016 projection scale
- **Safety Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set back one year, projected generationally with the two-dimensional MP-2016 projection scale

## Mortality Rates – Disabled

- **General Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward seven years, projected generationally with the two-dimensional MP-2016 projection scale
- **Safety Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set back one year, projected generationally with the two-dimensional MP-2016 projection scale

## Mortality Rates – Beneficiaries

- **Beneficiaries:** Beneficiaries are assumed to have the same mortality as a General Member of the opposite sex who is receiving a service (non-disability) retirement.

## Member Contribution Rates

- **General Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward one year for males, projected to 2034 with the two-dimensional MP-2016 projection scale, weighted 30% male and 70% female.
- **Safety Members:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set back one year, projected to 2034 with the two-dimensional MP-2016 projection scale, weighted 90% male and 10% female.

## Pre-Retirement Mortality Rates

- **General and Safety Members:** Headcount-Weighted RP-2014 Employee Mortality Table times 90%, projected generationally with the two-dimensional MP-2016 projection scale

The RP-2014 mortality tables and adjustments as shown above reflect the mortality experience as of the measurement date. The generational projection is a provision for future mortality improvement.

## Mortality Rates Before Retirement

Age	Rate (%)	
	Male	Female
25	0.06	0.02
30	0.05	0.02
35	0.06	0.03
40	0.07	0.04
45	0.11	0.07
50	0.19	0.12
55	0.31	0.19
60	0.51	0.27
65	0.88	0.40
70	1.43	0.66

*All pre-retirement deaths are assumed to be non-service connected. Note that generational projections beyond the base year (2014) are not reflected in the above mortality rates.*

## Disability Incidence Rates

Age	Rate (%)	
	General <sup>1</sup>	Safety <sup>2</sup>
20	0.02	0.20
25	0.02	0.23
30	0.03	0.31
35	0.05	0.41
40	0.08	0.54
45	0.16	0.87
50	0.27	2.13
55	0.37	5.34
60	0.58	7.60
65	0.88	3.20
70	1.24	0.00

<sup>1</sup> 50% of General disabilities are assumed to be service connected (duty) disabilities and the other 50% are assumed to be non-service connected (ordinary) disabilities.

<sup>2</sup> 100% of Safety disabilities are assumed to be service connected (duty) disabilities.



## Withdrawal Rates<sup>1</sup>

Years of Service	Rate (%)	
	General	Safety
Less than 1	15.00	5.00
1	11.00	4.50
2	9.00	3.50
3	7.50	2.75
4	5.50	2.25
5	5.25	2.00
6	5.00	1.75
7	4.50	1.60
8	4.25	1.50
9	4.00	1.25
10	4.00	1.25
11	4.00	1.00
12	3.75	1.00
13	3.75	1.00
14	3.50	1.00
15	3.50	1.00
16	3.25	1.00
17	3.25	1.00
18	3.00	1.00
19	3.00	1.00
20 or more	3.00	1.00

<sup>1</sup> Refer to the next table that contains rates for electing a refund of contributions upon withdrawal. No withdrawal is assumed after a member is first assumed to retire.

## Electing a Refund of Contributions upon Termination

Years of Service	Rate (%)			
	General		Safety	
	Rate if Elected Refundable Contribution	Rate if Elected Non-Refundable Contribution	Rate if Elected Refundable Contribution	Rate if Elected Non-Refundable Contribution
Less than 5	100.00	100.00	100.00	100.00
5	40.00	20.00	25.00	12.50
6	40.00	20.00	25.00	12.50
7	40.00	20.00	25.00	12.50
8	40.00	20.00	25.00	12.50
9	40.00	20.00	25.00	12.50
10	40.00	20.00	25.00	12.50
11	40.00	20.00	25.00	12.50
12	40.00	20.00	15.00	7.50
13	40.00	20.00	15.00	7.50
14	40.00	20.00	15.00	7.50
15	40.00	20.00	15.00	7.50
16	20.00	10.00	10.00	5.00
17	20.00	10.00	10.00	5.00
18	20.00	10.00	5.00	2.50
19	20.00	10.00	5.00	2.50
20 or more	20.00	10.00	0.00	0.00

**Retirement Rates**

Age	Rate (%)			
	General		Safety	
	Tier 1	Tier 2	Tier 1	Tier 2
45	0.00	0.00	1.00	0.00
46	0.00	0.00	2.00	0.00
47	0.00	0.00	2.50	0.00
48	0.00	0.00	2.00	0.00
49	50.00	0.00	9.00	0.00
50	2.50	0.00	10.00	4.00
51	2.00	0.00	9.00	3.00
52	3.25	2.00	11.00	4.00
53	3.25	2.00	13.00	5.00
54	3.25	2.00	13.00	10.00
55	5.00	4.50	20.00	20.00
56	6.00	4.50	18.00	20.00
57	6.00	6.00	20.00	22.00
58	8.00	7.00	20.00	25.00
59	11.00	8.00	15.00	25.00
60	15.00	9.00	25.00	25.00
61	16.00	12.00	25.00	25.00
62	18.00	20.00	25.00	25.00
63	18.00	20.00	25.00	25.00
64	25.00	20.00	25.00	25.00
65	40.00	25.00	100.00	100.00
66	30.00	30.00	100.00	100.00
67	25.00	30.00	100.00	100.00
68	25.00	25.00	100.00	100.00
69	25.00	25.00	100.00	100.00
70	25.00	40.00	100.00	100.00
71	20.00	40.00	100.00	100.00
72	20.00	40.00	100.00	100.00
73	20.00	40.00	100.00	100.00
74	20.00	40.00	100.00	100.00
75	100.00	100.00	100.00	100.00

<b>Retirement Age and Benefit for Deferred Vested Members:</b>	<p>For current and future deferred vested members, retirement age assumptions are as follows:</p> <p style="padding-left: 40px;">General Age:           59</p> <p style="padding-left: 40px;">Safety Age:             53</p> <p>We assume that 40% of future General and 60% of future Safety deferred vested members will continue to work for a reciprocal employer. For reciprocal members, we assume 4.50% and 4.70% compensation increases per annum for General and Safety members, respectively.</p>
<b>Future Benefit Accruals:</b>	1.0 year of service per year.
<b>Unknown Data for Members:</b>	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
<b>Definition of Active Members:</b>	All active members of SBCERA as of the valuation date.
<b>Form of Payment:</b>	All members are assumed to elect the unmodified option at retirement.
<b>Percent Married:</b>	65% of male members and 55% of female members are assumed to be married at pre-retirement death or retirement.
<b>Age of Spouse:</b>	Male retirees are 3 years older than their spouses, and female retirees are 2 years younger than their spouses.
<b>Supplemental Disability Benefit:</b>	35% of future General service connected (duty) disableds are assumed to be eligible for this benefit; 75% of future General non-service connected (ordinary) disableds are assumed to be eligible for this benefit.
<b>Leave Cashouts:</b>	No leave cashouts are assumed to occur during the member's final average earnings period above what the member cashes out on an annual basis.

## Survivor Assumptions for Survivor Benefit Valuation

Member's Age at Death	Percent Married	Not Married No Child	Not Married One Child	Not Married 2+ Child	Married No Child	Married One Child	Married 2+ Child	Child 1 Age	Child 2 Age
Under 25	19%	67%	9%	5%	9%	6%	4%	3	1
25-34	56%	30%	6%	8%	17%	14%	25%	6	4
35-44	78%	14%	4%	5%	15%	17%	45%	10	8
45-54	76%	19%	3%	2%	39%	18%	19%	14	12
55-59	72%	27%	1%	0%	65%	5%	2%	18	16
60-64	72%	27%	1%	0%	65%	5%	2%	21	19
65-74	70%	30%	0%	0%	68%	1%	1%	N/A	N/A
75+	48%	52%	0%	0%	47%	0%	1%	N/A	N/A
Total	66%	28%	3%	3%	40%	10%	16%	N/A	N/A

Note 1: Derived from 2016 U.S. Census data.

Note 2: Child payments are assumed to end when the child reaches age 22.

Note 3: Widows or widowers are assumed to start payment at age 62 (or later if they are caring for an eligible child).

5478758v4/05111.119