

**Fresno County Employees'
Retirement Association**

ACTUARIAL EXPERIENCE STUDY

**Analysis of Actuarial Experience
During the Period
July 1, 2012 through June 30, 2015**



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San Francisco, CA 94104

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March 10, 2016

Board of Retirement
Fresno County Employees' Retirement Association
1111 H Street
Fresno, CA 93721

**Re: Review of Non-Economic Actuarial Assumptions for the June 30, 2016
Actuarial Valuation**

Dear Members of the Board:

We are pleased to submit this report of our review of the actuarial experience of the Fresno County Employees' Retirement Association (FCERA). This study utilizes the census data for the period July 1, 2012 to June 30, 2015 and provides the proposed actuarial assumptions to be used effective with the June 30, 2016 valuation.

The review of the economic assumptions for use in the June 30, 2016 valuation is provided in a separate report.

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", written over a horizontal line.

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

A handwritten signature in black ink, appearing to read "Andy Yeung", written over a horizontal line.

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

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I. INTRODUCTION, SUMMARY, AND RECOMMENDATIONS

To project the cost and liabilities of the Pension Fund, 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 assumptions, and to the extent there are differences, the future contribution requirement is adjusted.

If assumptions are changed, 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 that year's experience was 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 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 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, 2012 through June 30, 2015. The study was performed in accordance with Actuarial Standard of Practice (ASOP) No. 35, "Selection of Demographic and Other Non-economic Assumptions for Measuring Pension Obligations" and, as appropriate, ASOP No. 27 "Selection of 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 near-term experience, we recommend various changes in the current actuarial assumptions.

We are recommending changes in the assumptions for retirement from active employment, average retirement age for deferred vested Safety members, reciprocity, percent of female members with beneficiary entitled to an automatic survivor benefit, age difference between female members and their beneficiaries entitled to an automatic survivor benefit, pre-retirement mortality, healthy life post-retirement mortality, disabled life post-retirement mortality, termination, disability (ordinary and duty), salary increases, and annual leave conversion.

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

Retirement Rates - The probability of retirement at each age at which participants are eligible to retire.

Recommendation: We recommend adjusting the retirement rates to those developed in Section III (B) for both General and Safety Tier members to reflect slightly later retirement ages. We recommend reducing the average retirement age for deferred vested Safety members. We also recommend separate reciprocity assumptions for those with less than five years of service and those with more than five years of service, and, in both categories, we recommend decreasing those rates for both General and Safety members. In addition, we recommend decreasing the spouse age difference assumption for female retirees.

Mortality Rates - The probability of dying at each age. Mortality rates are used to project life expectancies.

Recommendation: We used experience for a six-year period including both the current and the prior experience study periods to study this assumption. In addition, we included a somewhat larger margin under the current “static” approach for anticipating future mortality improvements to partially reflect the anticipated effect of any future recommendation to use a “generational” approach for anticipating future mortality improvement. For healthy retirees, we adjust post-retirement mortality rates for non-disabled General and Safety members as developed in Section III (C) to anticipate future mortality improvement.

For General male retirees and all male beneficiaries, we are recommending about one and a half years improvement in assumed life expectancy. For Safety male retirees, we are recommending about two and a half years improvement in assumed life expectancy. For General female retirees and all female beneficiaries and for Safety female retirees, we are recommending about the same assumed life expectancy. For disabled retirees, we adjust mortality rates for disabled General and Safety members

as developed in Section III (D) to anticipate about a half year improvement for General disabled retirees but to reduce some of the margin for future improvement for Safety disabled retirees.

We recommend adjusting the rates for the pre-retirement mortality assumptions for General and Safety members as developed in Section III (C). In addition, we recommend that all pre-retirement deaths be assumed as non-service connected deaths.

Termination Rates - The probability of leaving employment at each age and receiving either a refund of member contributions or a deferred vested retirement benefit.

Recommendation: We recommend combining the General male and General female termination rates and adjusting those rates to those developed in Section III (E) to reflect higher incidence of termination for General members and lower incidence of termination for Safety members. In addition, under the recommended assumptions, a slightly lower proportion of members is expected to elect a refund of member contributions with a correspondingly higher proportion expected to elect receiving a deferred vested benefit, as compared to the current assumptions.

Disability Incidence Rates - The probability of becoming disabled at each age.

Recommendation: We recommend adjusting the disability rates to those developed in Section III (F) to reflect slightly lower incidence of disability for General and Safety members.

Individual Salary Increases - Increases in the salary of a member between the date of the valuation to the date of separation from active service.

Recommendation: We recommend increasing slightly the merit and promotional rates of salary increase in the earlier years of employment for General and Safety members while decreasing the salary increase for Safety members in the later years of employment to those developed in Section III (H), all to reflect current experience.

Annual Leave Conversion - Additional service that is expected to be received when the member retires due to conversion of unused annual leave.

Recommendation: We recommend adjusting the current assumptions to reflect the actual accumulated annual leave balances for active members as of June 30, 2015.

Section II provides some background on basic principles and the methodology used for the experience study and the review of the demographic actuarial assumptions. A detailed discussion of each assumption and reasons for the proposed changes is found in Section III.

Section IV shows the estimated cost impact of the recommended assumptions. Table A shows the cost impact of all the recommended assumptions (including the economic assumptions as recommended in our separate report) for the June 30, 2016 valuation. Table B shows the cost impact of 7.25% (alternative investment return assumption) and all the other recommended assumptions (including the rest of the economic assumptions as recommended in our separate report) for the June 30, 2016 valuation.

II. BACKGROUND AND METHODOLOGY

In this report, we analyzed the “demographic” or “non-economic” assumptions only. Our analysis of the “economic” assumptions for the June 30, 2016 valuation is provided in a separate report. 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 after retirement. We also review the individual salary increases net of inflation (i.e., the merit and promotional assumptions) in this report.

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 credence 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. ACTUARIAL ASSUMPTIONS

A. ECONOMIC ASSUMPTIONS

The economic assumptions are reviewed in a separate report titled “Review of Economic Actuarial Assumptions for the June 30, 2016 Actuarial Valuation.”

B. 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 retirement experience during the current three-year period indicated that actual retirements were slightly later than expected from General Tiers 1, 2 and 3 and Safety Tiers 1 and 2. In this study, we have adjusted the retirement probabilities to reflect the current three-year experience, as well as prior experience as represented by the current retirement assumptions.

Even though there were no actual retirements from General Tiers 4 and 5 and Safety Tiers 4 and 5, we are nonetheless recommending some changes in those retirement rates for the older ages to commensurate with the reduction we are recommending for General Tiers 1, 2 and 3 and Safety Tiers 1 and 2. This is because the retirement rates for General and Safety Tiers 4 and 5 were partially developed based on the then current Tier 1 retirement rates when those tiers were first established. In particular, since we are recommending extending the retirement ages from age 70 to age 75 for some General Tier 1 members, we have also applied the same kind of extension to the retirement rates to the other General Tiers albeit with some margin due to lack of actual experience.

The following tables show the current, observed and proposed rates for each of the General and Safety Tiers.

Retirement Rates for General Tier 1 Male

Rate (%)

Age	Current	Observed	Proposed
50	4.00	5.47	5.00
51	3.00	3.70	3.50
52	3.00	3.08	3.00
53	4.00	4.20	4.00
54	5.00	3.45	4.00
55	8.00	7.69	8.00
56	11.00	6.40	9.00
57	16.00	13.08	14.00
58	21.00	9.38	15.00
59	22.00	6.54	16.00
60	25.00	24.51	25.00
61	25.00	14.75	20.00
62	27.00	25.86	25.00
63	27.00	16.33	25.00
64	30.00	21.57	25.00
65	40.00	47.50	45.00
66	50.00	25.00	40.00
67	50.00	30.77	40.00
68	50.00	16.67	40.00
69	50.00	100.00	50.00
70	100.00	50.00	50.00
71	100.00	0.00	50.00
72	100.00	33.33	50.00
73	100.00	0.00	50.00
74	100.00	100.00	50.00
75	100.00	16.67	100.00

Retirement Rates for General Tier 1 Female

Rate (%)

Age	Current	Observed	Proposed
50	5.00	3.00	4.00
51	5.00	3.61	4.00
52	5.00	2.86	4.00
53	5.00	3.70	4.00
54	6.00	6.96	6.00
55	9.00	8.37	9.00
56	12.00	10.48	11.00
57	14.00	12.79	14.00
58	15.00	13.99	15.00
59	18.00	14.37	16.00
60	19.00	21.30	20.00
61	23.00	21.32	22.00
62	27.00	29.36	28.00
63	25.00	18.31	22.00
64	27.00	16.67	25.00
65	40.00	45.10	35.00
66	40.00	19.35	35.00
67	40.00	23.81	35.00
68	45.00	17.39	45.00
69	50.00	42.86	45.00
70	100.00	37.50	50.00
71	100.00	25.00	50.00
72	100.00	50.00	50.00
73	100.00	0.00	50.00
74	100.00	0.00	50.00
75	100.00	25.00	100.00

Retirement Rates for General Tier 2

Rate (%)

Age	Current	Observed	Proposed
50	3.00	0.00	3.00
51	3.00	100.00	3.00
52	3.60	0.00	3.60
53	3.60	0.00	3.60
54	4.20	0.00	4.20
55	8.40	0.00	8.40
56	10.00	0.00	10.00
57	10.00	50.00	10.00
58	10.00	100.00	10.00
59	10.00	0.00	10.00
60	15.00	0.00	15.00
61	15.00	0.00	15.00
62	25.00	0.00	25.00
63	24.00	0.00	24.00
64	24.00	0.00	24.00
65	35.00	0.00	35.00
66	34.00	0.00	34.00
67	34.00	0.00	34.00
68	35.00	100.00	35.00
69	35.00	0.00	35.00
70	100.00	0.00	70.00
71	100.00	0.00	70.00
72	100.00	0.00	70.00
73	100.00	0.00	70.00
74	100.00	0.00	70.00
75	100.00	0.00	100.00

Retirement Rates for General Tier 3

Rate (%)

Age	Current	Observed	Proposed
50	3.00	0.00	2.40
51	3.00	0.00	2.40
52	3.60	0.00	2.80
53	3.60	0.00	2.80
54	4.20	0.00	3.40
55	8.40	0.00	6.70
56	10.00	0.00	8.00
57	10.00	0.00	8.00
58	10.00	50.00	8.00
59	15.00	20.00	12.00
60	19.20	50.00	15.40
61	19.20	0.00	15.40
62	34.20	0.00	27.40
63	23.70	0.00	19.00
64	23.70	0.00	19.00
65	43.30	0.00	34.60
66	33.30	0.00	26.60
67	33.30	0.00	26.60
68	40.00	0.00	32.00
69	46.70	0.00	37.00
70	100.00	100.00	60.00
71	100.00	0.00	60.00
72	100.00	0.00	60.00
73	100.00	0.00	60.00
74	100.00	0.00	60.00
75	100.00	0.00	100.00

Retirement Rates for Safety Tiers 1 and 2

Rate (%)

Age	Current	Observed	Proposed
45	1.00	0.00	1.00
46	1.00	0.00	1.00
47	1.00	4.65	1.00
48	1.00	4.76	1.00
49	3.00	8.51	3.00
50	6.00	1.37	5.00
51	6.00	7.46	7.00
52	9.00	5.36	8.00
53	18.00	12.07	14.00
54	30.00	23.40	27.00
55	40.00	39.39	40.00
56	25.00	15.38	25.00
57	25.00	30.00	25.00
58	25.00	14.29	20.00
59	25.00	20.00	20.00
60	50.00	30.00	40.00
61	50.00	16.67	40.00
62	50.00	40.00	50.00
63	50.00	0.00	50.00
64	50.00	50.00	50.00
65	100.00	50.00	100.00

Chart 1 compares actual experience with the current and the proposed rates of retirement for General Tier 1 Male members. Chart 2 has the same data for General Tier 1 Female members, Chart 3 has the same data for General Tier 2, Chart 4 has the same data for General Tier 3, and Chart 5 has the same data for Safety Tiers 1 and 2 members.

Retirement Rates for General Tiers 4 and 5

Rate (%)

Age	Current Tier 4	Proposed Tier 4	Current Tier 5	Proposed Tier 5
50	2.00	2.00	0.00	0.00
51	2.00	2.00	0.00	0.00
52	2.50	2.50	4.50	4.50
53	2.50	2.50	2.00	2.00
54	3.00	3.00	2.50	2.50
55	4.00	4.00	3.50	3.50
56	5.00	5.00	4.50	4.50
57	6.00	6.00	5.50	5.50
58	7.00	7.00	6.50	6.50
59	8.00	8.00	7.50	7.50
60	9.00	9.00	8.50	8.50
61	11.00	10.00	10.50	9.50
62	17.00	16.00	16.00	15.00
63	16.00	16.00	15.00	15.00
64	20.00	19.00	19.00	18.00
65	25.00	23.00	24.00	22.00
66	21.00	20.00	21.00	20.00
67	21.00	20.00	21.00	20.00
68	25.00	25.00	25.00	25.00
69	30.00	30.00	30.00	30.00
70	100.00	60.00	100.00	60.00
71	100.00	60.00	100.00	60.00
72	100.00	60.00	100.00	60.00
73	100.00	60.00	100.00	60.00
74	100.00	60.00	100.00	60.00
75	100.00	100.00	100.00	100.00

Retirement Rates for Safety Tiers 4 and 5

Rate (%)

Age	Current Tier 4	Proposed Tier 4	Current Tier 5	Proposed Tier 5
45	1.00	1.00	0.00	0.00
46	1.00	1.00	0.00	0.00
47	1.00	1.00	0.00	0.00
48	1.00	1.00	0.00	0.00
49	2.00	2.00	0.00	0.00
50	4.00	4.00	4.00	4.00
51	4.00	4.00	4.00	4.00
52	5.00	5.00	5.00	5.00
53	6.00	6.00	6.00	6.00
54	11.00	11.00	11.00	11.00
55	20.00	20.00	20.00	20.00
56	20.00	20.00	20.00	20.00
57	20.00	20.00	20.00	25.00
58	20.00	20.00	20.00	20.00
59	23.00	23.00	23.00	23.00
60	50.00	45.00	50.00	45.00
61	50.00	45.00	50.00	45.00
62	50.00	45.00	50.00	45.00
63	50.00	45.00	50.00	45.00
64	50.00	45.00	50.00	45.00
65	100.00	100.00	100.00	100.00

Chart 6 compares current assumptions with the proposed rates of retirement for General Tier 4, Chart 7 has the same data for General Tier 5, Chart 8 has the same data for Safety Tier 4, and Chart 9 has the same data for Safety Tier 5.

Deferred Vested Members

In prior valuations, deferred vested General and Safety members were assumed to retire at age 58 and 55, respectively. The average age at retirement over the prior three years was 58.09 and 52.86 for General and Safety, respectively. We recommend maintaining the assumed retirement age for General deferred vested members and decreasing the assumed retirement age for Safety deferred vested members to 54.

Reciprocity

The current assumption is that 40% of future inactive General and 65% of future inactive Safety deferred vested participants would be covered under a reciprocal retirement system and receive 4.75% and 5.25% compensation increases for General and Safety members, respectively, from termination until their date of retirement. As part of the upgrade to the new ARRIVOS pension administration system, for the June 30, 2015 valuation, FCERA reclassified 1,419 members who were previously reported in the data file reserved for terminated members and understood by Segal (and the prior actuary) as not owed any liability by FCERA. Those members were reclassified to the data file reserved for vested terminated members owed either a refund of contributions or deferred retirement benefit. With the inclusion of 1,419 terminated members primarily with less than five years of service, we recommend separating out the data and analyzing the reciprocal assumption separately for those members with less than five years of service and those with five or more years of service. The following tables shows the current, observed and proposed rates for General and Safety.

Reciprocal Rates for All General Members as of June 30, 2015

Years of Service	Total Deferred Vested Participants	Actual Covered by a Reciprocal Agency	Current Assumption	Observed Ratio	Proposed Assumption
Less than 5	1,919	295	40%	15.37%	20%
5 or More	968	248	40%	25.62%	35%

Reciprocal Rates for All Safety Members as of June 30, 2015

Years of Service	Total Deferred Vested Participants	Actual Covered by a Reciprocal Agency	Current Assumption	Observed Ratio	Proposed Assumption
Less than 5	190	50	65%	26.32%	30%
5 or More	86	39	65%	45.35%	55%

In addition, based on the ultimate 1.00% and 1.40% recommended merit and promotional salary increase assumptions together with 3.00% and 0.50% recommended inflation and “across the board” salary increase assumptions, respectively, we propose a 4.50% and 4.90% salary increase assumption for General and Safety members, respectively, be utilized to anticipate salary increases from the date of termination from FCERA to the expected date of retirement for participants in a reciprocal retirement system.

Survivor Continuance under the Unmodified Option

In prior valuations, it was assumed that 75% of all active male members and 55% of all active female members would be married or have an eligible domestic partner when they retired. According to the experience of members who retired recently, about 74% of all male members and 50% of all female members were married or had a domestic partner at retirement. We recommend maintaining the marriage assumption at 75% for male members and decreasing the marriage assumption to 50% 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 over 80% of survivors are actually of 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 recommended assumptions 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	Recommended Assumption
Male	3 years older	2.80 years older	3 years older
Female	3 years younger	2.40 years younger	2 years younger

Chart 1

Retirement Rates - General Tier 1 Male Members

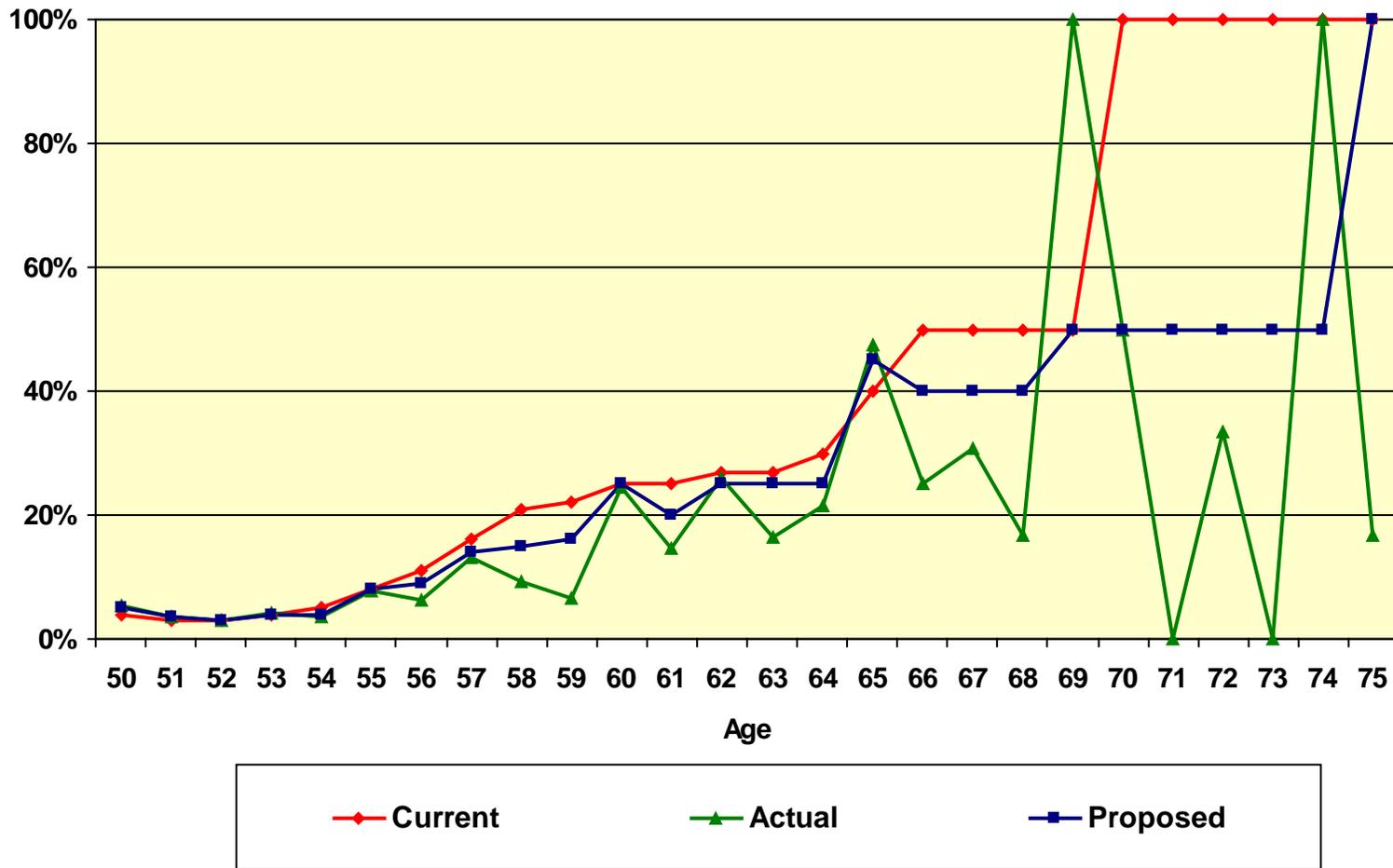


Chart 2 Retirement Rates - General Tier 1 Female Members

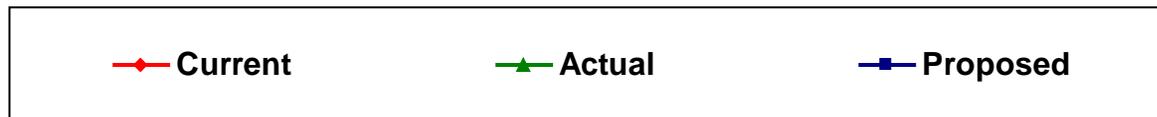
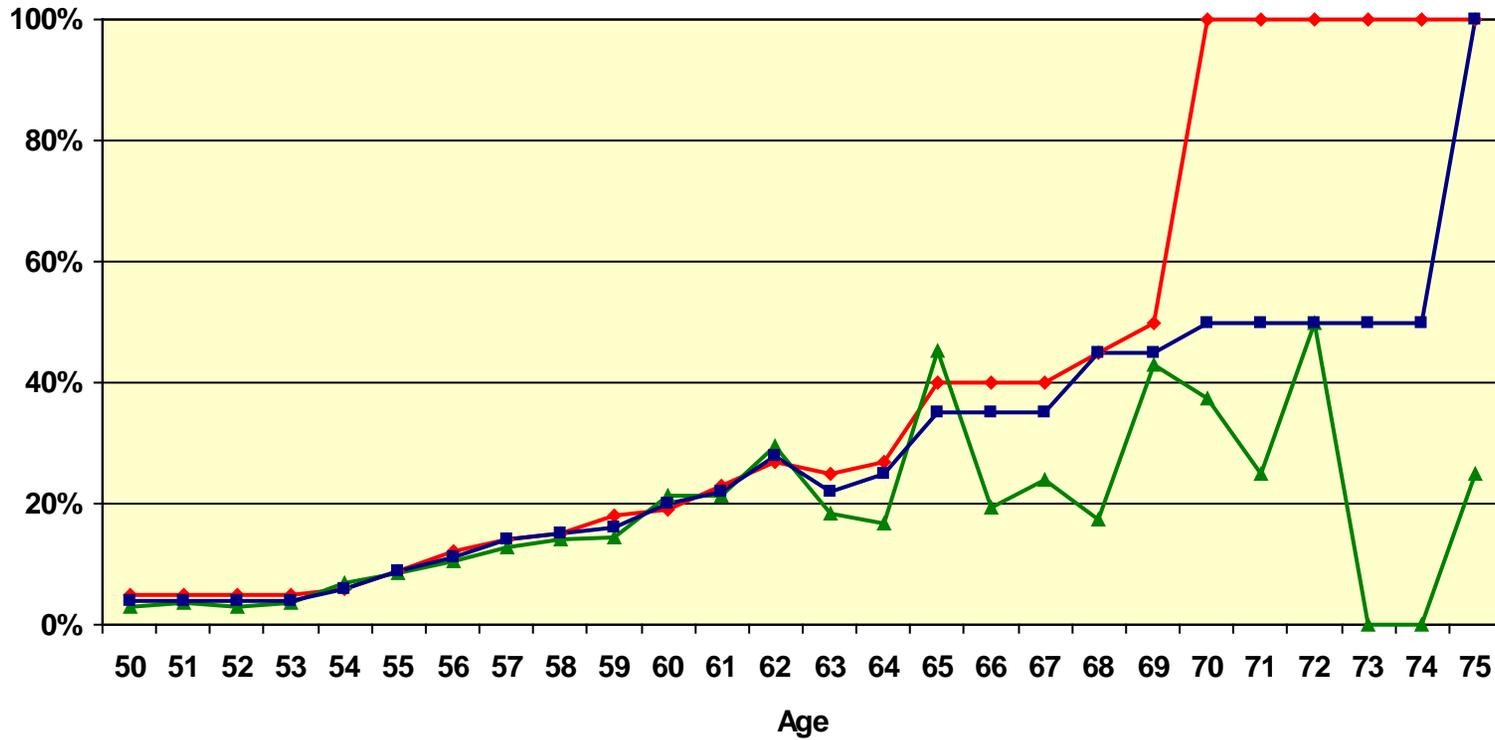


Chart 3 Retirement Rates - General Tier 2

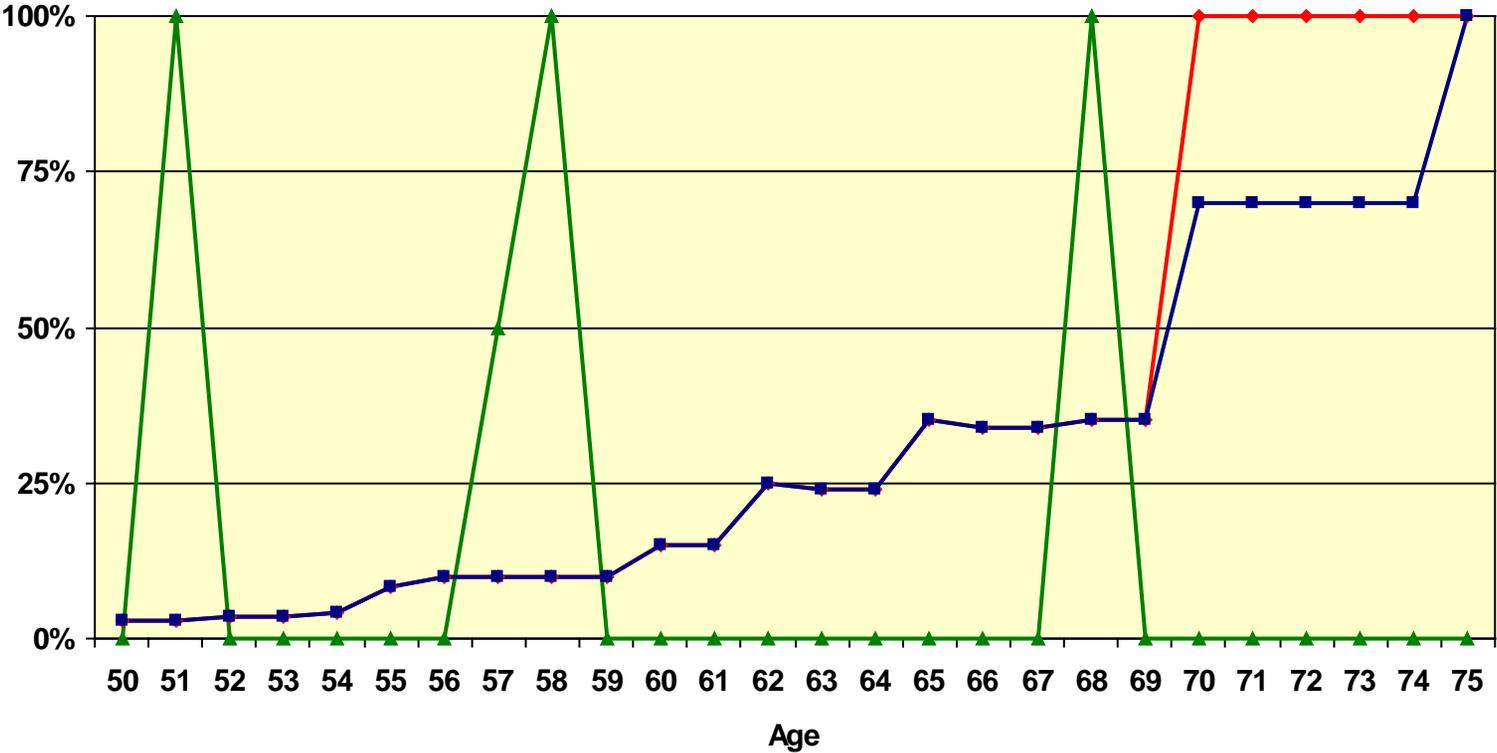


Chart 4 Retirement Rates - General Tier 3 Members

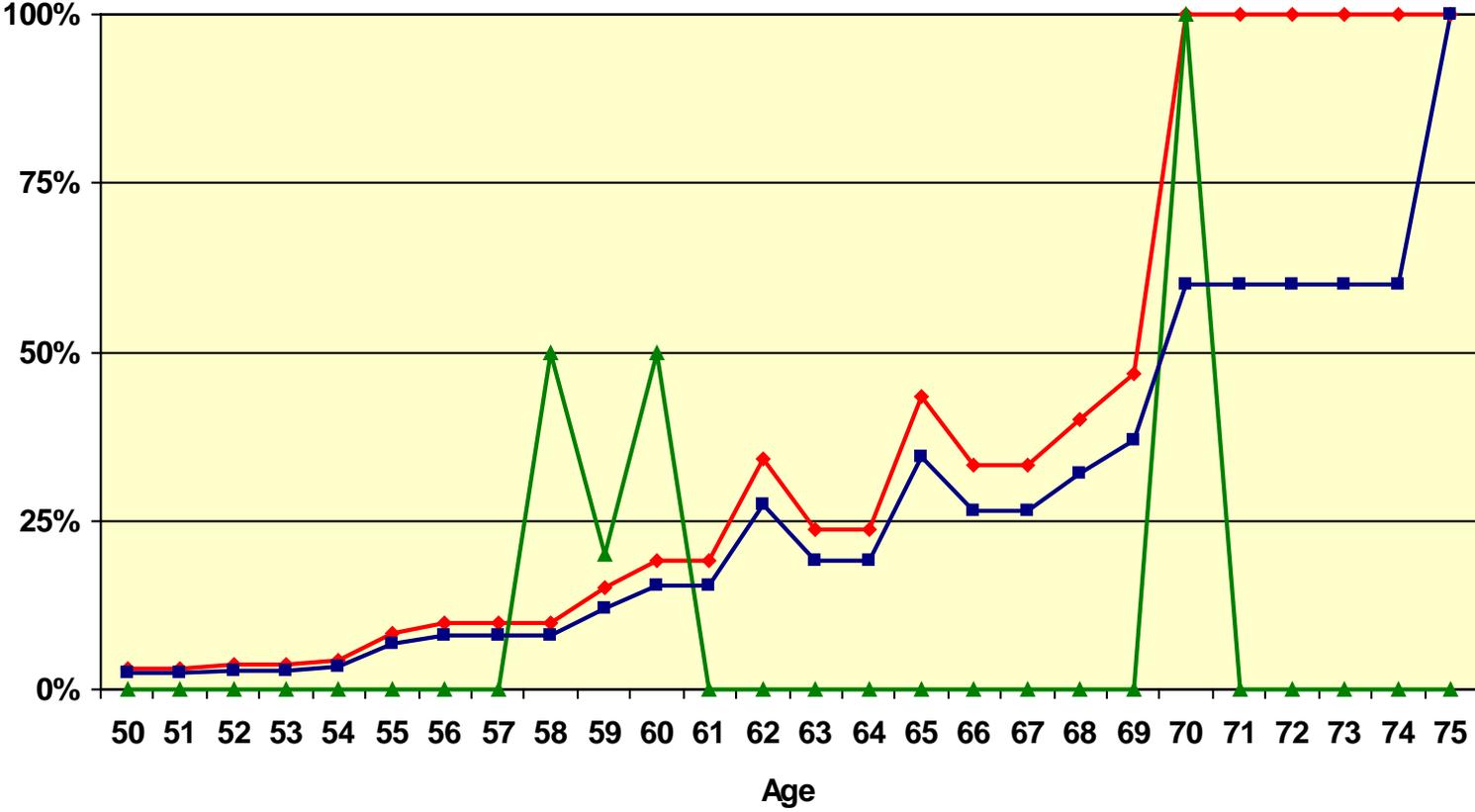


Chart 5 Retirement Rates - Safety Tier 1 and Tier 2 Members

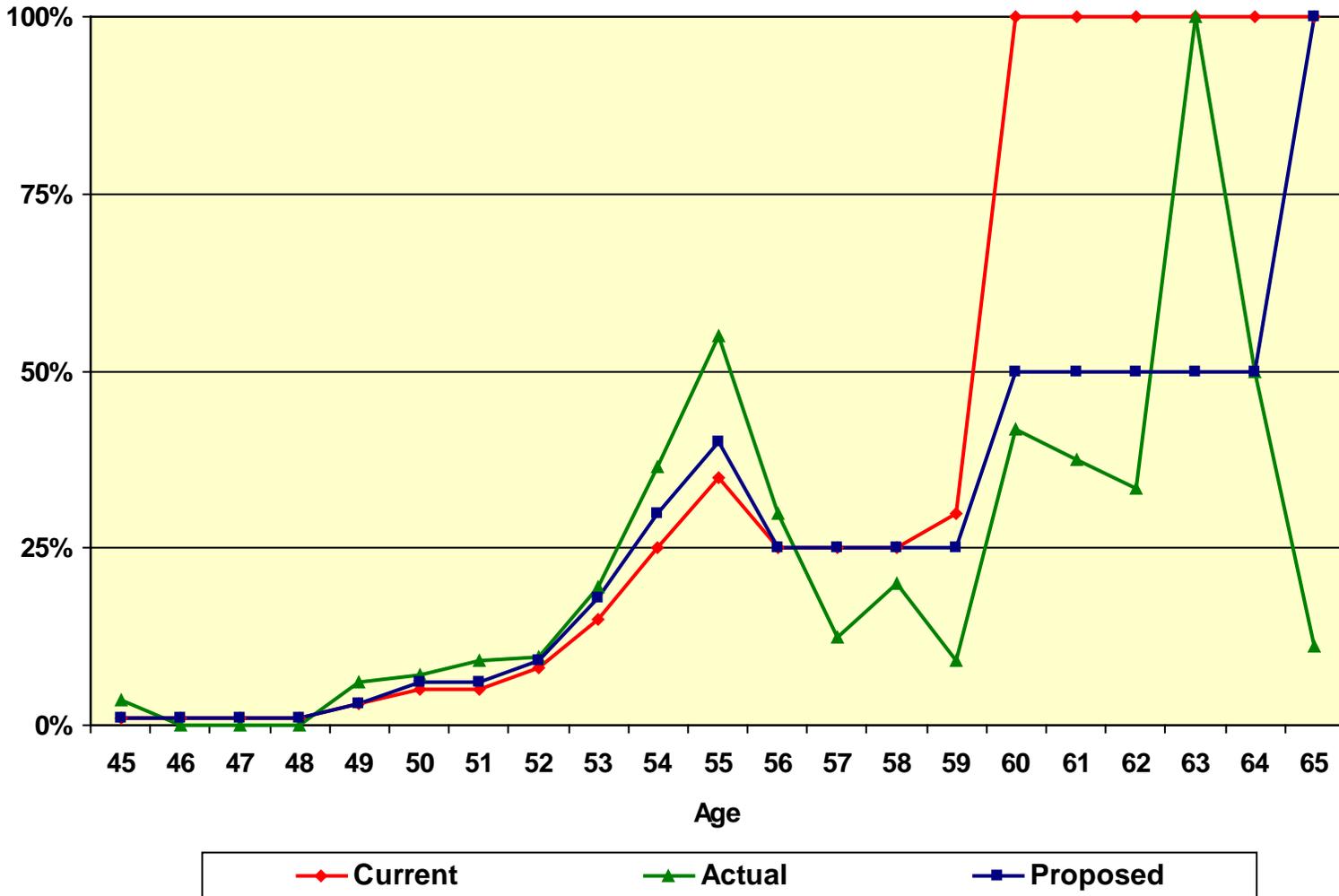


Chart 6

Retirement Rates - General Tier 4

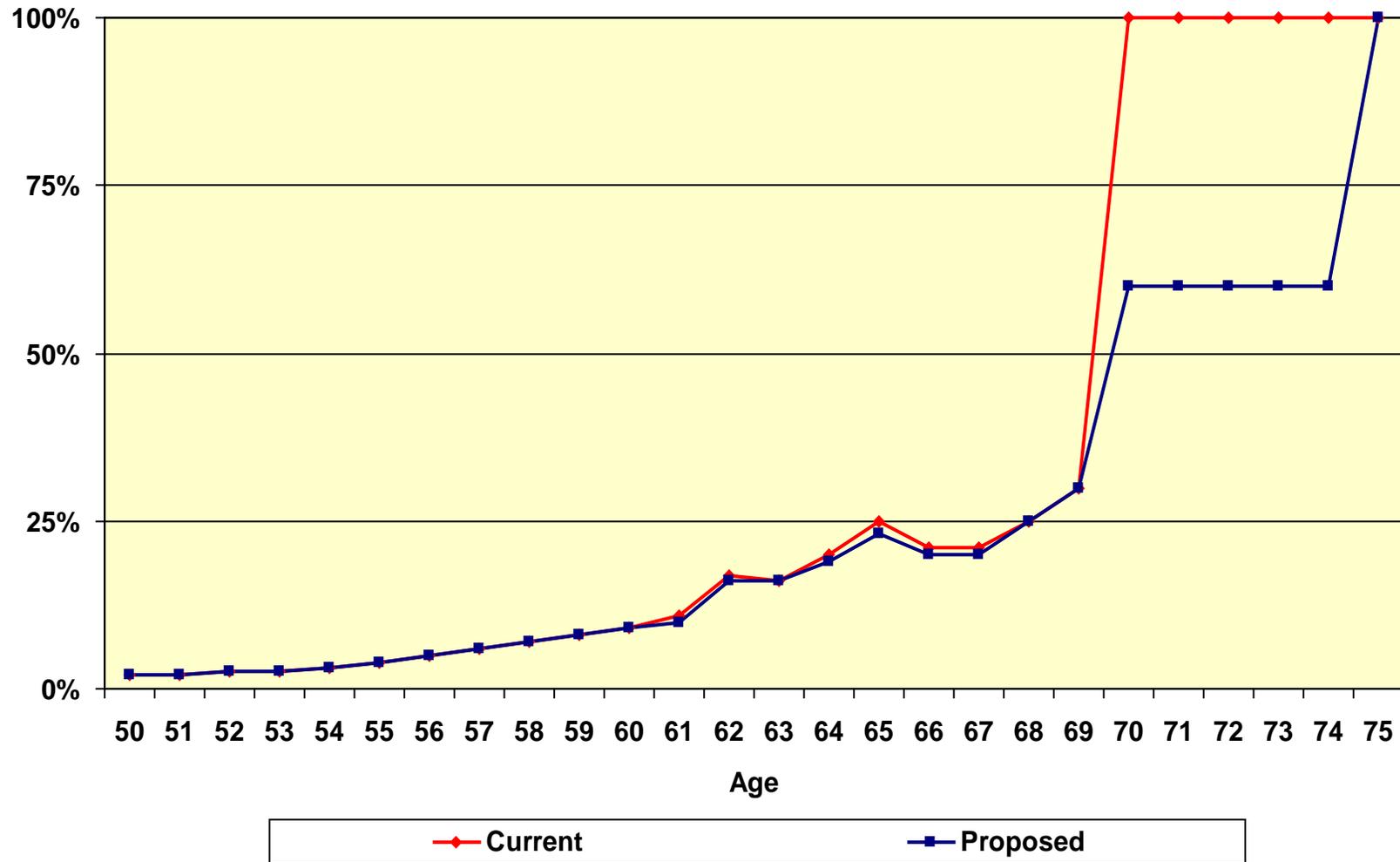


Chart 7 Retirement Rates - General Tier 5

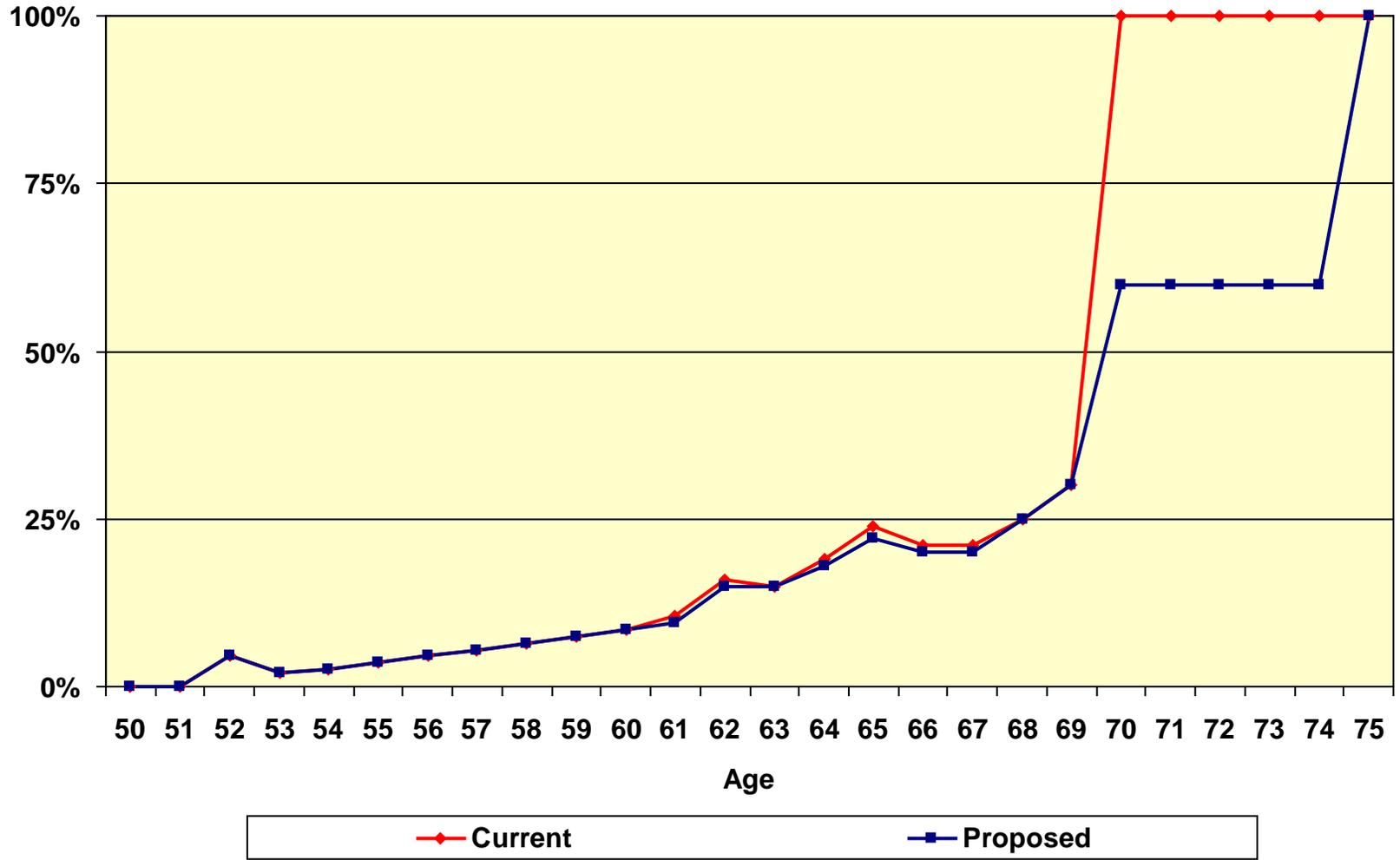


Chart 8 Retirement Rates - Safety Tier 4

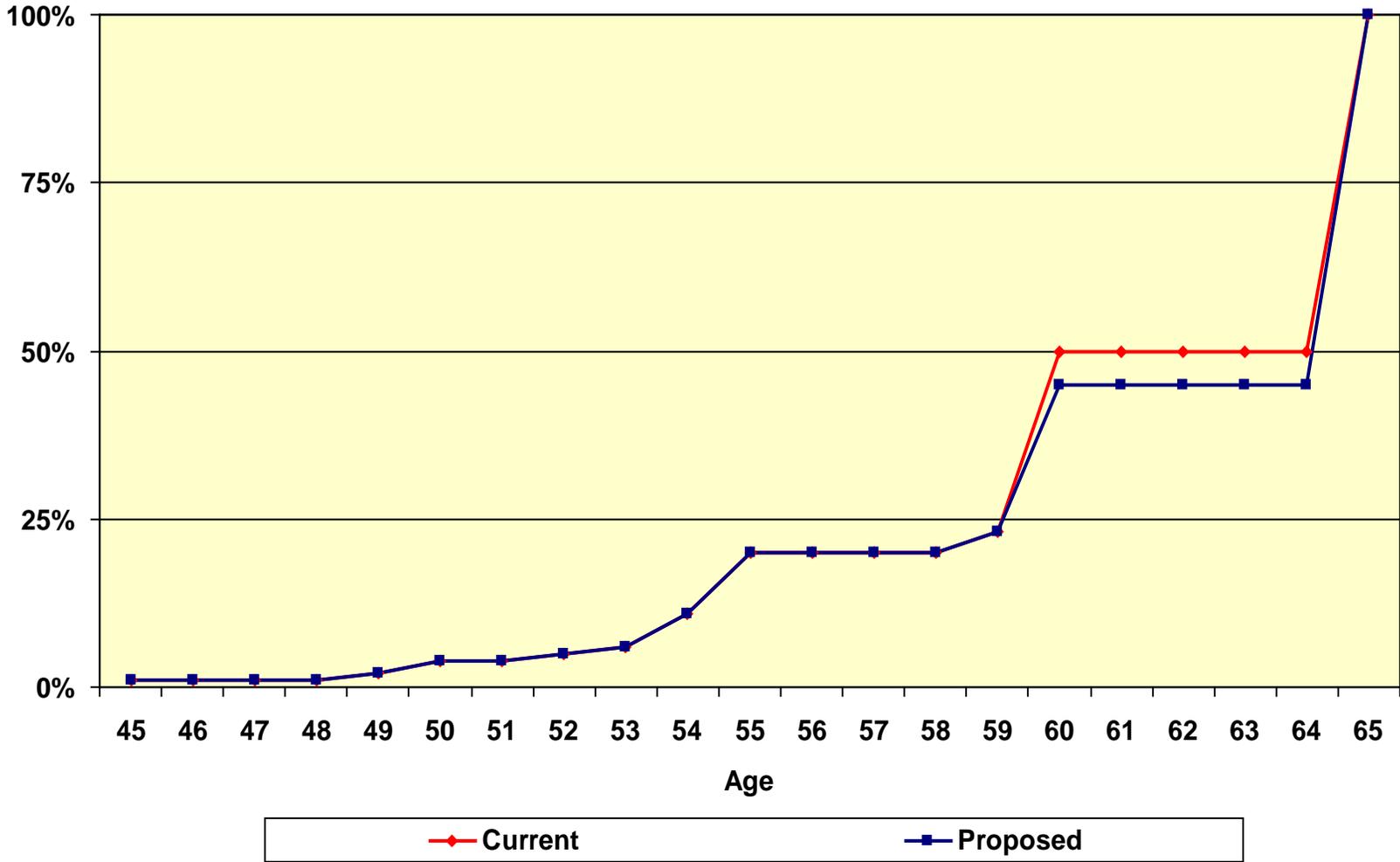
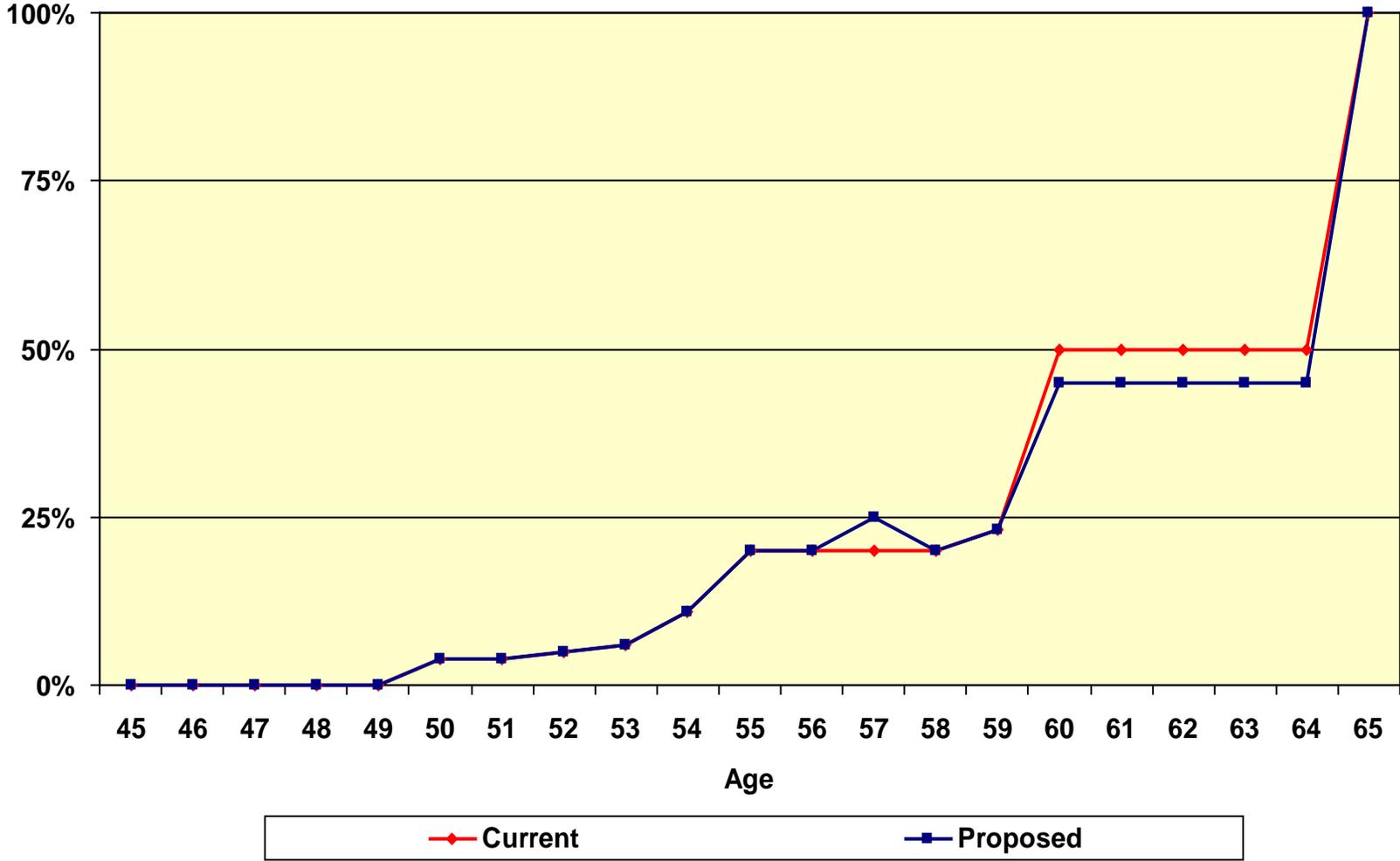


Chart 9 Retirement Rates - Safety Tier 5



C. 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. 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 AA to 2015, with ages set back one year for General male members and all male beneficiaries, set back two years for General female members and all female beneficiaries and set back one year for all Safety members.

The Society of Actuaries (SOA) has recently published the RP-2014 family of mortality tables and associated life expectancy 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 and is the approach used by Segal in the past for its California public system clients (including FCERA) and by other public sector actuaries in California.

As for the life expectancy improvement scales, they can be applied in one of two ways. Currently, 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. The static approach is used by Segal for its California public system clients (including FCERA) and is still most commonly used by other public sector actuaries in California and nationwide.

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-2014D life improvement expectancy scale, the SOA has replaced it with the two-dimensional MP-2015D life improvement expectancy scale to remove some of the conservatism built into the MP-2014D scale and to better reflect the most recent data of mortality improvement from the Social Security Administration. Segal believes that given the trend

in the retirement industry to move towards generational mortality, it would be prudent for the Board to adopt the Headcount-Weighted RP-2014 mortality table, adjusted for FCERA experience. However, given that there is a large difference between the generational MP-2014D and MP-2015D, Segal recommends that FCERA continue to use a static mortality improvement but with adjustments that would nearly double the 10% margin we have recommended in the past to anticipate the move towards a “generational” approach in a future experience study.

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 the experience study. Finally, note that in order to use more actual FCERA experience in our analysis, we have used experience for a six-year period from both the current and the last 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 Impact Combined
Headcount Weighted RP-2014 – Static approach with increased margin	2.5% of payroll
Headcount Weighted RP-2014 – Generational approach	3.0% of payroll
Benefit Weighted RP-2014 – Static approach without increased margin	3.1% 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) projected 20 years with the two-dimensional scale MP2015D times 75%, all to account for the lower incidences of observed pre-retirement death on the combined General and Safety workforce.

In addition, based on recent experience, we recommend that all pre-retirement deaths are assumed to be non-service connected.

Post-Retirement Mortality (Service Retirements)

Among service retired member and beneficiaries, the actual deaths compared to the expected deaths under the current and the proposed assumptions for the last six years are as follows:

	General – Healthy and All Beneficiaries			Safety – Healthy		
	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	296	319	255	45	43	35
Female	<u>432</u>	<u>527</u>	<u>434</u>	<u>4</u>	<u>2</u>	<u>4</u>
Total	728	846	689	49	45	39
Actual / Expected	116%		123%	92%		115%

For General members and all beneficiaries, the ratio of actual to expected deaths under the current assumption was 116%. We recommend changing to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females) projected 20 years with the two-dimensional scale MP2015D, with no age adjustment for males and set forward one year for females.¹ This will bring the actual to expected ratio for the most recent six year period to 123% for General members and all beneficiaries.

For Safety members, the ratio of actual to expected deaths was 92%. We recommend changing to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females) projected 20 years with the two-dimensional scale MP2015D, set back two years. This will bring the actual to expected rates to 115%. Note that the margin for Safety members under proposed assumptions is smaller when compared to the General members. However, that margin will increase to about the same level as that observed for General under the proposed assumptions if we were to combine the disabled Safety mortality experience that will be discussed in the next section.

Chart 10 compares actual to expected deaths for General members and all beneficiaries under the current and the proposed assumptions for all members and beneficiaries over the last six years. Experience shows that there were more deaths than predicted by the current table.

¹ Note that we also considered the above tables but set forward one year for males and set forward two years for females. We are not recommending those tables because the margin associated with using those tables would be reduced from 123% to 111%, which is even lower than the 116% margin under the current assumptions.

Chart 11 has the same comparison for Safety members. Experience shows that there were fewer deaths than predicted by the current table.

Chart 12 shows the life expectancies under the current and the proposed tables for General members and all beneficiaries.

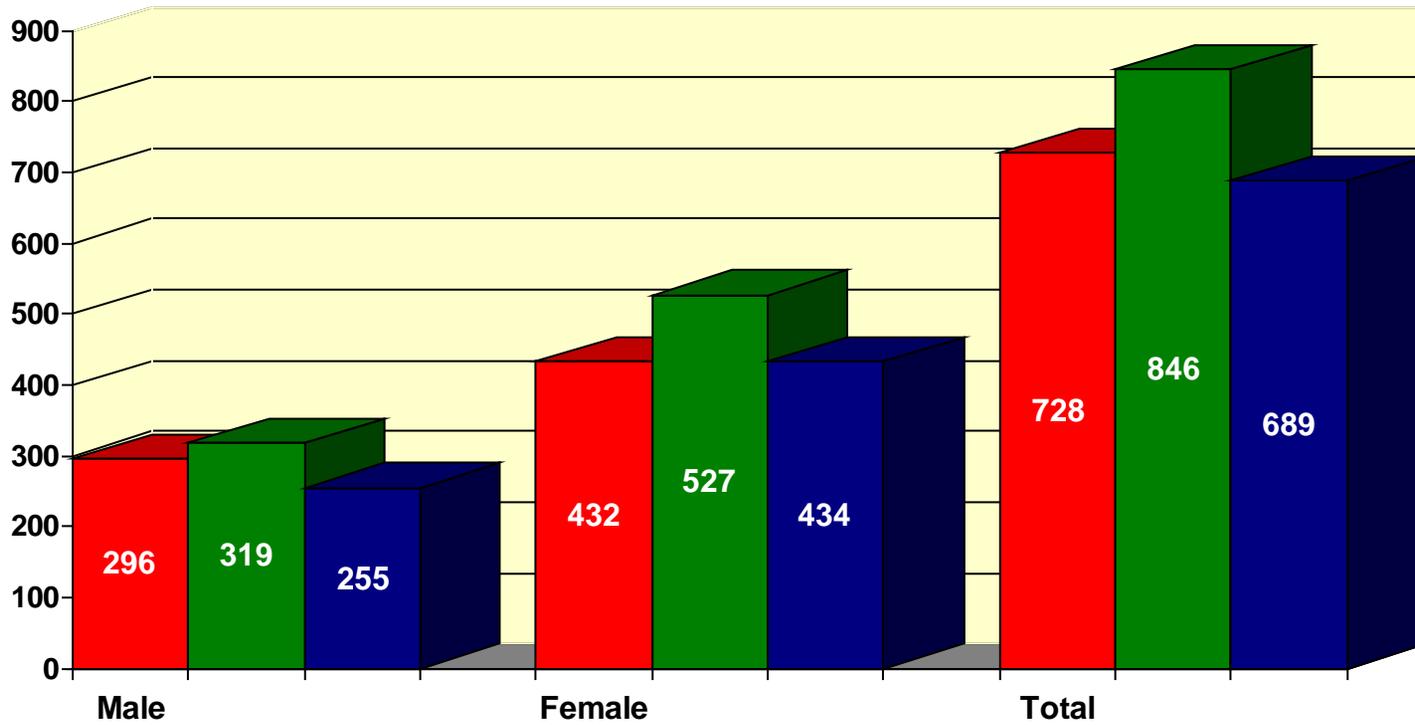
Chart 13 has the same information for Safety members.

Mortality Table for Member Contributions

We recommend the mortality table used for determining contributions for General members be changed from the RP-2000 Combined Healthy Mortality Table projected with scale AA to 2015 set back one year for males and set back two years for females weighted 35% male and 65% female to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP2015D with no age adjustment for males and set forward one year for females weighted 35% male and 65% female. This is based on the proposed mortality table for General members and the actual gender distribution for current General members.

For Safety members, we recommend the mortality table be changed from the RP-2000 Combined Healthy Mortality Table projected with scale AA to 2015 set back one year weighted 80% male and 20% female to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP2015D set back two years weighted 80% male and 20% female. This is based on the proposed mortality table for Safety members and the actual gender distribution for current Safety members.

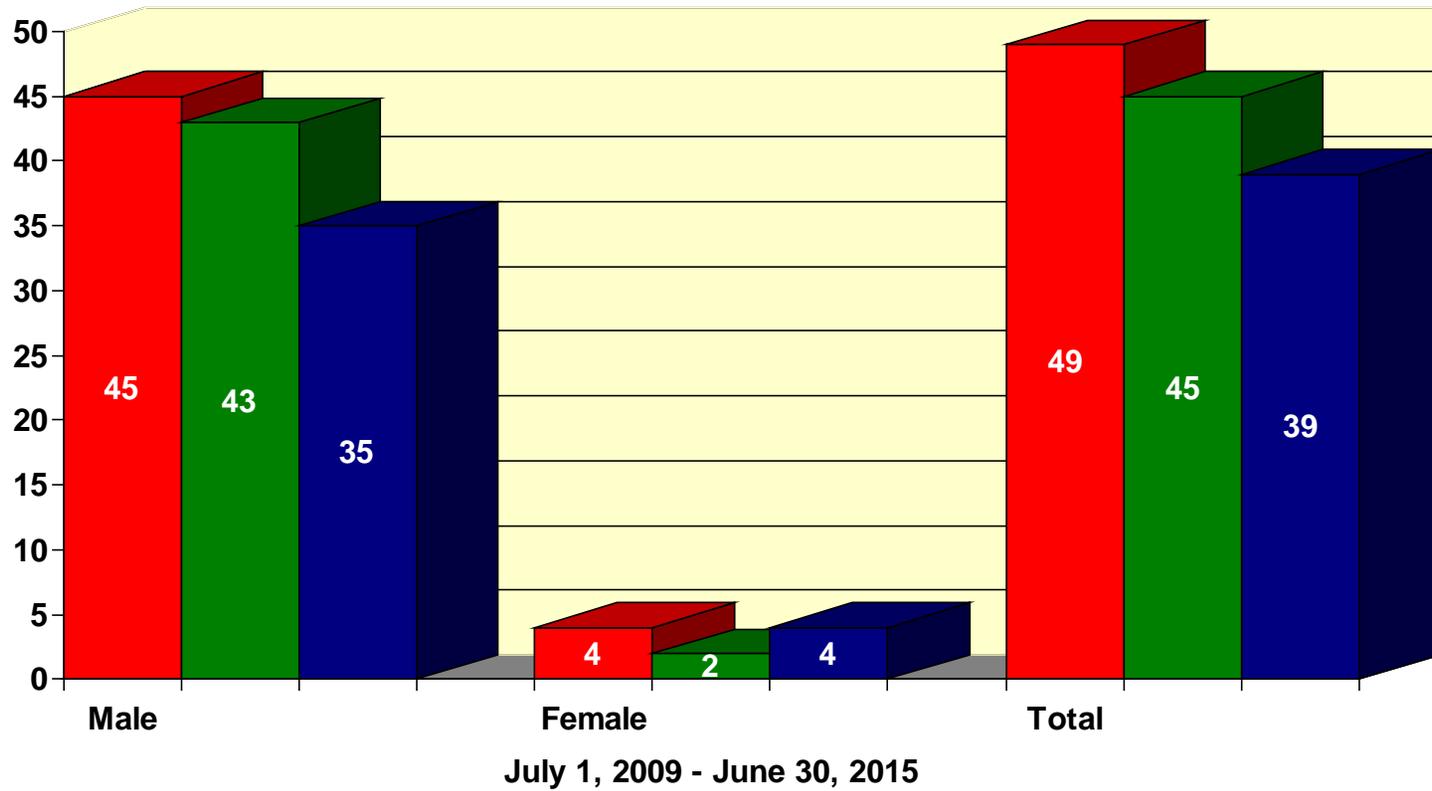
Chart 10
Post-Retirement Deaths Non-Disabled General Members and All Beneficiaries



July 1, 2009 - June 30, 2015



Chart 11
Post-Retirement Deaths Non-Disabled Safety Members



Expected - Current Actual Expected - Proposed

Chart 12

Life Expectancies

Non-Disabled General Members and All Beneficiaries

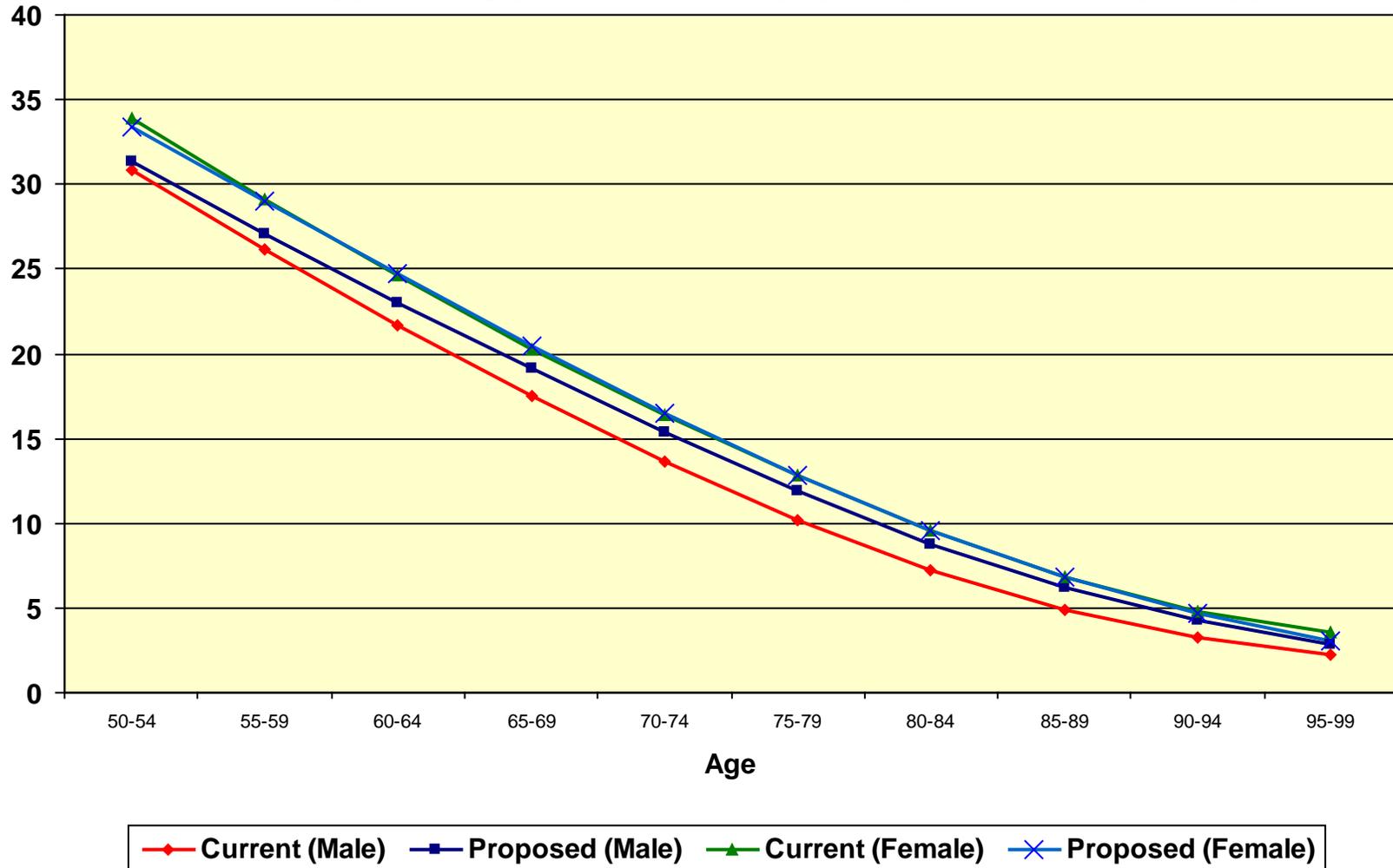
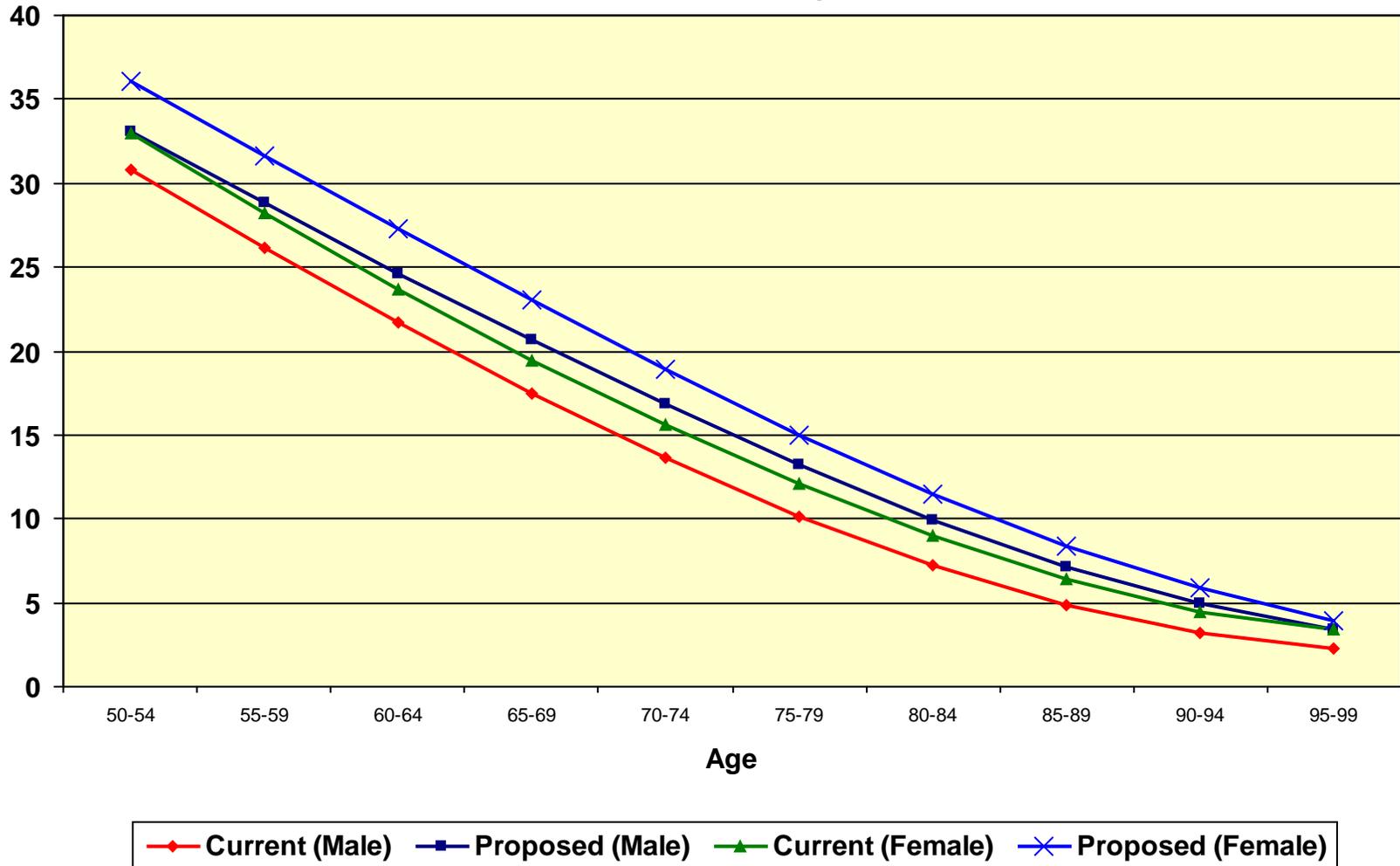


Chart 13 Life Expectancies Non-Disabled Safety Members



D. MORTALITY RATES - DISABLED

Since death rates for disabled members can differ from those of healthy members, a different mortality assumption is often used. The table currently being used is the RP-2000 Combined Healthy Mortality Table projected with scale AA to 2015 (separate tables for males and females) set forward six years for General male members, set forward five years for General female members and set forward one year for all Safety members.

The number of actual deaths compared to the number expected under the current and the proposed assumptions for the last six years has been as follows:

	General – Disabled			Safety – Disabled		
	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths	Current Expected Deaths	Actual Deaths	Proposed Expected Deaths
Male	26	30	23	6	12	10
Female	<u>21</u>	<u>21</u>	<u>21</u>	<u>1</u>	<u>7</u>	<u>2</u>
Total	47	51	44	7	19	12
Actual / Expected	109%		116%	271%		158%

Based on the actual experience, we recommend changing the mortality table for General disabled members to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females) projected 20 years with the two-dimensional scale MP2015D, set forward eight years. It should be noted that the margin will increase if we were to combine this experience with healthy General mortality experience.

Based on the actual experience, we recommend changing the mortality table for Safety disabled members to the Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females) projected 20 years with the two-dimensional scale MP2015D, set forward seven years.

Chart 14 compares actual to expected deaths under both the current and the proposed assumptions for disabled General members over the last six years.

Chart 15 compares actual to expected deaths under both the current and the proposed assumptions for disabled Safety members over the last six years.

Chart 16 and 17 show the life expectancies under both the current and the proposed tables for General and Safety, respectively.

Chart 14
Post - Retirement Deaths
Disabled General Members

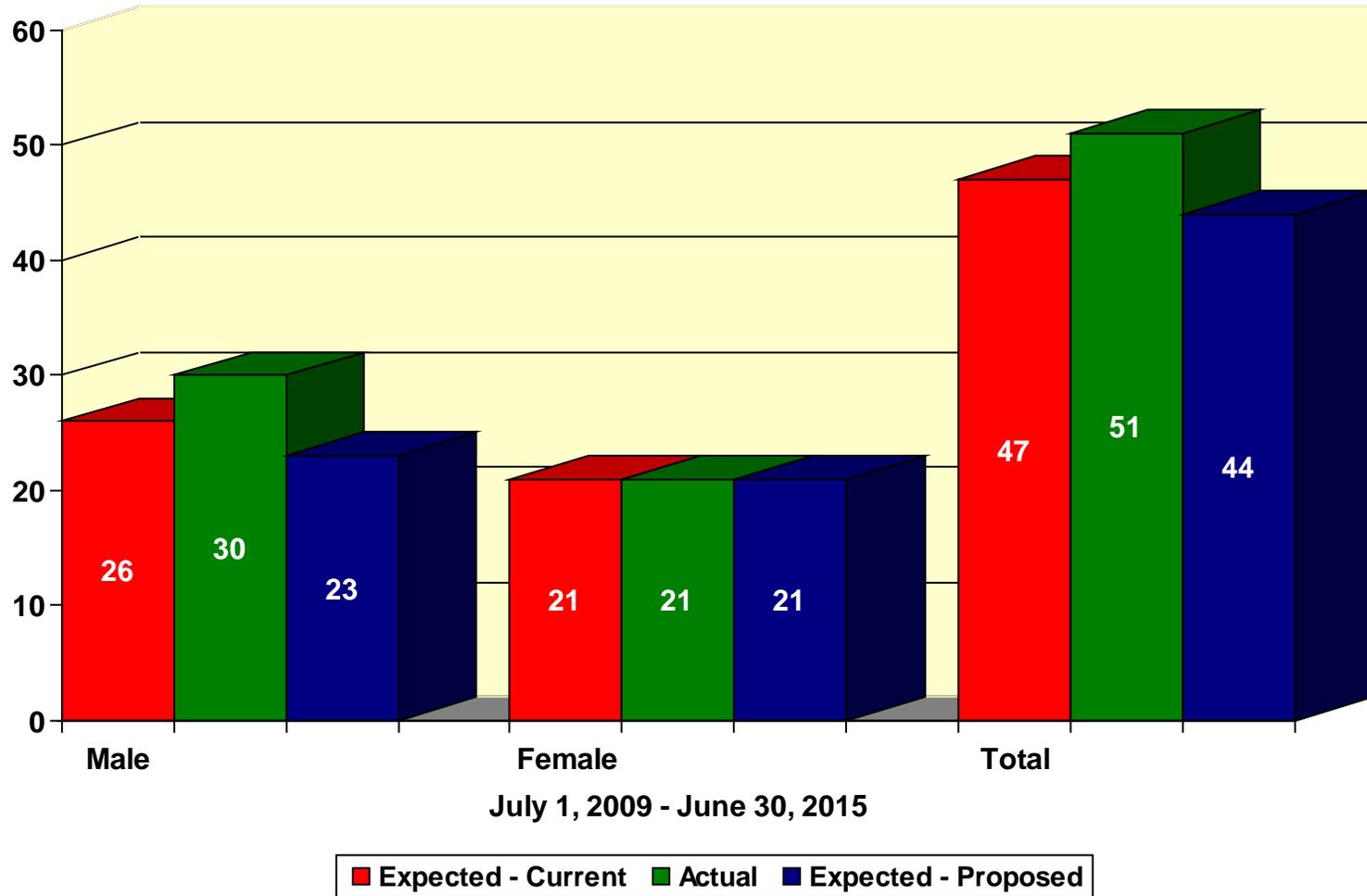
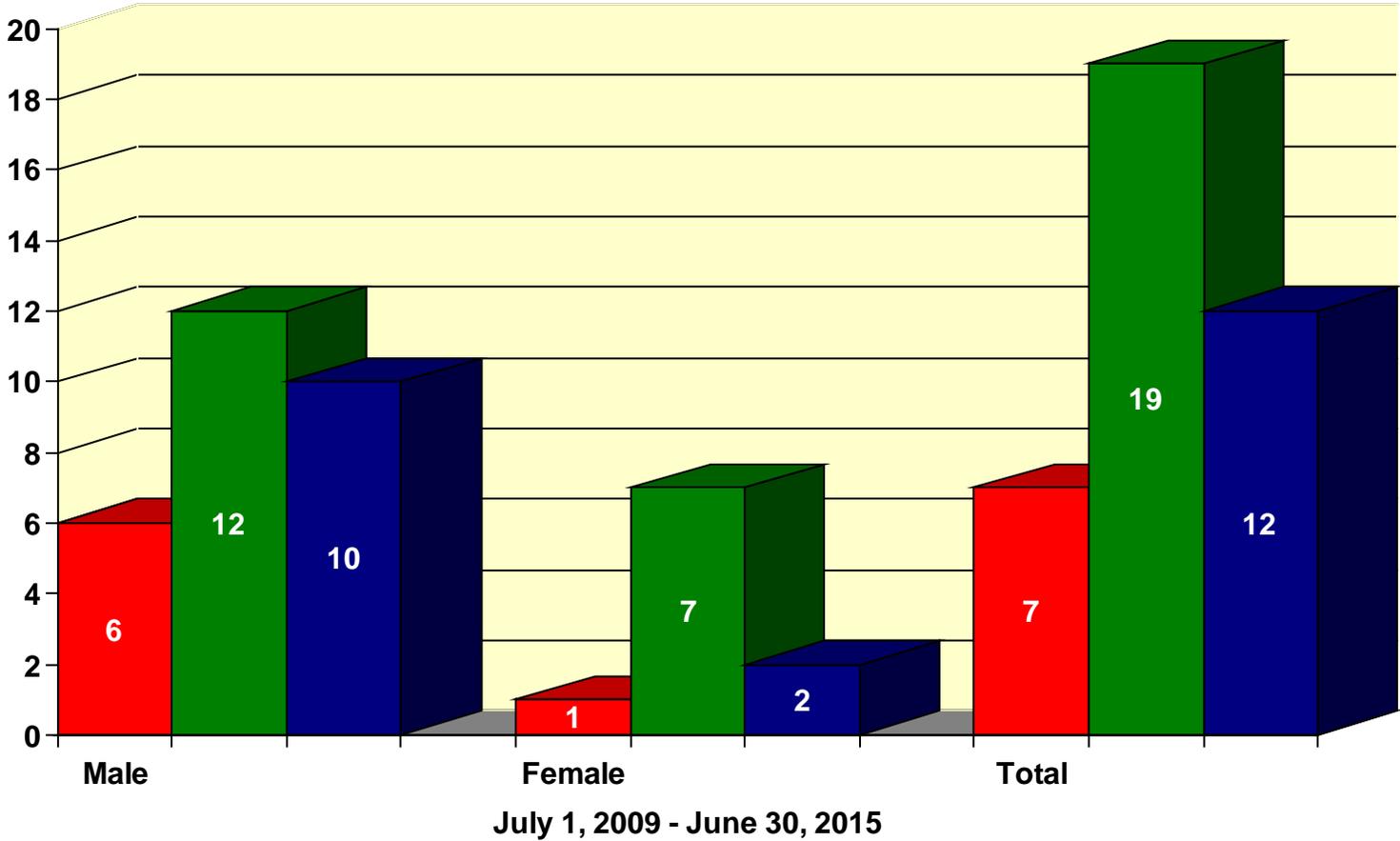


Chart 15
Post - Retirement Deaths
Disabled Safety Members



Expected - Current Actual Expected - Proposed

Chart 16

Life Expectancies

Disabled General Members

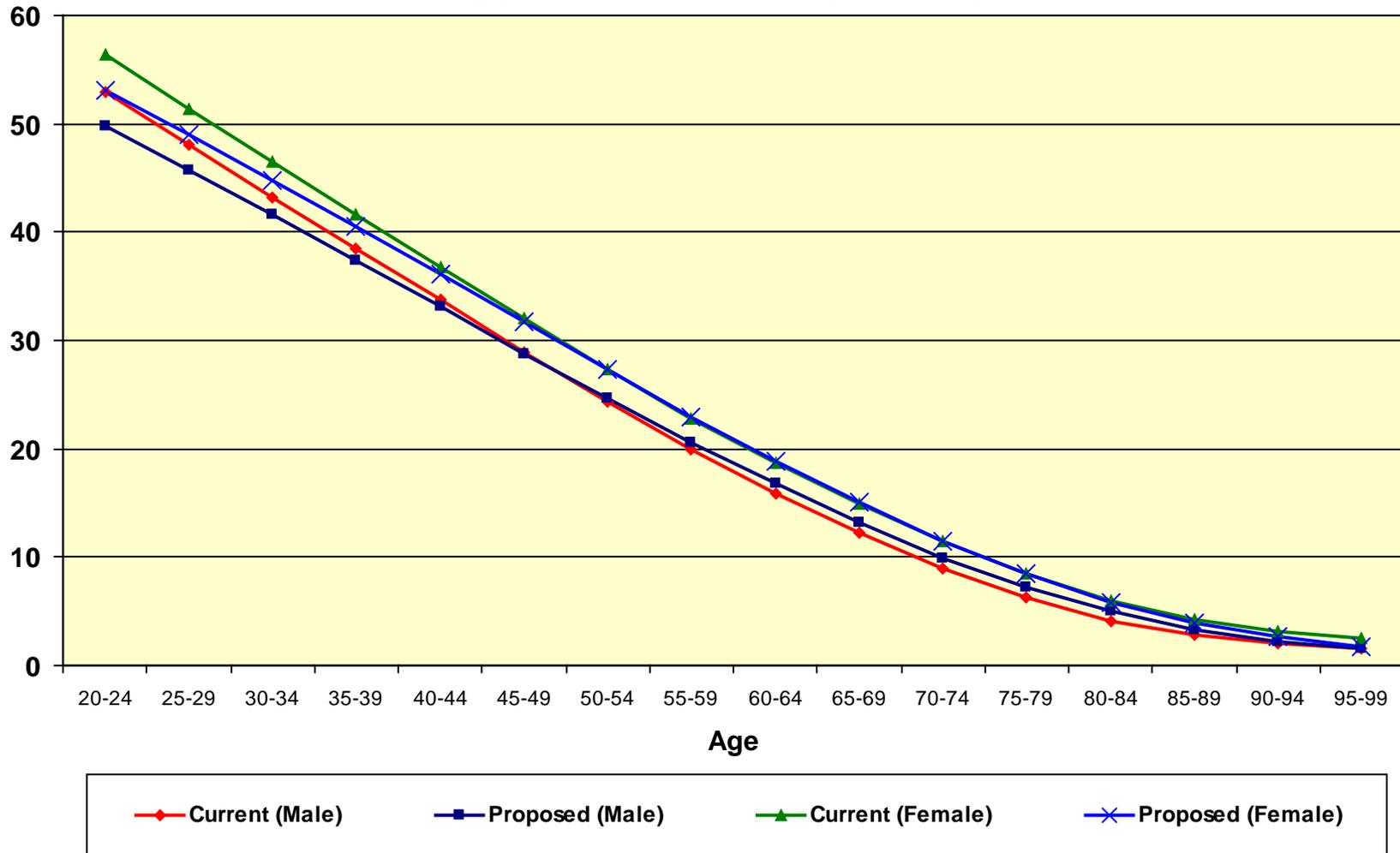
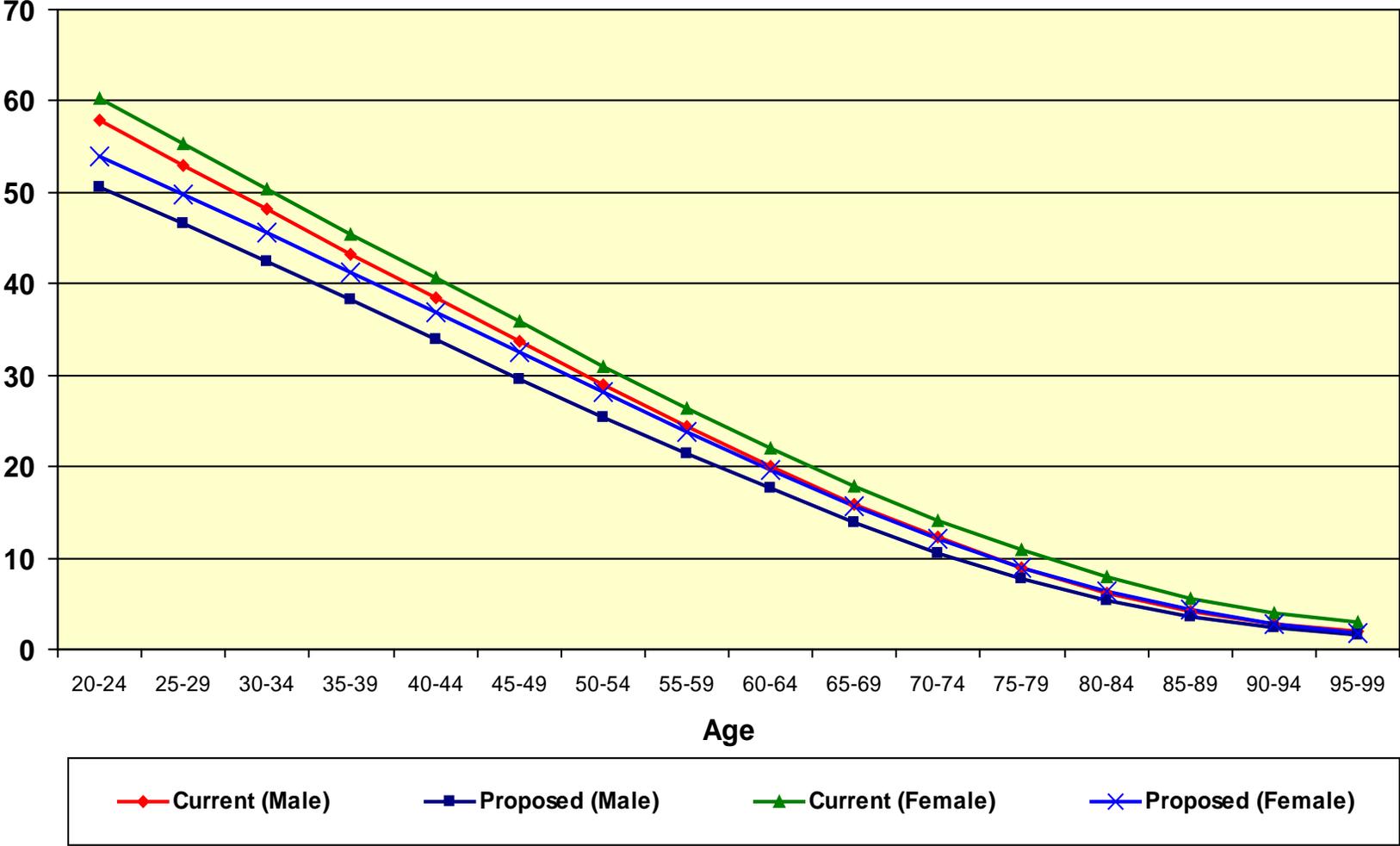


Chart 17

Life Expectancies

Disabled Safety Members



E. TERMINATION RATES

Termination rates include all terminations for reasons other than death, disability, or retirement. Under the current sex distinct assumptions, there is an overall assumed incidence of total termination combined with a separate assumption for the percent of members who would elect a refund of contributions versus a deferred retirement benefit. With this experience study, we are recommending combining the experience from both male and female members to increase the experience available to set this assumption. The termination experience (total) over the last three years for General members separated between those members with under five years of service and those with five or more years of service is as follows:

Rates of Termination (General Separate) (Less than Five Years of Service)

Years of Service	Current Male Rate	Observed Male Rate	Current Female Rate	Observed Female Rate
0	17.00%	19.31%	15.00%	17.67%
1	8.00	11.11	7.00	12.19
2	7.00	12.31	6.50	8.57
3	6.00	11.61	5.00	7.51
4	6.00	11.58	5.00	6.53

Rates of Termination (General Combined) (Less than Five Years of Service)

Years of Service	Current Rate ²	Observed Rate	Proposed Rate
0	15.67%	18.22%	17.00%
1	7.33	11.83	9.50
2	6.66	9.76	8.00
3	5.35	8.93	7.00
4	5.31	8.08	6.75

² This column shows composite rates of both General male and General female termination assumptions.

Rates of Termination (General Separate)

(Five or More Years of Service)

Years of Service	Current Male Rate	Observed Male Rate	Current Female Rate	Observed Female Rate
20 – 24	5.50%	0.00%	5.00%	0.00%
25 – 29	5.50	8.75	5.00	6.04
30 – 34	4.50	3.85	5.00	6.17
35 – 39	4.00	2.50	4.50	4.37
40 – 44	3.80	3.21	4.00	3.37
45 – 49	3.60	4.02	3.50	3.14
50 – 54	3.50	5.66	3.25	4.00
55 – 59	3.25	4.59	3.00	2.51
60 – 64	3.00	6.98	3.00	6.98
65 – 69	1.50	6.90	1.50	11.90
70 – 74	0.00	0.00	0.00	0.00

Rates of Termination (General Combined)

(Five or More Years of Service)

Age	Current Rate³	Observed Rate	Proposed Rate
20 – 24	5.50%	0.00%	5.75
25 – 29	5.17	6.99	5.75
30 – 34	4.83	5.37	5.00
35 – 39	4.32	3.68	4.25
40 – 44	3.93	3.32	3.70
45 – 49	3.53	3.45	3.50
50 – 54	3.34	4.61	3.40
55 – 59	3.09	3.25	3.25
60 – 64	3.00	6.98	3.00
65 – 69	1.50	9.86	3.00
70 – 74	0.00	0.00	0.00

³ This column shows composite rates of both male and female termination assumptions.

The termination experience (total) over the last three years for Safety members separated between those members with under five years of service and those with five or more years of service is as follows:

Rates of Termination (Safety)
(Less than Five Years of Service)

Years of Service	Current Rate	Observed Rate	Proposed Rate
0	17.00%	11.06%	14.00%
1	6.00	9.02	7.50
2	5.00	7.14	6.00
3	4.75	0.00	5.00
4	4.50	0.00	4.75

Rates of Termination (Safety)
(Five or More Years of Service)

Age	Current Rate	Observed Rate	Proposed Rate
20 – 24	3.75%	0.00%	3.50%
25 – 29	3.75	10.53	3.50
30 – 34	3.00	1.64	2.50
35 – 39	2.50	1.46	2.00
40 – 44	2.00	0.84	1.75
45 – 49	1.00	2.30	1.50
50 – 54	1.00	6.67	1.50
55 – 59	1.00	14.29	1.50
60 – 64	0.00	0.00	0.00

Chart 18 compares actual to expected total terminations over the past three years for both the current and the proposed assumptions for General members and Safety members.

Chart 19 shows the current along with the proposed termination rates for General members with less than five years of service.

Chart 20 shows the same information as Chart 19, but for Safety members.

Chart 21 shows the current along with the proposed termination rates for General members with five or more years of service.

Chart 22 shows the same information as Chart 21, but for Safety members

Based upon the recent experience, the termination rates for General and Safety members have been increased in most cases. In addition, among the terminations, we recommend the following

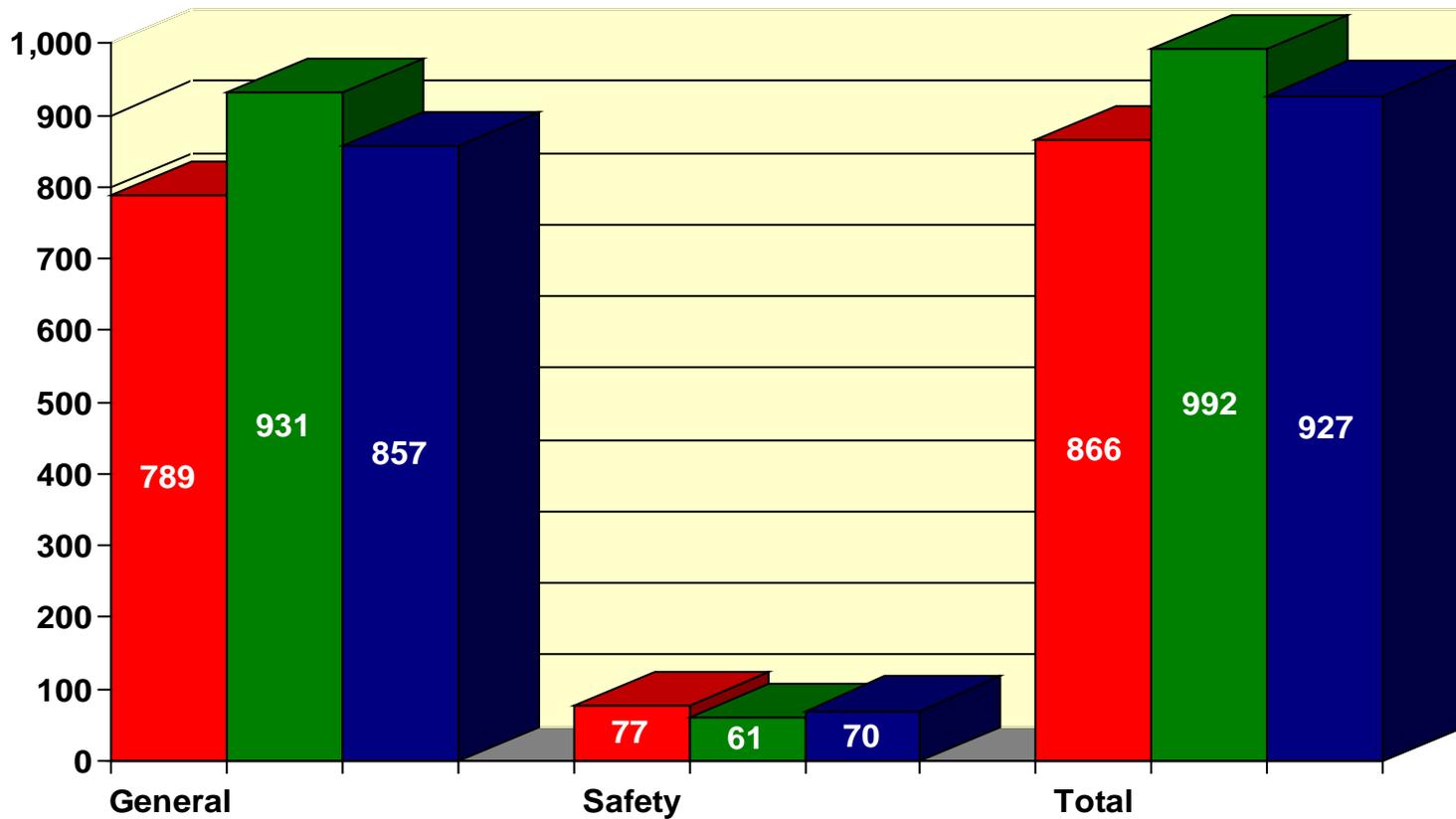
assumptions for the percent of members electing a refund and the percent of members electing to leave their contributions on deposit so that they would be eligible to receive a deferred retirement benefit. We have changed the assumption significantly for members with less than five years of service as a result of including the 1,419 terminated members who were reclassified as of June 30, 2015.

**Proportion of Total Termination Assumed to Receive Refunds and
Deferred Vested Benefit Based on all General and Safety Data as of June 30, 2015**

Years of Service	Refunds			Deferred Vested Benefits		
	Current Rate	Observed Rate	Proposed Rate	Current Rate	Observed Rate	Proposed Rate
0-4	90.00%	39.27%	60.00%	10.00%	60.73%	40.00%
5-9	30.00	27.71	30.00	70.00	72.29	70.00
10-14	30.00	15.38	25.00	70.00	84.62	75.00
15-19	15.00	13.04	15.00	85.00	86.96	85.00
20 or more	15.00	7.02	10.00	85.00	92.98	90.00

We will continue to assume that all termination rates are zero at any age where members are eligible and assumed to retire. That means that, at these ages, the members will either retire (and commence receiving a benefit) or continue working.

Chart 18
Actual Number of Terminations Compared to Expected



July 1, 2012 - June 30, 2015

Expected Actual Proposed

Chart 19
Termination Rates - General Members
(Less than Five Years of Service)

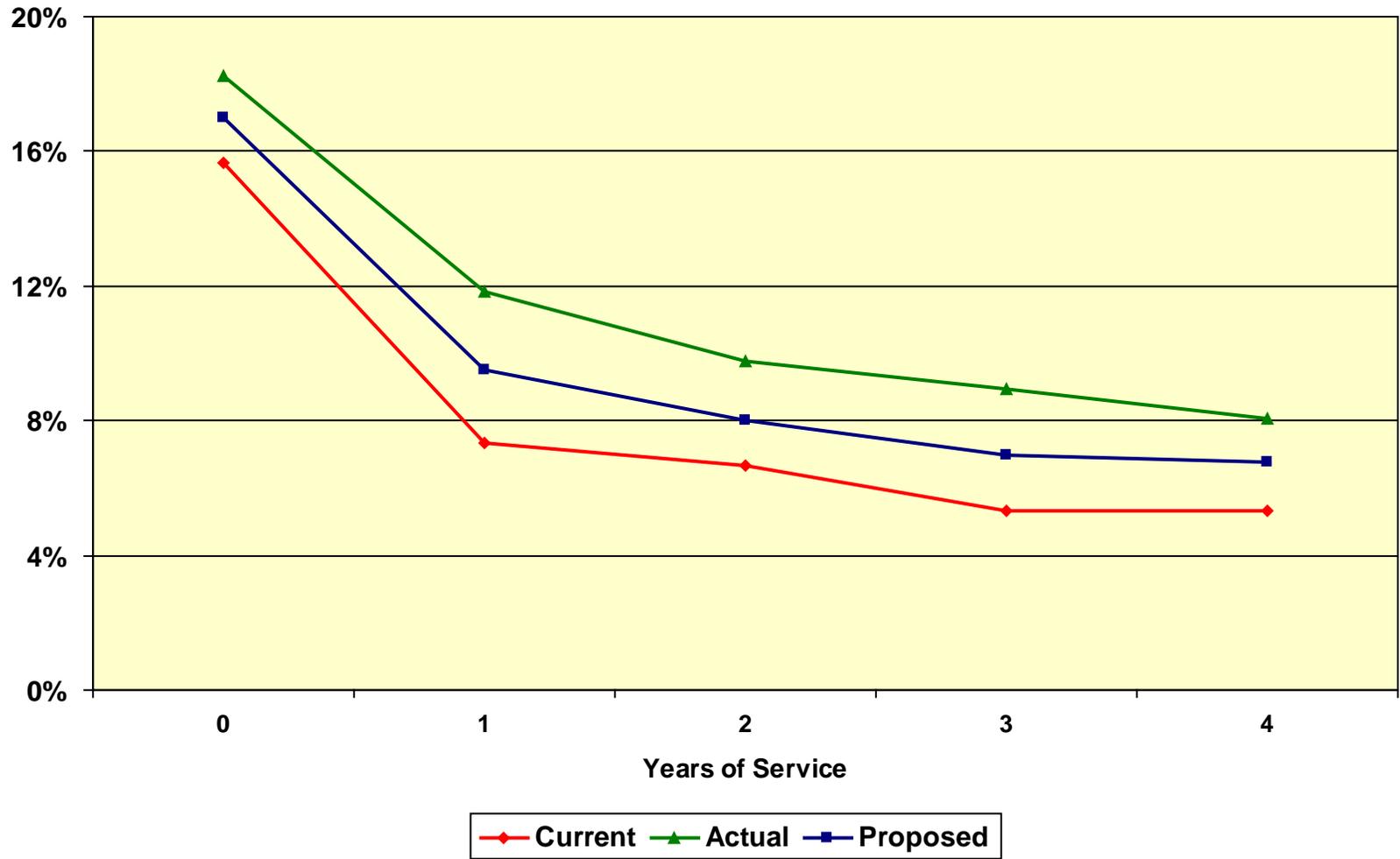


Chart 20
Termination Rates - Safety Members
(Less Than Five Years of Service)

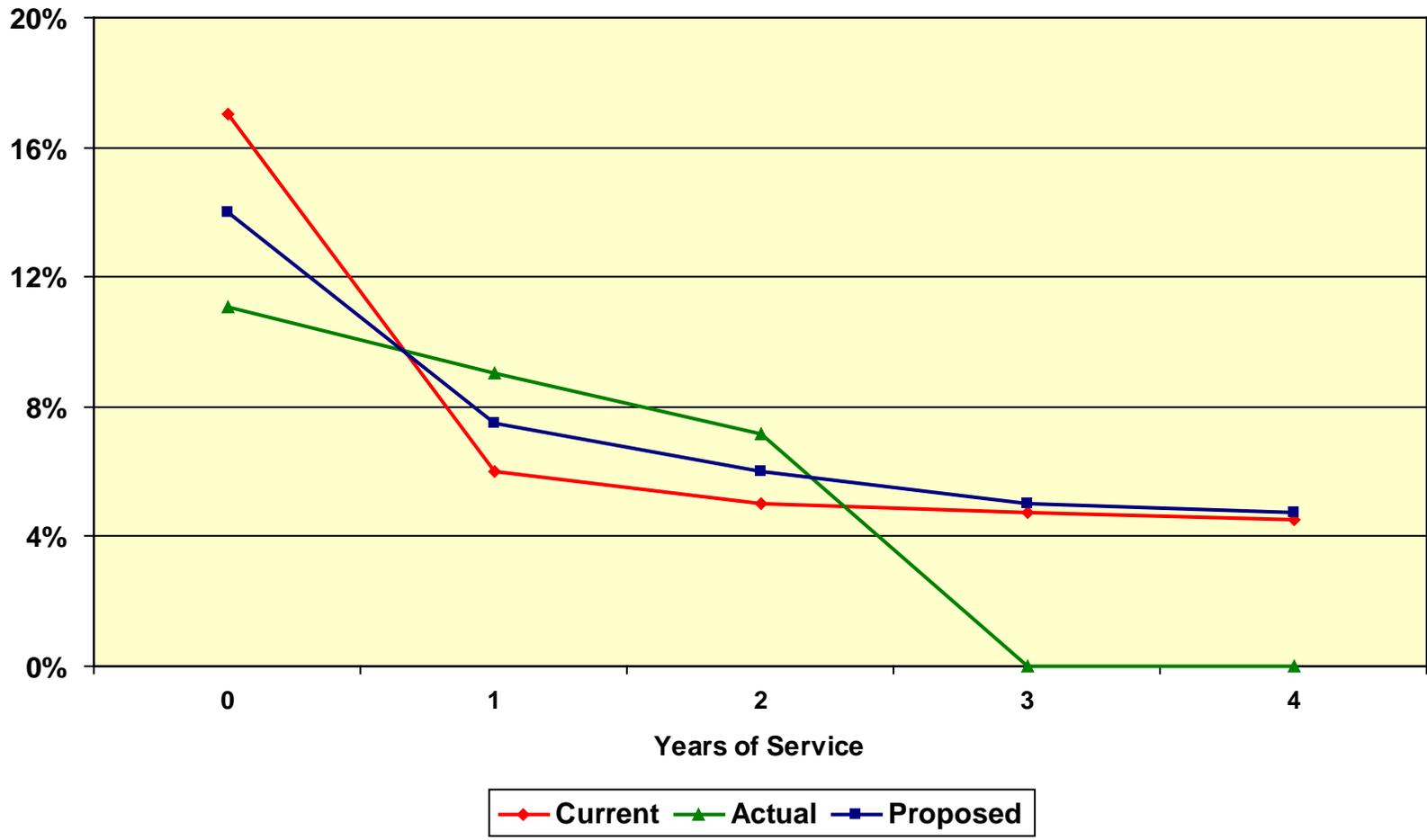


Chart 21
Termination Rates - General Members
(Five or More Years of Service)

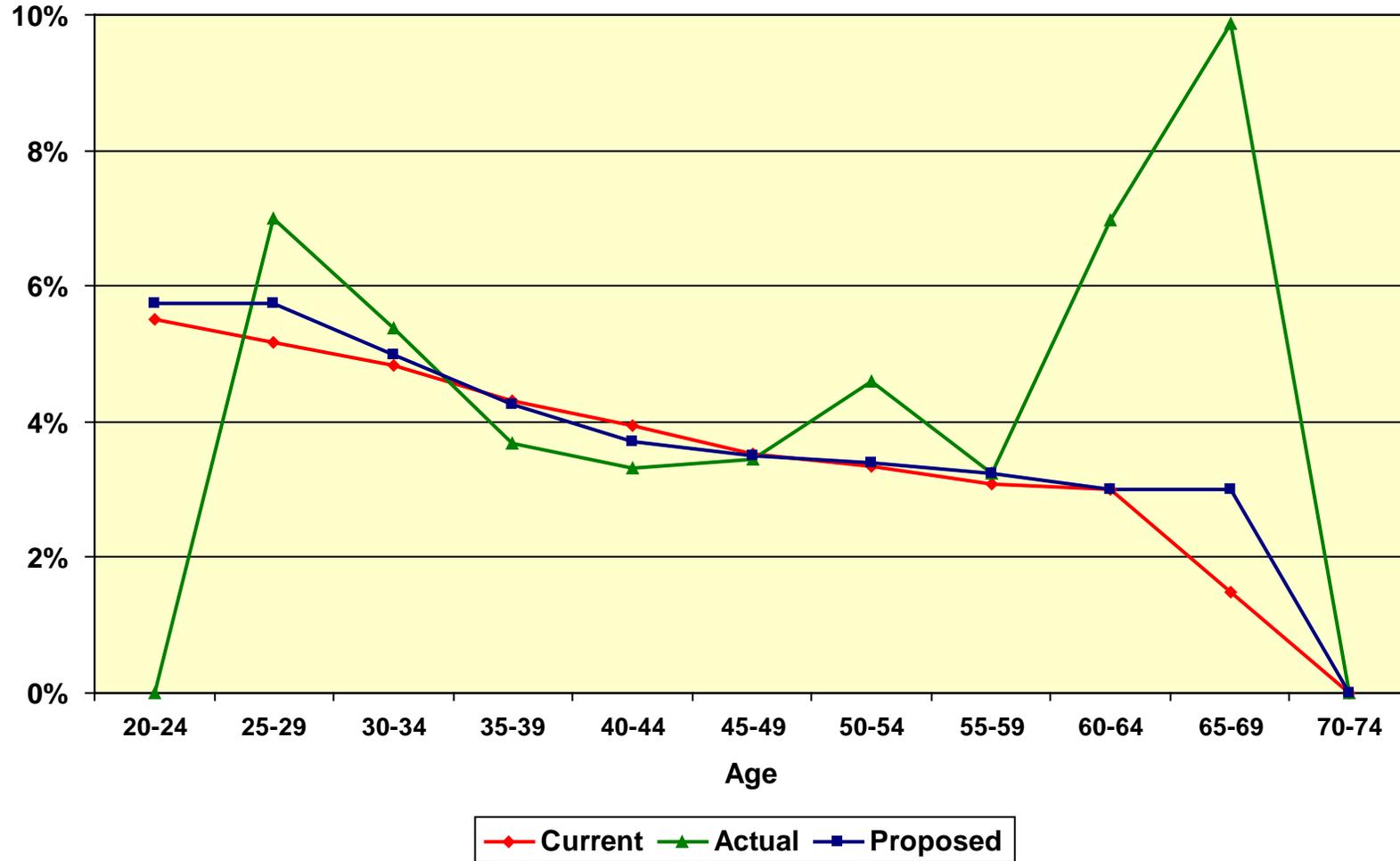
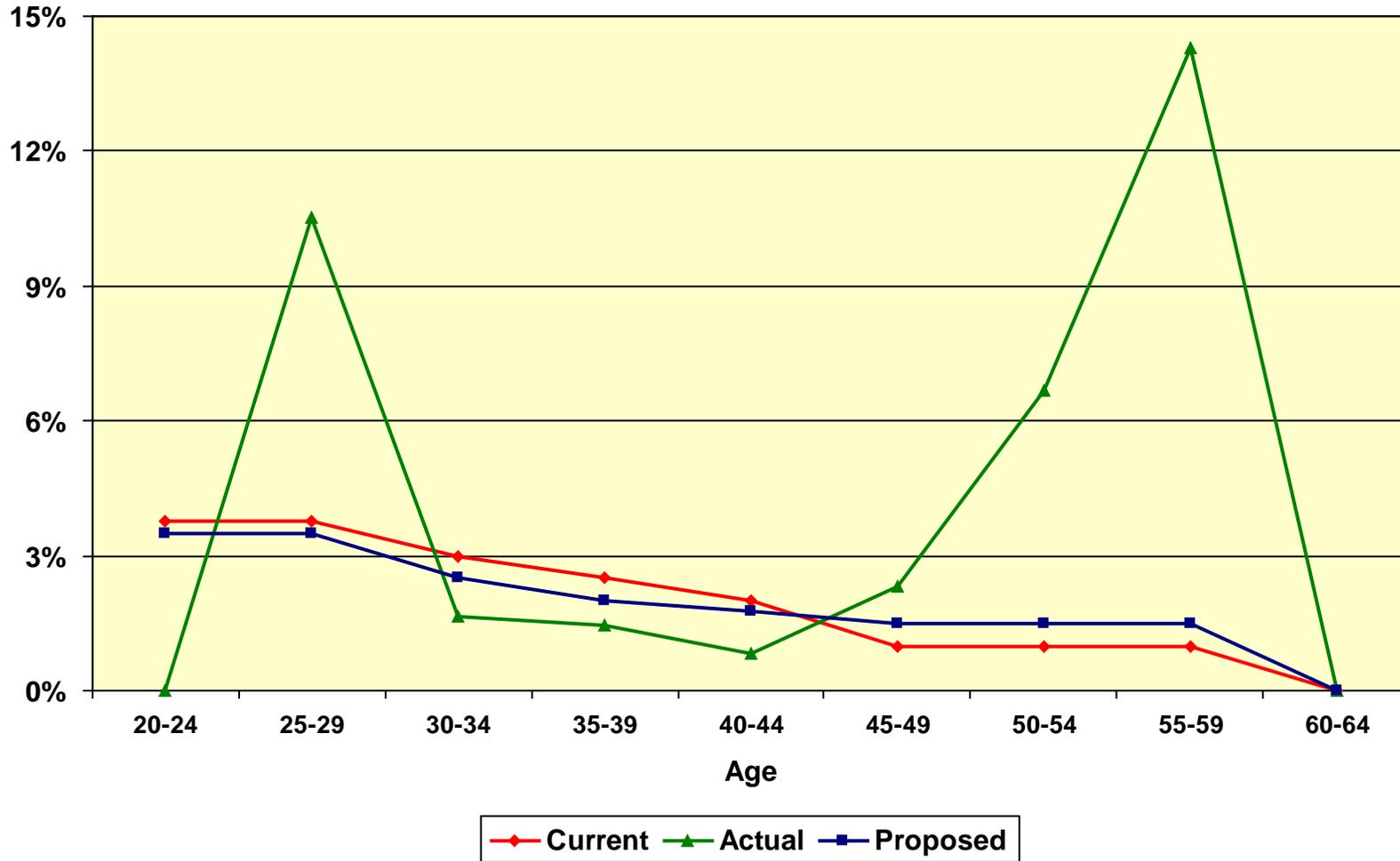


Chart 22
Termination Rates - Safety Members
(Five or More Years of Service)



F. DISABILITY INCIDENCE RATES

When a member becomes disabled, he or she may be entitled to a minimum 50% of pay pension (duty disability), or a pension that depends upon the member's years of service (ordinary disability). The following summarizes the actual incidence of combined duty and ordinary disabilities over the past three years compared to the current and the proposed assumptions for combined duty and ordinary disability incidence:

Rates of Disability Incidence (General Male)

Age	Current Rate	Observed Rate	Proposed Rate
20 – 24	0.01%	0.00%	0.01%
25 – 29	0.01	0.00	0.01
30 – 34	0.02	0.00	0.02
35 – 39	0.03	0.10	0.06
40 – 44	0.05	0.22	0.16
45 – 49	0.25	0.35	0.25
50 – 54	0.30	0.11	0.25
55 – 59	0.45	0.00	0.35
60 – 64	1.00	0.89	0.90
65 – 69	1.00	0.81	1.00
70 – 74	1.00	0.00	1.00

Rates of Disability Incidence (General Female)

Age	Current Rate	Observed Rate	Proposed Rate
20 – 24	0.01%	0.00%	0.01%
25 – 29	0.02	0.00	0.02
30 – 34	0.02	0.00	0.02
35 – 39	0.08	0.00	0.08
40 – 44	0.12	0.00	0.12
45 – 49	0.18	0.12	0.16
50 – 54	0.20	0.12	0.18
55 – 59	0.35	0.21	0.28
60 – 64	0.50	0.28	0.36
65 – 69	0.50	2.00	0.75
70 – 74	0.50	10.00	1.00

Rates of Disability Incidence (Safety)

Age	Current Rate	Observed Rate	Proposed Rate
20 – 24	0.05%	0.00%	0.05%
25 – 29	0.15	0.00	0.15
30 – 34	0.30	0.00	0.30
35 – 39	0.50	0.43	0.50
40 – 44	0.70	0.57	0.60
45 – 49	0.90	0.22	0.70
50 – 54	1.10	0.31	0.80
55 – 59	3.00	1.16	2.00
60 – 64	3.00	5.71	4.00

We are recommending a reduction in the disability rates at most ages even though we understand from our discussions with FCERA that the Association has accelerated the process of reviewing the applications for disabilities which, everything else being equal could have resulted in higher incidence of disability being reported for the current period. We would continue to monitor the actual incidence of disability in our next experience study and to advise the Board should further reduction be warranted.

Chart 23 compares the actual number of ordinary and duty disabilities over the past three years to that expected under both the current and the proposed assumptions. The current disability rates were adjusted slightly to reflect the past three years' experience.

Chart 24 shows actual disablement rates, compared to the assumed and the proposed rates for General Male members.

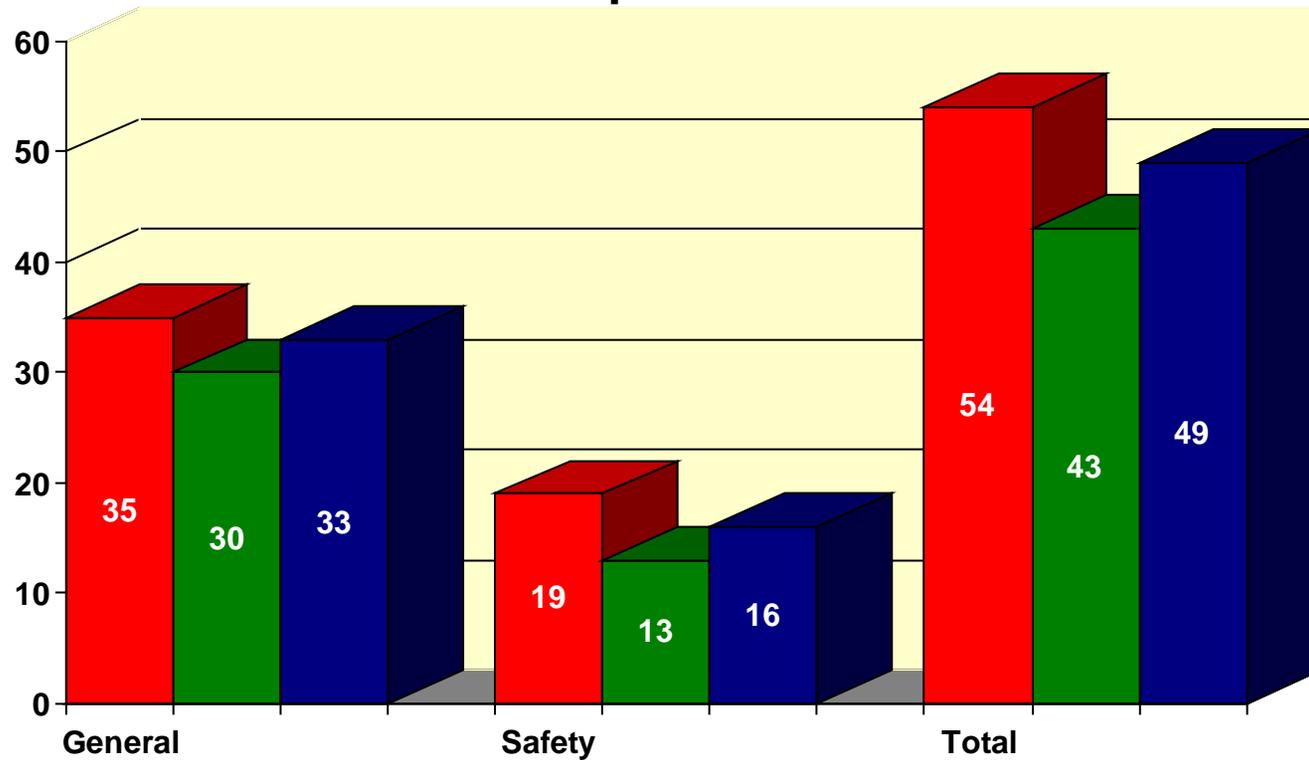
Chart 25 graphs the same information as Chart 24, but for General Female members.

Since 77% of disabled General members received a duty disability, we recommend that the current 33% assumption used to anticipate duty disability retirement be increased to 50%. The remaining 50% of General disabled members will be assumed to receive an ordinary disability.

Chart 26 graphs the same information as Chart 24, but for Safety members.

Since 100% of disabled Safety members received a duty disability, we recommend that the current 100% assumption used to anticipate duty disability retirement be maintained. No Safety disabled members will be assumed to receive an ordinary disability.

Chart 23
Actual Number of Disabilities Compared to Expected



July 1, 2012 - June 30, 2015

Expected Actual Proposed

Chart 24

Disablement Rates for General Male Members

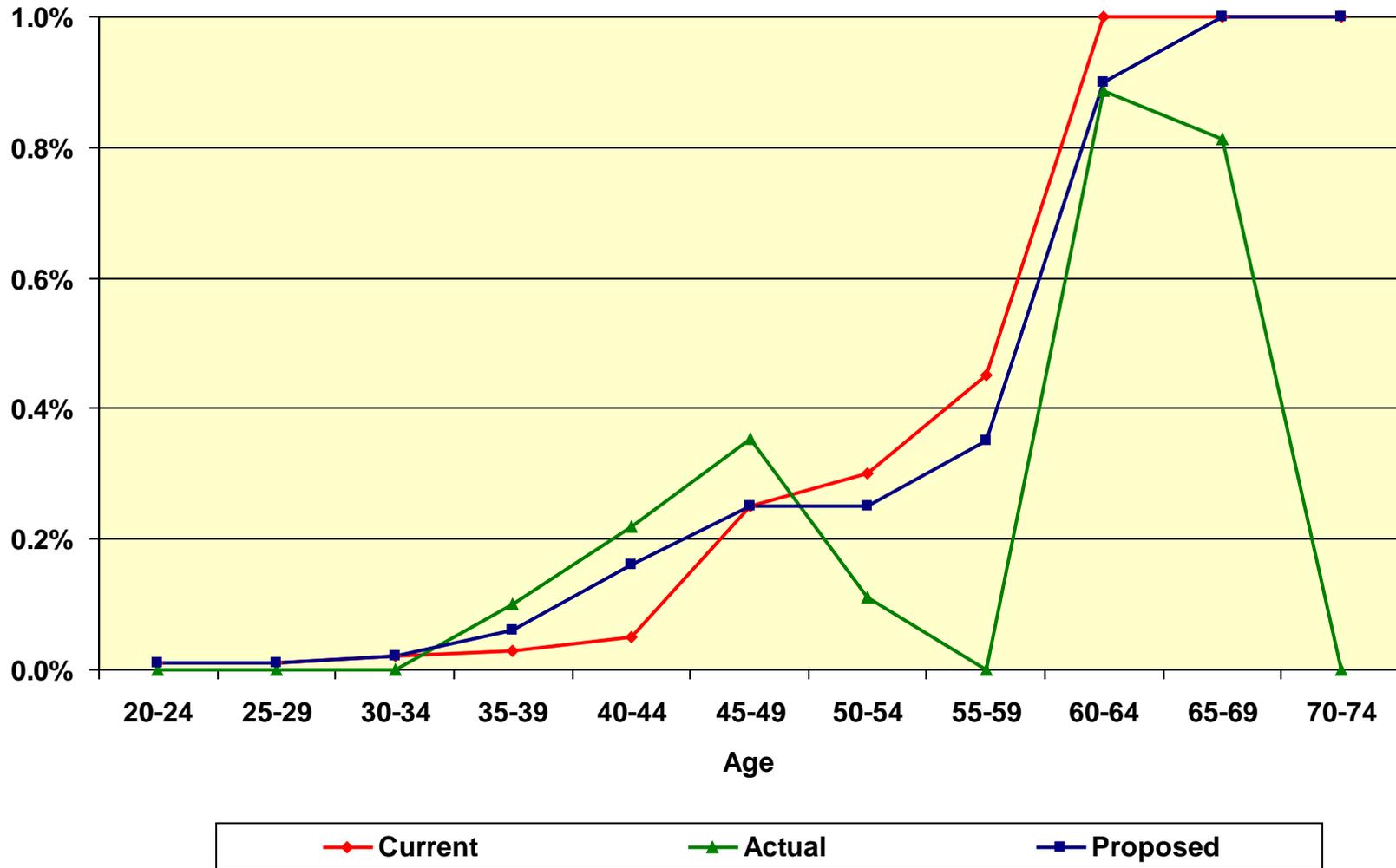


Chart 25 Disablement Rates for General Female Members

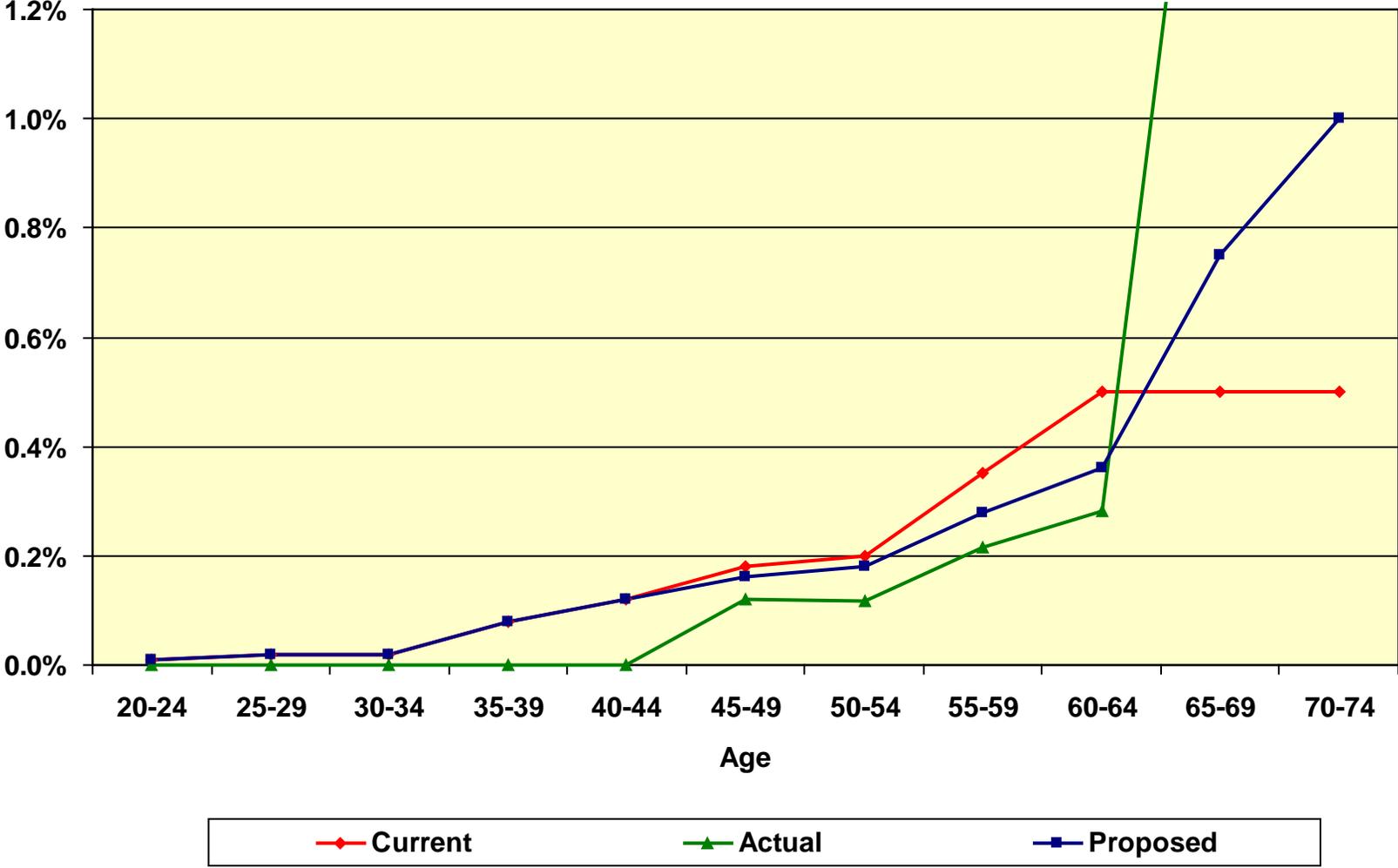
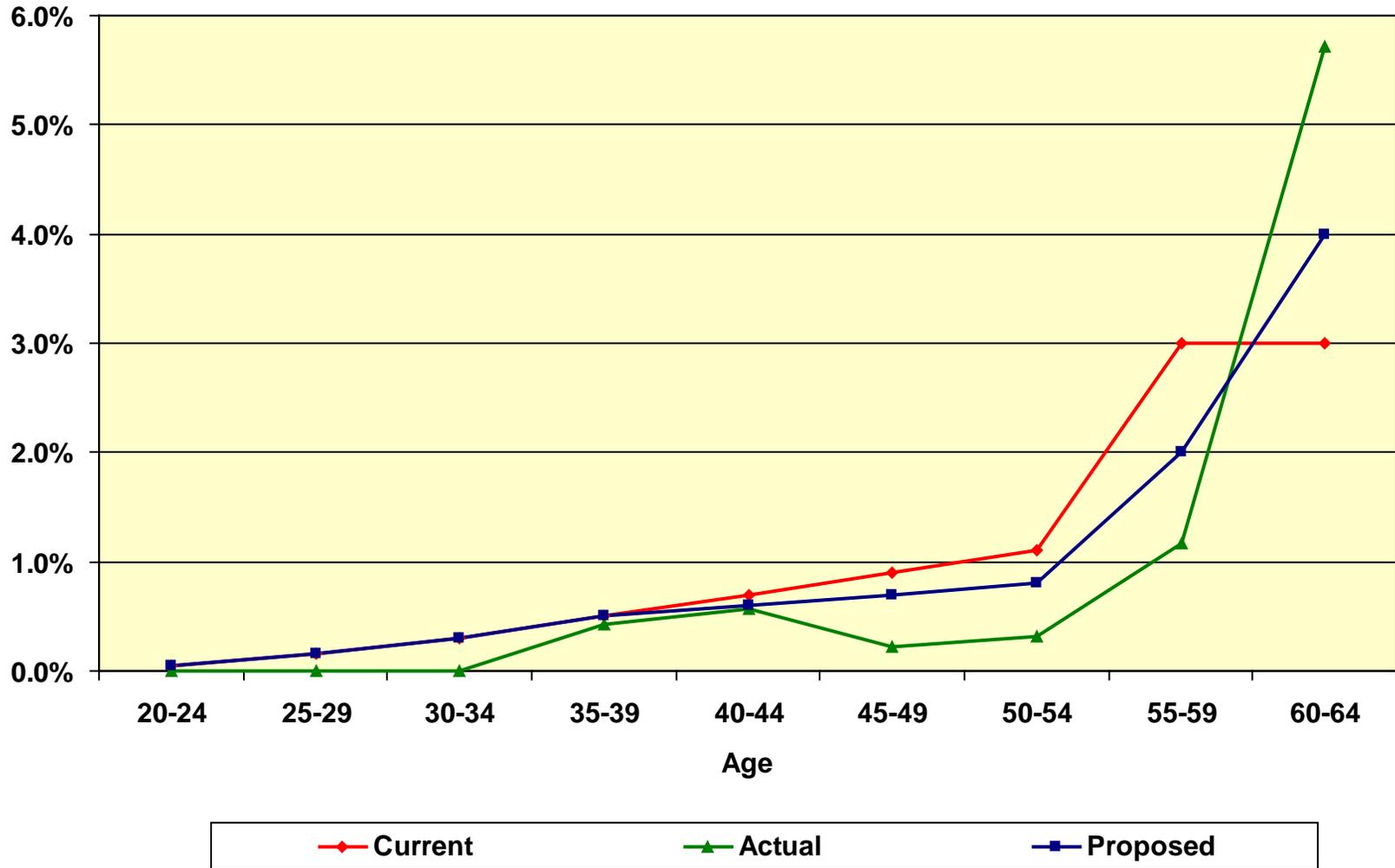


Chart 26

Disablement Rates for Safety Members



G. MERIT AND PROMOTIONAL SALARY INCREASES

FCERA's retirement benefits are determined in large part by a member's compensation just prior to retirement. For that reason it is important to anticipate salary increases that employees will receive over their careers. These salary increases are made up of three components:

- Inflationary increases;
- Real "across the board" increases; and
- Merit and promotional increases.

The inflationary increases are assumed to follow the general inflation assumption discussed in our separate economic assumption report, where we recommended decreasing the inflation assumption from 3.25% to 3.00%. We also discussed in that report maintaining the current assumption of 0.50% "across the board" real pay increases. Therefore, the total inflation and real "across the board" increase (i.e., wage inflation) is 3.50%. This is the assumed annual rate of payroll growth at which payments to amortize the Unfunded Actuarial Accrued Liability (UAAL) are assumed to increase.

The merit and promotional increases are determined by measuring the actual increases received by members over the experience period, net of the actual average inflationary and real "across the board" pay increases. Increases are measured separately for General and Safety members. This is accomplished by:

- Measuring each member's actual salary increase over each year of the experience period;
- Categorizing these increases into service groups;
- Removing the wage inflation component from these increases (assumed equal to the increase in the average salary of all members during the year);
- Averaging the remaining individual annual increases over the experience period; and
- Modifying current assumptions to reflect some portion of these measured increases reflective of their "credibility."

Note that, to be consistent with 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 shown in our economic assumptions report.

The following table shows the General members' actual average merit and promotional increases by years of service over the three-year period from July 1, 2012 through June 30, 2015 along with the actual average increases based on a combination of increases in the current three-year period and those of the prior three-year period. The current and proposed assumptions are also shown. The actual average merit and promotional increases for the most recent three-year period and the prior three-year period were reduced 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 of the current and the prior three-year experience periods (0.21% and -1.15%, respectively, on average).

General					
Years of Service	Current Assumptions	2013-2015 Actual Average Merit and Promotional Increases	2009-2012 Actual Average Merit and Promotional Increases	Average of Increases from Current and Prior Study	Proposed Assumptions
Less than 1	7.00%	9.69%	6.82%	8.25%	8.00%
1	6.00	7.81	6.29	7.05	7.00
2	5.50	6.61	5.42	6.01	6.00
3	5.00	5.19	4.87	5.03	5.00
4	4.00	4.00	4.08	4.04	4.00
5	2.25	3.32	3.53	3.42	2.75
6	1.50	2.80	2.39	2.60	2.25
7	1.25	1.62	1.11	1.37	1.25
8 & Over	1.00	1.16	0.72	0.94	1.00

The following table provides the same information for Safety members. The actual average merit and promotional increases for the most recent three-year period and the prior three-year period were reduced 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 of the current and prior three-year experience periods (-1.04% and -1.10%, respectively, on average).

Safety

Years of Service	Current Assumptions	2013-2015 Actual Average Merit and Promotional Increases	2009-2012 Actual Average Merit and Promotional Increases	Average of Increases from Current and Prior Study	Proposed Assumptions
Less than 1	7.00%	10.72%	0.00%	5.36%	8.00%
1	6.00	7.81	-3.49	2.16	7.00
2	5.50	3.54	-1.69	0.92	5.50
3	5.25	23.18 ⁴	4.63	13.91	5.50
4	4.25	8.95	3.04	5.99	5.00
5	3.75	3.68	4.32	4.00	3.75
6	3.50	3.25	2.49	2.87	3.25
7	3.25	1.19	1.99	1.59	2.75
8 & Over	1.50	1.22	0.99	1.11	1.40

Charts 27 and 28 provide a graphical comparison of the current assumed, actual, and proposed assumed promotional and merit increases. Chart 27 shows this information for General members and Chart 28 for Safety members.

We made relatively modest adjustment to the assumptions recommended for Safety member even though the data for 2013-2015 might appear to support higher assumptions especially for the earlier years of employment. Our model to study this assumption is heavily dependent on the actual average inflation plus “across the board” increase observed during the experience study period. In an environment where that increase averaged -1.04% for 2013-2015, it could produce anomalous results. This is also one of the reasons why we chose to incorporate results for the prior 2009-2012 period and we have given relatively less weight to the actual average increases experienced during the 2013-2015 period.

Based on this experience, we are proposing slight increases in the merit and promotional salary increases for both General and Safety members.

⁴ We have observed only six members in this service category over the three-year period ending June 30, 2015. This larger increase in average salary was verified by FCERA as part of our data reconciliation when we performed the annual valuation.

Chart 27 Merit and Promotional Salary Increase Rates for General Members

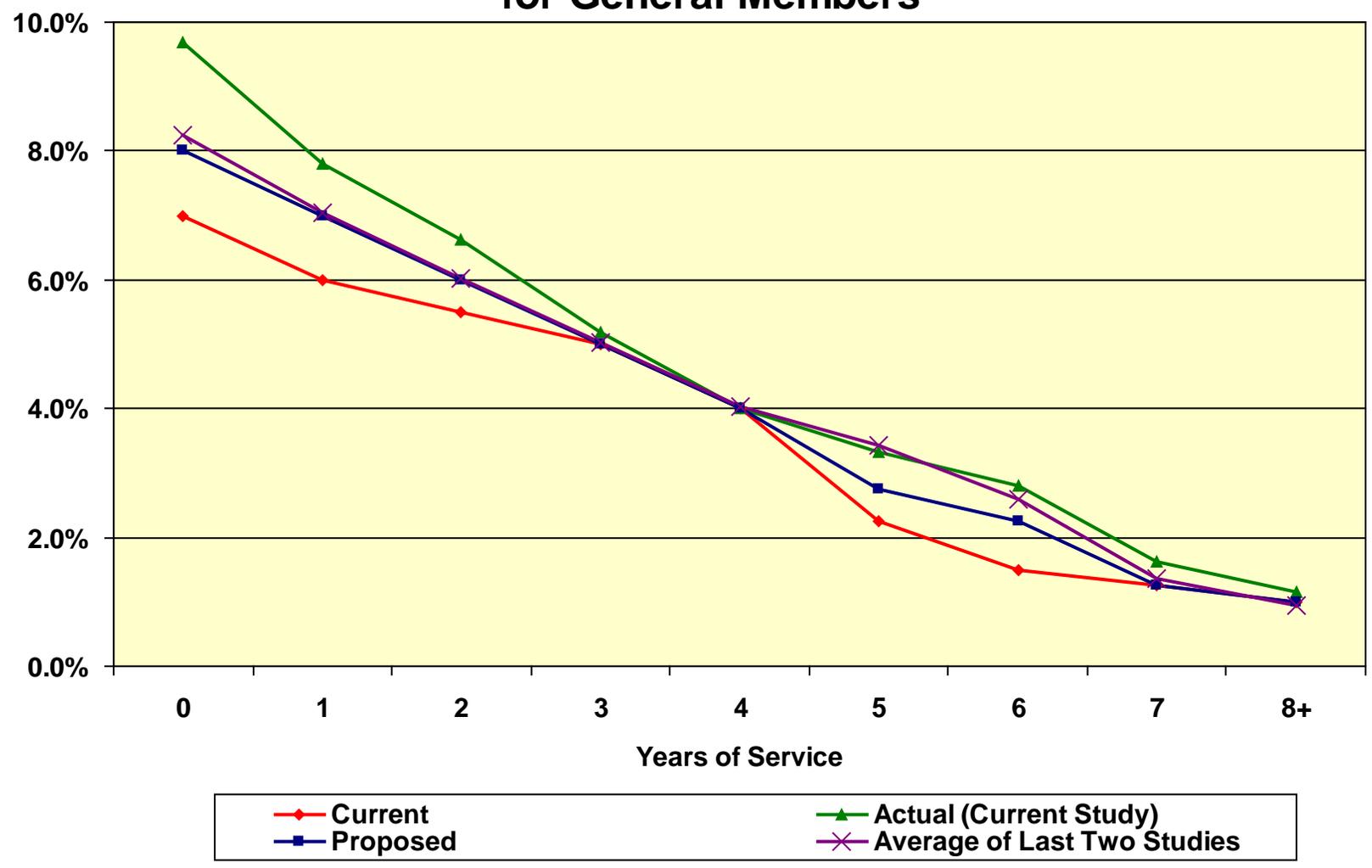
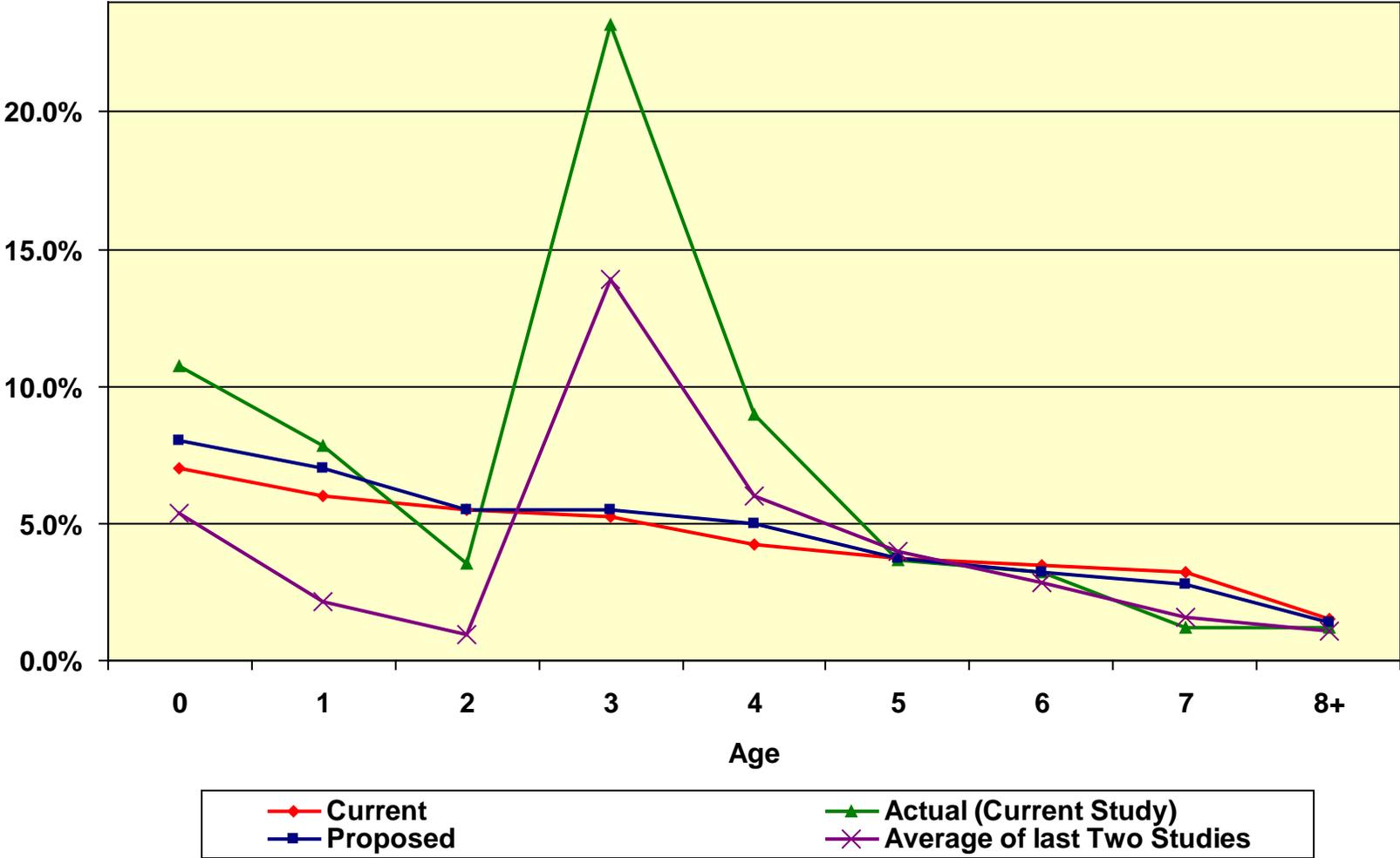


Chart 28
Merit and Promotional Salary Increase Rates
for Safety Members



H. ANNUAL LEAVE CONVERSION

At retirement, members can convert their unused annual leave to increase the service credit used in the calculation of their retirement benefit. The actuarial valuation anticipates this additional benefit using an assumption to estimate the number of hours of annual leave that will be converted at retirement.

We collected information on the actual amount of annual leave balance for actives as of June 30, 2015. Consistent with the structure of the current assumption, the actual annual leave balance was expressed as a number of hours per year of service.

The tables below show the actual hours of accumulated annual leave available at retirement and the number of active members currently eligible for each plan.

	Number of Members Reported	Current	Actual	Proposed
New Annual Leave Plan (5Y)	53	40.00	34.58	35.00
Annual Leave Plan II (5Y)	249	30.00	26.46	25.00
Vacation/Sick Leave Plan (General: 5Q, 5S and 5W)	71	35.00	32.74	35.00
Vacation/Sick Leave Plan (Safety: 5Q, 5S and 5W)	252	40.00	40.18	40.00

Other Annual leave Programs

We understand that members in the Annual Leave Plan IV (5P) and Annual Leave Plan V (5N) are allowed to transfer hours to their Time Off Bank (5O). Since the hours in the Time Off Bank are frozen, with the exception of some one-time adjustments, we will continue to assume no future addition to the Time Off Bank hours and a member will only convert his/her frozen Time Off hours to service credit.

IV. COST IMPACT OF ASSUMPTION CHANGES

The tables below show the changes in the employer and member contribution rates due to the recommended assumption changes as if they were applied in the June 30, 2015 actuarial valuation. If all of the proposed assumption changes were implemented along with the proposed 7.00% investment return and 3.00% inflation assumptions in our review of economic assumptions report, the Plan's average employer rate would have increased by 5.44% of payroll while the average member rate would have increased by 0.30% of payroll. The Plan's UAAL would have increased by \$229.4 million.

Employer Contribution Rate Impact (% of Payroll)

Contributions	General	Safety	Total
Normal Cost	0.33%	0.14%	0.30%
UAAL	<u>4.51%</u>	<u>8.54%</u>	<u>5.14%</u>
Total	4.84%	8.68%	5.44%

Increase in Average Member Contribution Rate Impact (% of Payroll)

	Change
General Tier 1	0.28%
General Tier 2	0.32%
General Tier 3	0.23%
General Tier 4	0.22%
General Tier 5	0.21%
Safety Tier 1	0.58%
Safety Tier 2	0.51%
Safety Tier 4	0.24%
Safety Tier 5	0.15%

The increase in the rates is primarily due to the increase in liabilities for active and retirees from the reduction in investment return assumption and the anticipated improvement in life expectancy, offset to some degree by other assumption changes.

Table A shows the cost impact of all the recommended assumptions (including the economic assumptions as recommended in our separate report) for the June 30, 2016 valuation. Table B shows the cost impact of 7.25% (alternative investment return assumption) and all the other recommended assumptions (including the rest of the economic assumptions as recommended in our separate report) for the June 30, 2016 valuation.

Table A:
Cost Impact of All Recommended Assumptions for the June 30, 2016 Valuation

	<u>Employer Contribution Rate Impact</u>		<u>Member Contribution Rate Impact</u>	
	% of Payroll	\$ Amount ¹ (000s)	% of Payroll	\$ Amount ¹ (000s)
Mortality Assumption	2.48%	\$9,518	0.06%	\$230
Investment Return Assumption (7.00%)	4.53%	\$17,385	0.56%	\$2,149
Changes in Other Assumptions²	<u>-1.57%</u>	<u>-\$6,025</u>	<u>-0.32%</u>	<u>-\$1,228</u>
Total Cost Impact	5.44%	\$20,878	0.30%	\$1,151

Note: The cost impact was valued as if the proposed assumptions were applied in the June 30, 2015 valuation.

¹ *Based on total member payroll of \$383,775,000 as used in the June 30, 2015 valuation.*

² *Include (but not limited to) the following assumption changes with the associated impacts:*

<i>Inflation</i>	<i>Decrease rates</i>
<i>Service Retirement</i>	<i>Decrease rates</i>
<i>Termination</i>	<i>Decrease rates for General and Increase rates for Safety</i>
<i>Disability Retirement</i>	<i>Decrease rates</i>
<i>Merit and Promotional Salary Increase</i>	<i>Decrease rates</i>
<i>Annual Leave Conversion</i>	<i>Decrease rates</i>

Table B:
**Cost Impact of 7.25% (Alternative Investment Return Assumption) and All
Other Recommended Assumptions for the June 30, 2016 Valuation**

	<u>Employer Contribution Rate Impact</u>		<u>Member Contribution Rate Impact</u>	
	% of Payroll	\$ Amount ¹ (000s)	% of Payroll	\$ Amount ¹ (000s)
Mortality Assumption	2.48%	\$9,518	0.06%	\$230
Investment Return Assumption (7.25%)	0.00%	\$0	0.00%	\$0
Changes in Other Assumptions²	<u>-1.57%</u>	<u>-\$6,025</u>	<u>-0.32%</u>	<u>-\$1,228</u>
Total Cost Impact	0.91%	\$3,493	-0.26%	-\$998

Note: The cost impact was valued as if the proposed assumptions were applied in the June 30, 2015 valuation.

¹ *Based on total member payroll of \$383,775,000 as used in the June 30, 2015 valuation.*

² *Include (but not limited to) the following assumption changes with the associated impacts:*

<i>Inflation</i>	<i>Decrease rates</i>
<i>Service Retirement</i>	<i>Decrease rates</i>
<i>Termination</i>	<i>Decrease rates for General and Increase rates for Safety</i>
<i>Disability Retirement</i>	<i>Decrease rates</i>
<i>Merit and Promotional Salary Increase</i>	<i>Decrease rates</i>
<i>Annual Leave Conversion</i>	<i>Decrease rates</i>

APPENDIX A

CURRENT ACTUARIAL ASSUMPTIONS

Post-Retirement Mortality Rates:

Healthy:

For General Members and all Beneficiaries: RP-2000 Combined Healthy Mortality Table projected with scale AA to 2015, set back one year for males and set back two years for females.

For Safety Members: RP-2000 Combined Healthy Mortality Table projected with scale AA to 2015, set back one year.

Disabled:

For General Members: RP-2000 Combined Healthy Mortality Table projected with scale AA to 2015, set forward six years for males and set forward five years for females.

For Safety Members: RP-2000 Combined Healthy Mortality Table projected with scale AA to 2015, set forward one year.

Pre-Retirement Mortality Rates:

Same rates as those used for post-retirement mortality.

Member Contribution Rates:

For General Members: RP-2000 Combined Healthy Mortality Table projected with scale AA to 2015, set back one year for males and set back two years for females weighted 35% male and 65% female.

For Safety Members: RP-2000 Combined Healthy Mortality Table projected with scale AA to 2015, set back one year weighted 80% male and 20% female.

Termination Rates Before Retirement:

Age	Rate (%)			
	Mortality			
	General ⁽¹⁾		Safety ⁽¹⁾	
	Male	Female	Male	Female
25	0.03	0.02	0.03	0.02
30	0.04	0.02	0.04	0.02
35	0.07	0.03	0.07	0.04
40	0.09	0.05	0.09	0.05
45	0.12	0.07	0.12	0.08
50	0.15	0.11	0.15	0.12
55	0.24	0.18	0.24	0.21
60	0.47	0.36	0.47	0.41
65	0.91	0.71	0.91	0.80

⁽¹⁾ All pre-retirement deaths are assumed to be non-service connected deaths.

Termination Rates Before Retirement (continued):

Age	Rate (%)		
	Disability		
	General ⁽¹⁾		Safety ⁽²⁾
	Male	Female	Male and Female
20	0.01	0.01	0.01
25	0.01	0.02	0.11
30	0.02	0.02	0.24
35	0.03	0.06	0.42
40	0.04	0.10	0.62
45	0.17	0.16	0.82
50	0.28	0.19	1.02
55	0.39	0.29	2.24
60	0.78	0.44	3.00
65	1.00	0.50	3.00

⁽¹⁾ One-third of General disabilities are assumed to be duty disabilities. The other two-thirds are assumed to be ordinary disabilities.

⁽²⁾ 100% of Safety disabilities are assumed to be duty disabilities.

Termination Rates Before Retirement (continued):

Rate (%)

Total Termination (< 5 Years of Service)

Years of Service	General		Safety
	Male	Female	Male and Female
0	17.00	15.00	17.00
1	8.00	7.00	6.00
2	7.00	6.50	5.00
3	6.00	5.00	4.75
4	6.00	5.00	4.50

Rate (%)

Total Termination (5+ Years of Service)

Age	General		Safety
	Male	Female	Male and Female
20	5.50	5.00	3.75
25	5.50	5.00	3.75
30	4.90	5.00	3.30
35	4.20	4.70	2.70
40	3.88	4.20	2.20
45	3.68	3.70	1.40
50	3.54	3.35	1.00
55	3.35	3.10	1.00
60	3.10	3.00	0.40
65	2.10	2.10	0.00

**Proportion of Total Termination Assumed to
Receive Refunds and Deferred Vested Benefits (%)**

Years of Service	Refunds	Deferred Vested Benefits
0-4	90.00	10.00
5-9	30.00	70.00
10-14	30.00	70.00
15-19	15.00	85.00
20 or more	15.00	85.00

Retirement Rates:

Rate (%)

Age	General Tier 1 Male	General Tier 1 Female	General Tier 2 Male & Female	General Tier 3 Male & Female	General Tier 4 Male & Female
45	0.00	0.00	0.00	0.00	0.00
46	0.00	0.00	0.00	0.00	0.00
47	0.00	0.00	0.00	0.00	0.00
48	0.00	0.00	0.00	0.00	0.00
49	0.00	0.00	0.00	0.00	0.00
50	4.00	5.00	3.00	3.00	2.00
51	3.00	5.00	3.00	3.00	2.00
52	3.00	5.00	3.60	3.60	2.50
53	4.00	5.00	3.60	3.60	2.50
54	5.00	6.00	4.20	4.20	3.00
55	8.00	9.00	8.40	8.40	4.00
56	11.00	12.00	10.00	10.00	5.00
57	16.00	14.00	10.00	10.00	6.00
58	21.00	15.00	10.00	10.00	7.00
59	22.00	18.00	10.00	15.00	8.00
60	25.00	19.00	15.00	19.20	9.00
61	25.00	23.00	15.00	19.20	11.00
62	27.00	27.00	25.00	34.20	17.00
63	27.00	25.00	24.00	23.70	16.00
64	30.00	27.00	24.00	23.70	20.00
65	40.00	40.00	35.00	43.30	25.00
66	50.00	40.00	34.00	33.30	21.00
67	50.00	40.00	34.00	33.30	21.00
68	50.00	45.00	35.00	40.00	25.00
69	50.00	50.00	35.00	46.70	30.00
70	100.00	100.00	100.00	100.00	100.00

Retirement Rates (continued):

Age	Rate (%)			
	General Tier 5 Male & Female	Safety Tiers 1 and 2 Male & Female	Safety Tier 4 Male & Female	Safety Tier 5 Male & Female
45	0.00	1.00	1.00	0.00
46	0.00	1.00	1.00	0.00
47	0.00	1.00	1.00	0.00
48	0.00	1.00	1.00	0.00
49	0.00	3.00	2.00	0.00
50	0.00	6.00	4.00	4.00
51	0.00	6.00	4.00	4.00
52	4.50	9.00	5.00	5.00
53	2.00	18.00	6.00	6.00
54	2.50	30.00	11.00	11.00
55	3.50	40.00	20.00	20.00
56	4.50	25.00	20.00	20.00
57	5.50	25.00	20.00	20.00
58	6.50	25.00	20.00	20.00
59	7.50	25.00	23.00	23.00
60	8.50	50.00	50.00	50.00
61	10.50	50.00	50.00	50.00
62	16.00	50.00	50.00	50.00
63	15.00	50.00	50.00	50.00
64	19.00	50.00	50.00	50.00
65	24.00	100.00	100.00	100.00
66	21.00	100.00	100.00	100.00
67	21.00	100.00	100.00	100.00
68	25.00	100.00	100.00	100.00
69	30.00	100.00	100.00	100.00
70	100.00	100.00	100.00	100.00

**Retirement Age and Benefit for
Deferred Vested Members:**

For current deferred vested members, we make the following retirement assumption:

General: Age 58
Safety: Age 55

We assume that 40% of future General and 65% of future Safety deferred vested members will continue to work for a reciprocal employer. For these members, we assume 4.75% and 5.25% compensation increases per annum for General and Safety members, respectively.

Future Benefit Accruals:

1.0 year of service per year of employment.

Unknown Data for Members:

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

Percent Married:

75% of male members; 55% of female members.

Age of Spouse:

Wives are 3 years younger than their husbands.

Annual Leave Conversion:

The following assumptions for service from unused annual leave balance at retirement are used:

New Annual Leave Plan

40 hours per year of service.

Annual Leave Plan II

30 hours per year of service.

Vacation/Sick Leave Plans

35 hours per year of service for General and 40 hours per year of service for Safety.

*Annual Leave IV Plan or
the Old Annual Leave Plan*

Based on actual hours in a member's frozen time off bank.

Individual Salary Increases:

Annual Rate of Compensation Increase (%)

Inflation: 3.25%; plus "across the board" salary increases of 0.50% per year; plus the following merit and promotional increases.

Service	General	Safety
0	7.00	7.00
1	6.00	6.00
2	5.50	5.50
3	5.00	5.25
4	4.00	4.25
5	2.25	3.75
6	1.50	3.50
7	1.25	3.25
8 or more	1.00	1.50

APPENDIX B

PROPOSED ACTUARIAL ASSUMPTIONS

Post-Retirement Mortality Rates:

Healthy:

For General Members and all Beneficiaries: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP2015D, set forward one year for females.

For Safety Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP2015D, set back two years.

Disabled:

For General Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP2015D, set forward eight years.

For Safety Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP2015D, set forward seven years.

Pre-Retirement Mortality Rates:

For General and Safety Members: Headcount-Weighted RP-2014 Healthy Employee Mortality Table projected 20 years with the two-dimensional scale MP2015D times 75%. All pre-retirement deaths are assumed to be non-service connected deaths.

Member Contribution Rates:

For General Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP2015D, set back one year for females weighted 35% male and 65% female.

For Safety Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table projected 20 years with the two-dimensional scale MP2015D, set back two years weighted 80% male and 20% female.

Termination Rates Before Retirement:

Age	Rate (%)			
	Mortality			
	General ⁽¹⁾		Safety ⁽¹⁾	
	Male	Female	Male	Female
25	0.03	0.01	0.03	0.01
30	0.03	0.02	0.03	0.02
35	0.04	0.02	0.04	0.02
40	0.04	0.03	0.04	0.03
45	0.07	0.05	0.07	0.05
50	0.11	0.08	0.11	0.08
55	0.20	0.13	0.20	0.13
60	0.35	0.19	0.35	0.19
65	0.60	0.27	0.60	0.27

⁽¹⁾ All pre-retirement deaths are assumed to be non-service connected deaths.

Termination Rates Before Retirement (continued):

Age	Rate (%)		
	Disability		
	General ⁽¹⁾		Safety ⁽²⁾
	Male	Female	Male and Female
20	0.01	0.01	0.05
25	0.01	0.02	0.11
30	0.02	0.02	0.24
35	0.04	0.06	0.42
40	0.12	0.10	0.56
45	0.21	0.14	0.66
50	0.25	0.17	0.76
55	0.31	0.24	1.52
60	0.68	0.33	3.20
65	0.96	0.59	4.00
70	1.00	0.90	4.00

⁽¹⁾ 50% of General disabilities are assumed to be duty disabilities. The other 50% are assumed to be ordinary disabilities.

⁽²⁾ 100% of Safety disabilities are assumed to be duty disabilities.

Termination Rates Before Retirement (continued):

Rate (%)		
Total Termination (< 5 Years of Service)		
Years of Service	General	Safety
0	17.00	14.00
1	9.50	7.50
2	8.00	6.00
3	7.00	5.00
4	6.75	4.75

Rate (%)		
Total Termination (5+ Years of Service)		
Age	General	Safety
20	5.75	3.50
25	5.75	3.50
30	5.30	2.90
35	4.55	2.20
40	3.92	1.85
45	3.58	1.60
50	3.44	1.50
55	3.31	1.50
60	3.10	0.60
65	3.00	0.00
70	1.20	0.00

**Proportion of Total Termination Assumed to
Receive Refunds and Deferred Vested Benefits (%)**

Years of Service	Refunds	Deferred Vested Benefits
0-4	60.00	40.00
5-9	30.00	70.00
10-14	25.00	75.00
15-19	15.00	85.00
20 or more	10.00	90.00

Retirement Rates:

Rate (%)

Age	General Tier 1 Male	General Tier 1 Female	General Tier 2 Male & Female	General Tier 3 Male & Female	General Tier 4 Male & Female
45	0.00	0.00	0.00	0.00	0.00
46	0.00	0.00	0.00	0.00	0.00
47	0.00	0.00	0.00	0.00	0.00
48	0.00	0.00	0.00	0.00	0.00
49	0.00	0.00	0.00	0.00	0.00
50	5.00	4.00	3.00	2.40	2.00
51	3.50	4.00	3.00	2.40	2.00
52	3.00	4.00	3.60	2.80	2.50
53	4.00	4.00	3.60	2.80	2.50
54	4.00	6.00	4.20	3.40	3.00
55	8.00	9.00	8.40	6.70	4.00
56	9.00	11.00	10.00	8.00	5.00
57	14.00	14.00	10.00	8.00	6.00
58	15.00	15.00	10.00	8.00	7.00
59	16.00	16.00	10.00	12.00	8.00
60	25.00	20.00	15.00	15.40	9.00
61	20.00	22.00	15.00	15.40	10.00
62	25.00	28.00	25.00	27.40	16.00
63	25.00	22.00	24.00	19.00	16.00
64	25.00	25.00	24.00	19.00	19.00
65	45.00	35.00	35.00	34.60	23.00
66	40.00	35.00	34.00	26.60	20.00
67	40.00	35.00	34.00	26.60	20.00
68	40.00	45.00	35.00	32.00	25.00
69	50.00	45.00	35.00	37.00	30.00
70	50.00	50.00	70.00	60.00	60.00
71	50.00	50.00	70.00	60.00	60.00
72	50.00	50.00	70.00	60.00	60.00
73	50.00	50.00	70.00	60.00	60.00
74	50.00	50.00	70.00	60.00	60.00
75	100.00	100.00	100.00	100.00	100.00

Retirement Rates (continued):

Age	Rate (%)			
	General Tier 5 Male & Female	Safety Tiers 1 and 2 Male & Female	Safety Tier 4 Male & Female	Safety Tier 5 Male & Female
45	0.00	1.00	1.00	0.00
46	0.00	1.00	1.00	0.00
47	0.00	1.00	1.00	0.00
48	0.00	1.00	1.00	0.00
49	0.00	3.00	2.00	0.00
50	0.00	5.00	4.00	4.00
51	0.00	7.00	4.00	4.00
52	4.50	8.00	5.00	5.00
53	2.00	14.00	6.00	6.00
54	2.50	27.00	11.00	11.00
55	3.50	40.00	20.00	20.00
56	4.50	25.00	20.00	20.00
57	5.50	25.00	20.00	25.00
58	6.50	20.00	20.00	20.00
59	7.50	20.00	23.00	23.00
60	8.50	40.00	45.00	45.00
61	9.50	40.00	45.00	45.00
62	15.00	50.00	45.00	45.00
63	15.00	50.00	45.00	45.00
64	18.00	50.00	45.00	45.00
65	22.00	100.00	100.00	100.00
66	20.00	100.00	100.00	100.00
67	20.00	100.00	100.00	100.00
68	25.00	100.00	100.00	100.00
69	30.00	100.00	100.00	100.00
70	60.00	100.00	100.00	100.00
71	60.00	100.00	100.00	100.00
72	60.00	100.00	100.00	100.00
73	60.00	100.00	100.00	100.00
74	60.00	100.00	100.00	100.00
75	100.00	100.00	100.00	100.00

**Retirement Age and Benefit for
Deferred Vested Members:**

For current deferred vested members, we make the following retirement assumption:

General:	Age 58
Safety:	Age 54

We assume that 20% of future General and 30% of future Safety deferred vested members terminated with less than five years of service will continue to work for a reciprocal employer. For those future deferred vested members terminated with five or more years of service, we assume that 35% of General and 55% of Safety will continue to work for a reciprocal employer. In addition, we assume 4.50% and 4.90% compensation increases per annum for General and Safety members, respectively.

Future Benefit Accruals:

1.0 year of service per year of employment.

Unknown Data for Members:

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

Percent Married:

75% of male members; 50% of female members.

Age of Spouse:

Male retirees are 3 years older than their spouses, and Female retirees are 2 years younger than their spouses.

Annual Leave Conversion:

The following assumptions for service from unused annual leave balance at retirement are used:

New Annual Leave Plan

35 hours per year of service.

Annual Leave Plan II

25 hours per year of service.

Vacation/Sick Leave Plans

35 hours per year of service for General and 40 hours per year of service for Safety.

*Annual Leave IV Plan or
the Old Annual Leave Plan*

Based on actual hours in a member's frozen time off bank.

Individual Salary Increases:

Annual Rate of Compensation Increase (%)

Inflation: 3.00%; plus “across the board” salary increases of 0.50% per year; plus the following merit and promotional increases.

Service	General	Safety
0	8.00	8.00
1	7.00	7.00
2	6.00	5.50
3	5.00	5.50
4	4.00	5.00
5	2.75	3.75
6	2.25	3.25
7	1.25	2.75
8 or more	1.00	1.40

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**FRESNO COUNTY EMPLOYEES'
RETIREMENT ASSOCIATION**

**Review of Economic Actuarial Assumptions
for the June 30, 2016 Actuarial Valuation**



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MARCH 2016**



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March 10, 2016

Board of Retirement
Fresno County Employees' Retirement Association
1111 H Street
Fresno, CA 93721

**Re: Review of Economic Actuarial Assumptions
for the June 30, 2016 Actuarial Valuation**

Dear Members of the Board:

We are pleased to submit this report of our review of the economic actuarial assumptions for use in the Fresno County Employees' Retirement Association (FCERA) June 30, 2016 actuarial valuation. This report includes our recommendations and the analysis supporting their development.

Please note that we have also reviewed the non-economic actuarial experience for the three-year period from July 1, 2012 to June 30, 2015 for use in the June 30, 2016 actuarial valuation. The non-economic actuarial assumption recommendations are provided in a separate report.

We are Members of the American Academy of Actuaries and 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, EA, MAAA, FCA
Senior Vice President and Actuary

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

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

JAC/gxk

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I. INTRODUCTION, SUMMARY, AND RECOMMENDATIONS

To project the cost and liabilities of the Pension Fund, 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 changed, 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 in effect assumes that experience was 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 to maintain adequate funding, while fulfilling benefit commitments to participants already retired and to those near retirement. The actuarial assumptions 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 actuarial assumptions. The study was performed in accordance with Actuarial Standard of Practice (ASOP) No. 27, "Selection of Economic Assumptions for Measuring Pension Obligations." This Standard of Practice puts forth guidelines for the selection of the economic actuarial assumptions utilized in a pension plan actuarial valuation.

The last full review of the economic assumption was as of June 30, 2013. Prior to the implementation of the Governmental Accounting Standards Board (GASB) Statements No. 67 and 68, we reviewed and introduced a new stand-alone administrative expenses assumption and used that in the development of employer and member contributions starting with the June 30, 2014 valuation. In this report, we have inserted a new Section III.C for our review of the administrative expenses assumption.

We are recommending changes in the assumptions for investment return and inflation. Our recommendations for the economic actuarial assumptions for the June 30, 2016 Actuarial Valuation are as follows:

Inflation – Future increases in the Consumer Price Index (CPI) which drive investment returns and active member salary increases, as well as COLA increases to retired members.

Recommendation: *Reduce the current inflation assumption from 3.25% per annum to 3.00% per annum.*

Investment Return – The estimated average future rate of return, net of investment expenses, on current and future assets of FCERA as of the valuation date. This rate is used to discount liabilities.

Recommendation: *Reduce the current investment return assumption from 7.25% per annum to 7.00% per annum. We have also developed an alternative assumption that would maintain the current 7.25% per annum investment return assumption should the Board decide to anticipate “alpha” which may be available from active management of the portfolio in the future and use that anticipation of alpha to offset some of the expected investment expenses in the development of the investment return assumption.*

Administrative Expenses – The estimated future expenses for administering the plan. This is used both for funding and for the financial reporting required by the Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68.

Recommendation: *Maintain the current administrative expense assumption at 1.10% of projected payroll.*

Individual Salary Increases – Increases in the salary of a member between the date of the valuation and the date of separation from active service. This assumption has three components:

- Inflationary salary increases,
- Real “across the board” salary increases, and
- Merit and promotional increases.

Recommendation: *Reduce the current inflationary salary increase assumption from 3.25% per annum to 3.00% per annum consistent with our recommended general inflation assumption and maintain the 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% per annum. The review of the merit and promotional increase assumptions is provided as part of our*

triennial experience study of non-economic assumptions, along with the other recommended non-economic assumptions for the June 30, 2016 valuation.

Section II provides some background on basic principles and the methodology used for the review of the economic actuarial assumptions. A detailed discussion of each of the economic assumptions and reasons behind the recommendations is found in Section III.

The cost impact of these recommended assumptions (including the 7.25% alternative investment return assumption) is included in our separate analysis of the “non-economic” assumptions for the June 30, 2016 valuation.

II. BACKGROUND AND METHODOLOGY

For this study, we analyzed “economic” assumptions only. Our analysis of the “non-economic” assumptions for the June 30, 2016 valuation is provided in a separate report. The primary economic assumptions are inflation, expenses, investment return and salary increases.

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 members and drives increases in the allowances of retired members.

Investment Return – Expected long term rate of return on FCERA’s investments after investment expenses. This assumption has a significant impact on contribution rates.

Administrative Expenses – Expenses incurred in administering the plan.

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 members will receive raises above these average increases as they advance in their careers. These are commonly referred to as merit and promotional 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” pay increases that are assumed.

The setting of these assumptions is described in Section III.

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-year and 30-year moving averages of historical inflation rates:

Historical Consumer Price Index – 1930 to 2015

(U.S. City Average - All Urban Consumers)

	<u>25th Percentile</u>	<u>Median</u>	<u>75th Percentile</u>
15-year moving averages	2.5%	3.4%	4.6%
30-year moving averages	3.1%	4.1%	4.9%

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 more recent 15-year averages are lower as they do not include the high inflation years of the mid-1970s and early 1980s.

For 2015, the public fund survey published by the National Association of State Retirement Administrators (NASRA) no longer contains the distribution of the inflation assumptions used by the responding retirement systems included in their survey. But when we reached out to the NASRA staff, we were able to obtain the inflation assumptions used by 76 large public retirement funds in their 2014 valuations and the median inflation assumption is 3.00%. In California, CalPERS and Marin County use an inflation assumption of 2.75% while CalSTRS, LACERA, OCERS and eight other 1937 Act CERL systems use an inflation assumption of 3.00%.

FCERA’s investment consultant, Verus, anticipates an annual inflation rate of 2.00%. 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. The average inflation rate used by a sample of nine investment advisory firms is 2.44%.

To find a forecast of inflation based on a longer time horizon, we referred to the 2015 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 2.70%. We also compared the yields on the thirty-year inflation indexed U. S. Treasury bonds to comparable traditional U. S. Treasury bonds. As of January 2016, the difference in yields is 1.60%, 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, 2016 actuarial valuation.

Retiree Cost-of-Living Increases

In our last review of the economic assumptions as of June 30, 2013, consistent with the 3.25% annual inflation assumption adopted by the Board for that valuation, the Board adopted a 3.00% retiree cost-of-living adjustment for all General and Safety tiers that provide a statutory COLA.

We are recommending that the current retiree cost-of-living assumption (i.e., 3.00% per year) be continued in the June 30, 2016 valuation for those tiers that provide a statutory COLA.

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 banks 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 assumption.
- 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 assumption. Therefore, we continue to recommend setting the COLA assumption 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 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.

Following is FCERA'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 Verus' total or "nominal" 2016 return assumptions by their assumed 2.00% inflation rate. The second column of returns (except for Infrastructure, Hedge Fund, Private Credit 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 rates of return provided to us by Verus and by eight other investment advisory firms retained by Segal's California public sector retirement clients. We believe these averages are a reasonable forecast of long term future market returns.¹

¹ 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 assumptions is shorter than the time horizon we use for the actuarial valuation.

**FCERA’s Target Asset Allocation and Assumed Arithmetic Real Rate of Return
Assumptions by Asset Class and for the Portfolio**

<u>Asset Class</u>	<u>Percentage of Portfolio</u>	<u>Verus’ Assumed Real Rate of Return⁽¹⁾</u>	<u>Average Real Rate of Return from a Sample of Consultants to Segal’s California Public Sector Clients⁽²⁾</u>
Large Cap U.S. Equity	14%	5.00%	5.80%
Small Cap U.S. Equity	3%	5.00%	6.52%
Developed International Equity	12%	8.70%	6.89%
Emerging Markets Equity	7%	11.60%	8.88%
U.S. Core Fixed Income	5%	1.30%	0.76%
High Yield Fixed Income	5%	5.60%	3.55%
Global Bonds	7%	0.90%	0.41%
Bank Loans	5%	2.50%	2.34%
TIPS	4%	0.90%	0.41%
Emerging Market Debt	5%	5.60%	4.52%
Real Estate	5%	3.80%	4.48%
Commodities	3%	3.60%	4.14%
Infrastructure	3%	3.80%	3.80% ⁽³⁾
Hedge Funds	8%	4.40%	4.40% ⁽³⁾
Private Credit	8%	7.70%	7.70% ⁽³⁾
Private Equity	<u>6%</u>	<u>9.00%</u>	<u>9.00%</u> ⁽³⁾
Total Portfolio	100%	5.48%	5.03%

⁽¹⁾ Derived by reducing Verus’ total rate of return assumptions by their assumed 2.00% inflation rate.

⁽²⁾ These are based on the projected arithmetic real returns provided by the investment advisory firms serving the county retirement associations of Fresno, Sonoma, Alameda, Contra Costa, Mendocino, Ventura, the LA City Employees’ Retirement System, the East Bay Municipal Utility District Retirement Plan and the LA Fire & Police Pensions. These return assumptions are gross of any applicable investment expenses.

⁽³⁾ For these asset classes, the Verus’ assumption is applied in lieu of the average because there is a larger disparity in returns for these asset classes among firms surveyed and because using Verus’ assumption should more closely reflect the underlying investments made specifically for FCERA.

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 (ASOP) No. 27, Section 3.8.3.d, which states:

“Investment Manager Performance - Anticipating superior (or inferior) investment manager performance may be unduly optimistic (pessimistic). The actuary should not assume that superior or inferior returns will be achieved, net of investment expenses, from an active

investment management strategy compared to a passive investment management strategy unless the actuary believe, 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 duration of a retirement plan’s liabilities.
2. Using a sample average of expected real rates of return allows FCERA’s investment return assumption to reflect a broader range of capital market information and should help reduce year to year volatility in FCERA’s investment return assumption.
3. Therefore, we recommend that the 5.03% portfolio real rate of return be used to determine FCERA’s investment return assumption. This is 0.20% lower than the return that was used three years ago in the full review to prepare the recommended investment return assumption for the June 30, 2013 valuation. The difference is due to changes in FCERA’s target asset allocation (-0.14%), changes in the real rate of return assumptions provided to us by the investment advisory firms (-0.22%) and the effect of the interaction between those two changes² (0.16%).

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. As noted earlier in this report, FCERA has applied a new stand-alone administrative expenses assumption and used that in the development of employer and member contributions starting with the June 30, 2014 valuation so that payment of those expenses would not result in a reduction in the net income available from investment. (The recommended administrative expenses assumption can be found in Section III.C of this report.)

² This includes the joint effect of the changes in FCERA’s target asset allocation and the changes in the average real rate of return assumptions for each asset category as provided to us by the investment advisory firms.

Investment Expenses

The following table provides the investment expenses in relation to the actuarial value of assets for the five years ending June 30, 2015.

Investment Expenses as a Percentage of Actuarial Value of Assets
(All dollars in 000's)

Fiscal Year Ended	Actuarial Value of Assets ⁽¹⁾	Investment Expenses ⁽²⁾	Investment %
6/30/2011	\$3,151,541	\$14,934	0.47
6/30/2012	3,333,856	14,817	0.44
6/30/2013	3,539,367	15,154	0.43
6/30/2014	3,828,862	15,795	0.41
6/30/2015	4,093,377	16,374	<u>0.40</u>
		Average	0.43

⁽¹⁾ *As of the beginning of the 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.*

The average investment expenses percentage over this five-year period is 0.43% of the actuarial value of assets. Based on this experience, we believe a future expense assumption of 0.45% is reasonable.

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

In our prior studies, we have not taken into account whether some or all of the investment expenses paid to active managers might have been offset by additional returns (“alpha”) earned by that active management. In this study, we have developed one possible measure of “alpha” during the last several years as part of a discussion in a later section entitled “Alternative Investment Return Assumption”. However, at this point in our discussion, we will continue to use the current approach of treating any “alpha” that may be identified as an increase in the risk adjustment and corresponding confidence level in developing the investment return assumption rather than as an offset to any related active management expenses.³

³ As noted earlier, Actuarial Standard of Practice (ASOP) No. 27, Section 3.8.3.d states “Investment Manager Performance - Anticipating superior (or inferior) investment manager performance may be unduly optimistic (pessimistic). The actuary should not assume that superior or inferior returns will be achieved, **net of investment expenses**, from an active investment management strategy compared to a passive investment management strategy unless the actuary believe, based on relevant supporting data, that such superior or inferior returns represent a reasonable expectation over the measurement period.” (emphasis added). We believe this means that assuming only enough superior return to cover related investment expenses would not require the relevant supporting data referenced in ASOP No. 27.

Risk Adjustment

The real rate of return assumption for the portfolio is adjusted to reflect the potential risk of shortfalls in the return assumptions. FCERA'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. The 5.03% 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 51% to 55%.

Three years ago in the last full review of the economic assumptions, the Board adopted an investment return assumption of 7.25%. That return implied a risk adjustment of 0.68%, reflecting a confidence level of 59% that the actual average 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.⁴

Comment: As noted earlier, concurrent with the implementation of GASB 67 and 68, FCERA has included a stand-alone administrative expenses assumption in the development of employer and member contributions starting with the June 30, 2014 valuation so that payment of those expenses would no longer result in a reduction in the net income available from investments. As a result of introducing the stand-alone administrative expenses assumption, there was in effect a further increase in the risk adjustment from 0.68% to 0.80% and in the confidence level from 59% to 61% effective with the June 30, 2014 valuation because the investment assumption was kept unchanged at 7.25% (even though

⁴ Based on an annual portfolio return standard deviation of 10.80% provided by Wurts (i.e., Verus) in 2013. 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.

contributions are collected from the employer and member to defray the administrative expenses so that they do not have to be paid from investment income.)

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 59% confidence level from our last full study for the June 30, 2013 valuation to set this year’s risk adjustment, based on the current long-term portfolio standard deviation of 10.70% provided by Verus, the corresponding risk adjustment would be 0.67%. Together with the other investment return components, this would result in an investment return assumption of 6.91%, which is lower than the current assumption of 7.25%.

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 0.58%, which corresponds to a confidence level of 58%. While this is slightly lower than the confidence level of 59% used in FCERA’s last full study for the June 30, 2013 valuation, we note that the 58% confidence level is still above the confidence levels of 51% to 55% as determined for other public retirement systems in California that use this model to study the investment return assumption.

The table below shows FCERA’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

<u>Year Ending June 30</u>	<u>Investment Return</u>	<u>Risk Adjustment</u>	<u>Corresponding Confidence Level</u>
2006	8.16%	1.25%	66%
2007 - 2009	8.00%	1.16%	65%
2010 - 2012	7.75%	1.05%	64%
2013 (Full Study)	7.25%	0.68%	59%
2014 – 2015 (Interim Study)	7.25% ¹	0.80%	61%
2016 (Recommended)	7.00% ¹	0.58%	58%

¹ *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 FCERA has positioned itself over periods of time.⁵ The use of a 58% confidence level should be considered in context with other factors, including:

1. 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.
2. The confidence level is based on the standard deviation of the portfolio that is determined and provided to us by Verus. 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.
3. A lower level of inflation should reduce the overall risk of failing to meet the investment return assumption. Lowering the confidence level to some extent could be justified as consistent with the change in the inflation assumption.
4. A confidence level of 58% (which is associated with a 7.00% investment return assumption) is still above the general range of 51% to 55% as determined for most of Segal’s other California public retirement system clients under this risk adjustment model.

⁵ 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.”

5. Most public retirement systems that have recently reviewed their investment return assumptions have considered adopting more conservative investment return assumptions for their valuations, mainly to maintain the likelihood that future actual market return will meet or exceed the investment return assumption.
6. 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 7.25% to 7.00%. As noted above, this return implies a 0.58% risk adjustment, reflecting a confidence level of 58% 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 full and interim studies.

Calculation of Net Investment Return Assumption			
<u>Assumption Component</u>	<u>June 30, 2016 Recommended Value</u>	<u>June 30, 2014 Interim Study Adopted Value</u>	<u>June 30, 2013 Full Study Adopted Value</u>
Inflation	3.00%	3.25%	3.25%
Plus Portfolio Real Rate of Return	5.03%	5.23%	5.23%
Minus Expense Adjustment ¹	(0.45%)	(0.43%)	(0.55%)
Minus Risk Adjustment	<u>(0.58%)</u>	<u>(0.80%)</u>	<u>(0.68%)</u>
Total	7.00%	7.25%	7.25%
Confidence Level	58%	61%	59%

¹ The expense adjustment for June 30, 2013 includes both investment and administrative expenses whereas the expense adjustments for June 30, 2014 and 2016 include only investment expenses.

Based on this calculation, we recommend that the investment return assumption be decreased from 7.25% to 7.00% per annum.

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 7.25% is still one of most common investment return assumptions among those California public sector retirement systems. In particular, the 7.25% assumption is used by eight county employees retirement systems (including FCERA's current assumption). However, to our knowledge no other California county employees retirement system has yet adopted a 7.00% investment return assumption.

The following table compares the FCERA recommended net investment return assumptions against those of the nationwide public retirement systems that participated in the NASRA 2015 Public Fund Survey for 125 large public retirement funds in their 2014 valuations:

Assumption	FCERA	NASRA 2015 Public Fund Survey		
		Low	Median	High
Net Investment Return	7.00%	6.50%	7.75%	8.50%

The detailed survey results show that more than one-half of the systems that have an investment return assumption in the range of 6.75% to 7.75%. The survey also notes that several plans have reduced their investment return assumption during the last year, and others are considering doing so. 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% continues to provide for similar risk margin within the risk adjustment model as compared to the last study and is consistent with FCERA's current practice relative to other public systems.

Alternative Investment Return Assumption

The recommended investment return assumption of 7.00% provided above has been developed by reflecting the investment expenses paid for active management without any offsetting “credit” for any “alpha” earned by that active management. As noted earlier, the “net of investment expenses” text in Section 3.8.3.d of ASOP No. 27 would allow the Board to anticipate such “alpha” so as to offset some of the investment expenses that were reflected in developing the investment return assumption. That alternative is developed in this section.

Based on Verus quarterly investment report as of June 30, 2015, below is a table which presents one possible measure of the “alpha” earned by the active management strategy by comparing actual returns to the returns generated by the benchmark (“passive”) portfolio.

Fiscal Year Ended 6/30	Plan Fund Return (Gross of Expenses)	Benchmark Portfolio Return	Historical Alpha (Gross of Expenses)
Prior 1-year	0.1%	-2.1%	2.2%
Prior 3-year avg.	9.8%	8.4%	1.4%
Prior 5-year avg.	10.1%	9.4%	0.7%
Prior 10-year avg.	7.1%	5.7%	1.4%

This measure of historical alpha gross of investment expenses appears to be consistently greater than the historical investment expenses of less than 0.50% that were shown earlier in this report. If this relationship is expected to continue in the long term then, as cited earlier, under ASOP No. 27 that expectation could support some reduction in the future investment expenses component of the investment return assumption.⁶ Accordingly, we have developed for the Board’s consideration an assumption incorporating that expectation, where a future expectation of “alpha” is used to offset a portion of the investment expense component of the investment return assumption. That approach is shown in comparison to our recommended assumption and the comparable values from the last full and interim studies.

⁶ In theory any future expected “alpha” would offset only the investment expenses for active management. While we have not been provided with an allocation of investment expense between active and passive management, we understand that a clear majority of investment expenses are associated with active management.

Calculation of Net Investment Return Assumption

Assumption Component	June 30, 2016 Alternative (Partial offset of Investment Expenses)	June 30, 2016 Recommended Value	June 30, 2014 Interim Study Adopted Value	June 30, 2013 Full Study Adopted Value
Inflation	3.00%	3.00%	3.25%	3.25%
Plus Portfolio Real Rate of Return	5.03%	5.03%	5.23%	5.23%
Minus Expense Adjustment ¹	(0.25%)	(0.45%)	(0.43%)	(0.55%)
Minus Risk Adjustment	<u>(0.53%)</u>	<u>(0.58%)</u>	<u>(0.80%)</u>	<u>(0.68%)</u>
Total	7.25%	7.00%	7.25%	7.25%
Confidence Level	57%	58%	61%	59%

¹ The expense adjustment for June 30, 2013 includes both investment and administrative expenses whereas the expense adjustments for June 30, 2014 and 2016 include only investment expenses.

Based on the above, we are presenting this alternative assumption that would maintain the current 7.25% per annum investment return assumption should the Board decide to anticipate “alpha” which may be available from active management of the portfolio and use that anticipation of alpha to offset some of the expected investment expenses in the development of the investment return assumption.

While we believe this alternative assumption is reasonable under the governing ASOP No. 27, there are some cautionary factors for the Board to consider:

1. Because the expected return is a long term assumption, any anticipated alpha must also be expected to persist in the long term. The Board may want to consult with Verus on that issue.
2. The Board also may want to consult with Verus as to whether the measure of alpha developed above is appropriate for this context.
3. Any anticipation of alpha is by its nature a less conservative assumption, i.e., one with a lower margin for future adverse deviation. All else equal, that will increase the risk of future actuarial losses on investments and associated cost increases.

C. ADMINISTRATIVE EXPENSES

The following table provides the administrative expenses in relation to the projected payrolls for the five years ending June 30, 2015.

Administrative Expenses as a Percentage of Projected Payroll
(All dollars in 000's)

Fiscal Year Ended	Projected Payroll	Administrative and Other Noninvestment Expenses	Administrative Expense as a Percent of Payroll
6/30/2011	\$408,862	\$4,108	1.00%
6/30/2012	398,975	3,598	0.90
6/30/2013	365,596	3,676	1.01
6/30/2014	370,079	3,542	0.96
6/30/2015	373,774	4,297	<u>1.15</u>
		Average	1.00%

The average administrative expenses percentage over this five-year period is 1.00% of projected payroll, with the most recent value higher than this average. Based on this experience, we recommend maintaining the current administrative expense assumption of 1.10% 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, 2016 actuarial valuation, as determined before including the administrative expenses.

D. 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 will require an employer to maintain its members' standards of living.

As discussed earlier in this report, we are recommending that the assumed rate of inflation be reduced from 3.25% per annum 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 sometimes 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 July 2015. 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. The following table compares actual changes in average salaries for FCERA members with actual price inflation as measured by changes in the CPI.

<u>Valuation Date</u>	<u>FCERA Actual Change in Average Salary⁽¹⁾</u>	<u>Actual Change in CPI⁽²⁾</u>
June 30, 2011	0.22%	2.84%
June 30, 2012	-7.19%	2.15%
June 30, 2013	-1.56%	1.48%
June 30, 2014	-0.48%	1.86%
June 30, 2015	<u>2.19%</u>	<u>1.17%</u>
Average	-1.36%	1.90%
Average (excluding June 30, 2012)	0.09%	1.84%

⁽¹⁾ *Reflects the increase in average salary for all members at the beginning of the year compared to the average salary for all members at the end of the year. It does not reflect the average salary increases received by individual members who worked the full year.*

⁽²⁾ *Based on the change in the annual average CPI for the Western Region compared to the prior year.*

The actual average inflation plus “across the board” increase (i.e., wage inflation) over the past five years was about -1.4%. However, note that there was a large reduction in average salary observed as of the June 30, 2012 valuation. If we exclude the experience from the June 30, 2012 valuation, the actual average wage inflation over the four-year period was about 0.1%.

Considering all 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. Individual Merit and Promotional Increases – As the name implies, these increases come from an member’s career advances. This form of pay increase differs from the previous two, since it is specific to the individual. For FCERA, there are service-specific merit and promotional increases. These assumptions have been reviewed as part of our triennial experience study as of June 30, 2015.

Recommended merit and promotional assumptions are provided as part of our triennial experience study of non-economic assumptions for the June 30, 2016 valuation.

All three of these forces are incorporated into a salary increase assumption that is applied in the actuarial valuation to project future benefits and future normal cost contribution collections.

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 is assumed to increase only by inflation and real “across the board” pay increases. The merit and promotional increases are not an influence, because this average pay is not specific to an individual.

For the June 30, 2016 valuation, we recommend that the active member payroll increase assumption be reduced from 3.75% to 3.50% annually, consistent with the combined inflation and “across the board” salary increase assumptions.