

**Mendocino County Employees'  
Retirement Association**

**ACTUARIAL EXPERIENCE STUDY**

**Analysis of Actuarial Experience  
During the Period  
July 1, 2008 through June 30, 2011**

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THE SEGAL COMPANY  
100 Montgomery Street, Suite 500 San Francisco, CA 94104-4308  
T 415.263.8200 F 415.263.8290 www.segalco.com

November 2, 2011

Board of Retirement  
Mendocino County Employees' Retirement Association  
625-B Kings Court  
Ukiah, CA 95482

**Re: Review of Actuarial Assumptions for the June 30, 2011 Actuarial Valuation**

Dear Members of the Board:

We are pleased to submit this report of our review of the actuarial experience of the Mendocino County Employees' Retirement Association. This study utilizes the census data for the three-year period from July 1, 2008 through June 30, 2011 and includes the proposed actuarial assumptions, both demographic and economic, to be used in the June 30, 2011 and later actuarial valuations.

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,

Handwritten signature of Paul Angelo in cursive script.

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

Handwritten signature of Andy Yeung in cursive script.

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Andy Yeung, ASA, MAAA, EA, FCA  
Vice President and Associate 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 the gain or loss for a single year.

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

This study was undertaken in order to review the economic and demographic actuarial assumptions and to compare the actual experience with that expected under the current assumptions during the three year experience period from July 1, 2008 through June 30, 2011. The study was performed in accordance with Actuarial Standard of Practice (ASOP) No. 27, "Selection of Economic Assumptions for Measuring Pension Obligations" and ASOP No. 35, "Selection of Demographic and Other Non-economic Assumptions for Measuring Pension Obligations". These Standards of Practice put forth guidelines for the selection of the various actuarial assumptions utilized in a pension plan actuarial valuation. Based on the study's results and expected near-term experience, we are recommending various changes in the current actuarial assumptions.

We are recommending changes in the assumptions for: inflation, investment return, real "across the board" salary increase, promotional and merit salary increases, retirement from active employment, percentage married at retirement, inactive vested retirement age, pre-retirement mortality, healthy life mortality, disabled life mortality, termination from active employment, reciprocity percentage, disability incidence, and actuarial cost method.

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

**Inflation** – Future increases in the cost-of-living index which drives investment returns and active member salary increases, as well as COLA increases to retired employees.

***Recommendation: Reduce the rate from 4.00% to 3.50%.***

**Investment Return** - The estimated average net rate of return on assets over the projected lifetime of the Association as of the valuation date. This rate is used to discount liabilities.

***Recommendation: Reduce the rate from 8.00% to 7.75%.***

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

- Inflationary salary increases.
- Real across the board salary increases.
- Promotional and merit increases.

***Recommendation: Reduce the current inflationary salary increase assumption from 4.00% to 3.50%, consistent with our recommended general inflation assumption, and introduce a real "across the***

*board” salary increase assumption of 0.50%. This means that the combined inflationary and real “across the board” salary increases will remain unchanged at 4.00%. In addition to the combined inflationary and real “across the board” salary increases of 4.00%, re-introduce promotional and merit increases as developed in Section (III)(C). The net impact of these changes is to project somewhat larger salary increases in the long term.*

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

*Recommendation: For active members, adjust the current retirement rates to those developed in Section (IV)(A). Overall, the recommended assumptions will anticipate earlier retirements for active members. For active and inactive vested members, reduce the percent married at retirement assumption from 90% to 80% for males and maintain the assumption at 50% for females. Maintain the assumption that female spouses are 3 years younger than their male spouses. For inactive vested members, reduce the assumed retirement age from age 62 to age 60 for General members and maintain the assumed retirement age at 55 for Safety and Probation members.*

**Reciprocity** – The probability that a terminated member will continue employment at a reciprocal system.

*Recommendation: Increase the current assumption that 50% of MCERA’s members who terminate employment in the future will continue to work at a reciprocal system to 60%.*

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

*Recommendation: For healthy pensioners and all beneficiaries, change from the current 1994 Group Annuity Mortality Tables for Males and Females, with no setback, to the RP-2000 Combined Healthy Mortality Tables for Males and Females, with a 2-year setback for General males (and all male beneficiaries), a 1-year setback for General females (and all female beneficiaries), no setback for Safety and Probation males, and a 1-year set forward for Safety and Probation females. Use the actual sex of the Safety and Probation members instead of the assumption, as recommended in the last experience study (which was conducted by the prior actuary), that all Safety and Probation members were assumed to be males.*

*For disabled pensioners, change from the current 1981 Disability Mortality Table, for General members set back 5 years for males and 2 years for females, and for Safety members set back 4 years, to the RP-2000 Combined Healthy Mortality Tables for Males and Females, with a 2-year set forward*

*for General members and a 4-year set forward for Safety and Probation members. Use the actual sex of the Safety and Probation members instead of the assumption, as recommended in the last experience study, that all Safety and Probation members were assumed to be males.*

*For pre-retirement mortality, use the same mortality as for healthy pensioners.*

*The recommended mortality assumptions will anticipate longer life expectancy for both pre- and post-retirement.*

*For General member contribution rate purposes, change from the current 1994 Group Annuity Mortality Tables for Males, with a 3-year setback, to the RP-2000 Combined Healthy Mortality Tables for Males and Females, with a 2-year setback for males and a 1-year setback for females, weighted 30% male and 70% female.*

*For Safety and Probation member contribution rate purposes, change from the current 1994 Group Annuity Mortality Tables for Males, with no setback, to the RP-2000 Combined Healthy Mortality Tables for Males and Females, with no setback for males and a 1-year set forward for females, weighted 80% male and 20% female.*

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

*Recommendation: Adjust the current termination rates to those developed in Section (IV)(D). Adjust from an age-based to a service-based assumption for members with less than five years of service. The recommended assumptions will anticipate more terminations mainly for members with less than five years of service.*

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

*Recommendation: Adjust the current disability rates to those developed in Section (IV)(E). The recommended assumptions will anticipate fewer disability retirements.*

**Actuarial Cost Method** – Procedure used to allocate the cost of the plan among different plan years.

*Recommendation: Continue to use the Entry Age Normal Actuarial Cost Method, but consider calculating the annual Normal Cost on an individual basis instead of on an aggregate basis as described in Section (IV)(F).*

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

## II. BACKGROUND AND METHODOLOGY

In this report, we analyzed both economic and demographic (“non-economic”) assumptions. The primary economic assumptions reviewed are inflation, investment return, and salary increases. Demographic assumptions include the probabilities of certain events occurring in the population of members, referred to as “decrements,” e.g., termination from service, disability retirement, service retirement, and death after retirement.

### *Economic Assumptions*

Economic assumptions consist of:

*Inflation* – Increases in the price of goods and services. The inflation assumption reflects the basic return that investors expect from securities markets. It also reflects the expected basic salary increase for active employees and drives increases in the allowances of retired members.

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

*Salary Increases* – In addition to inflationary increases, it is assumed that salaries will also grow by any “across the board” real pay increases in excess of price inflation. It is also assumed that employees will receive raises above these average increases as they advance in their careers. These are commonly referred to as promotional and merit increases. Payments to amortize any Unfunded Actuarial Accrued Liability (UAAL) are assumed to increase each year by the inflation rate plus any “across the board” pay increases that are assumed.

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

### *Demographic Assumptions*

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

The reliability of the resulting probability is highly dependent on both the number of decrements and the number of exposures. For example, if there are only a few people in a high age category at the beginning of the year (number of exposures), we would not lend as much 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. 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 2010  
(U.S. City Average - All Urban Consumers)**

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	<u>25<sup>th</sup> Percentile</u>	<u>Median</u>	<u>75<sup>th</sup> Percentile</u>
15-year moving averages	2.7%	3.5%	4.8%
30-year moving averages	3.3%	4.2%	5.0%

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

In the 2010 public fund survey published by the National Association of State Retirement Administrators, the median inflation assumption used by 125 large public retirement funds in their 2009 valuations has remained unchanged from the 3.50% used in the 2008 valuations.

MCERA’s investment consultant, Callan, anticipates an annual inflation rate of 2.50%, while the average inflation assumption provided to us by Callan and by eight other investment advisory firms retained by Segal’s California public sector clients was 2.61%. Note that in general, the investment consultants’ time horizon for this assumption is shorter than the time horizon we use for the actuarial valuation.

To find a forecast of inflation based on a longer time horizon, we referred to the 2010 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 2.8%. We also compared the yields on the thirty-year inflation indexed U.S. Treasury bonds to comparable traditional U.S. Treasury bonds. As of April 2011, the difference in yields is about 2.75%, which provides a measure of market expectations of inflation.

**Based on all of the above information, we recommend that the current 4.00% annual inflation assumption be lowered to 3.50% for the June 30, 2011 valuation.**

#### *Retiree Cost-of-Living Increases*

In the last valuation as of June 30, 2010, consistent with the 3.00% maximum cost-of-living benefit provision adopted by the employer, the Board adopted a 3.00% retiree cost-of-living adjustment for all retirees.

**We are recommending that the same 3.00% cost-of-living assumption be used in the June 30, 2011 valuation.**

## **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 system's portfolio will vary with the Board's asset allocation among asset classes.

The next page shows the Association's current target asset allocation and assumed real rate of return assumptions by asset class. The column of returns represents the average of a sample of real rate of return expectations. The sample includes the expected annual real rate of returns provided to us by Callan and by eight other investment advisory firms retained by Segal's California public clients. We believe these averages reflect a reasonable consensus forecast of long-term future real market returns.

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

<b>Asset Class</b>	<b>Percentage of Portfolio</b>	<b>Average Real Rate of Return from a Sample of Consultants to Segal’s Public Clients*</b>
Domestic Equity	38%	6.40%
Developed International Equity	25%	6.68%
Core Bonds	28%	1.11%
Real Estate	<u>9%</u>	<u>5.11%</u>
Total	100%	4.87%

\* Including the County retirement systems of Mendocino, Alameda, Contra Costa, Imperial, San Bernardino and San Diego, and City retirement systems of Los Angeles City Employees’ Retirement System, Los Angeles Fire and Police Pensions, and Los Angeles Department of Water and Power.

Please note that the above are representative of “indexed” returns and do not include any additional returns (“alpha”) from active management. This is consistent with the Actuarial Standard of Practice No. 27, Section 3.6.3.e, which states:

“Investment Manager Performance - Anticipating superior (or inferior) investment manager performance may be unduly optimistic (pessimistic). Few investment managers consistently achieve significant above-market returns net of expenses over long periods.”

The following are some observations about the returns provided above:

1. The investment consultants to our California public 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 an average of expected real rate of returns allows the Association’s investment return assumption to include a broader range of capital market information and it should help reduce year-to-year volatility in the Association’s investment return assumption.
3. Therefore, we recommend that the 4.87% average real rate of return be used to determine the Association’s investment return assumption. In general, we have observed reductions in the

average real rates of return provided by the investment consultants for certain asset classes, reflecting a less optimistic outlook for those asset classes. This is especially the case for the bond component of the portfolio.

***Association Expenses***

The real rate of return assumption for the portfolio needs to be adjusted for administrative and investment expenses to be paid from investment income.

The following table provides the available history of these expenses in relation to the market value of assets.

**Administrative and Investment Expenses as a Percentage of Market Value of Assets**

<b>Year Ending June 30</b>	<b>Market Value of Assets at Beginning of Plan Year</b>	<b>Total Administrative and Investment Expenses</b>	<b>Total %</b>
2007	\$307,330,102	\$753,265	0.25%
2008	354,172,127	732,841	0.21%
2009	331,352,717	1,038,485	0.31%
2010	272,040,910	1,240,359	<u>0.46%</u>
Average			0.31%

Based on this experience, we recommend that the Association’s future expense assumption be set at 0.30%.

***Risk Adjustment***

The real rate of return assumption for the portfolio is adjusted to reflect the potential risk of shortfalls in the return assumptions. The Association’s asset allocation also 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 4.87% 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. This is consistent with our experience that retirement plan fiduciaries would generally prefer that returns exceed the assumed rate more often than not.

In our model, the confidence level associated with a particular risk adjustment is determined so as to represent 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 we would expect 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 Board previously adopted an investment return assumption of 8.00% together with an inflation assumption of 4.00%. If the 8.00% assumption is considered in combination with the updated inflation, real return, and expense components as recommended above for this year's valuation, that return implies a risk adjustment of 0.07% reflecting a confidence level of 51% that the actual return over 15 years would not fall below the assumed return, assuming that the distribution of returns over that period follows the normal statistical distribution<sup>1</sup>.

This means that the current 8.00% assumption would provide a relatively low confidence level under the risk adjusted model used by Segal in evaluating this assumption for our Californian public retirement system clients. Based on this model and confidence levels chosen by the retirement systems, as well as considerations discussed in the following sections, we would recommend an investment return assumption of 7.75%, which corresponds to a risk adjustment of 0.32% and a confidence level of 54%.

The table below shows MCERA's investment return assumptions, the risk adjustments, and the corresponding confidence levels. Note that for informational purposes, we have also provided the confidence level for a 7.50% assumption.

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<sup>1</sup> Based on an annual portfolio standard deviation of 12.83% provided by Callan for this study. Strictly speaking, future compound 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.

### Investment Return Assumptions, Risk Adjustments and Confidence Levels

<u>Investment Return</u>	<u>Risk Adjustment</u>	<u>Corresponding Confidence Level</u>
8.00%	0.07%	51%
7.75%	0.32%	54%
7.50%	0.57%	57%

We note that the risk adjustment model and associated confidence level is most useful as a means for comparing how the Association has positioned itself over periods of time<sup>2</sup> or how the Association compared with other similarly situated systems that have been measured using this risk adjustment model by Segal. The use of a 54% 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. Note that Segal's other California public retirement system clients have risk adjustments corresponding to confidence levels in the range of 55% to 65%. As you can see from the previous table, the investment return assumption has to be reduced to 7.50% so that the confidence level would fall within this range.
2. The confidence level is based on the standard deviation of the portfolio that is determined and provided to us by Callan. 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. As with any model, the results of the risk adjustment model should be evaluated for reasonableness and consistency. This is discussed in the following "Test of Risk Adjustment" section, which includes a discussion of the relationship between the inflation assumption and the risk adjustment, as well as in the subsequent section which provides a comparison with assumptions adopted by similarly situated public sector retirement systems.

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<sup>2</sup> In particular, it would not be appropriate to use this type of risk adjustment as a measure of determining an investment return rate that is "risk-free."

### ***Recommended Investment Return Assumption***

The following table provides the calculated net investment return assumption that results from the previous discussion.

<b><u>Assumption Component</u></b>	<b><u>June 30, 2011 Recommended Value</u></b>
Inflation	3.50%
Plus Average Real Rate of Return	4.87%
Minus Expense Adjustment	(0.30)%
Minus Risk Adjustment	<u>(0.32)%</u>
Total	7.75%

**Based this analysis, we recommend that the net investment return assumption be reduced from 8.00% to 7.75%.**

### ***Test of Risk Adjustment***

The original development of the risk adjustment component of our investment earnings assumption model arose from our experience with many retirement boards over many years. We consistently observed that combining the boards' inflation assumption with the real return and expense components (i.e., using no risk adjustment) produced – and produces – a substantially higher assumed return than what the boards actually adopt, regardless of the consulting actuary or the methods involved in the process. This led to the development of a risk adjustment component for our model.

There is a range of risk adjustment methodologies that may be incorporated in the development of an earnings assumption. Ideally, the particular risk adjustment selected should reflect the “downside” risk tolerance of the boards making the decision. This is similar to volatility risk that boards consider when selecting an appropriate asset allocation.

In addition to the generally risk adverse attitude of retirement boards noted above, we believe another reason for the use of a risk adjustment is to control the risk of overstating the effect of the inflation assumption on the assumed investment return. As noted earlier, the inflation assumption for actuarial valuations is generally longer term than that used by investment consultants. For many years, that has led to higher actuarial valuation inflation assumptions. A higher inflation assumption has a conservative effect - higher current cost - on the wage increase and COLA

assumption, but is less conservative as part of the investment earnings assumption. In effect, the risk adjustment compensates for this by offsetting the effect of the higher inflation assumption on assumed investment earnings.

One way to test the reasonableness of the risk adjustment incorporated in our recommendation is to compare our recommended risk adjusted investment return (i.e., 7.75%) against the expected net investment return that would result from using the average of all the capital market assumptions -- including the lower inflation assumption -- of the investment consultants in our sample.

The following table shows that comparison. This table shows how the difference between our recommended return and that derived using the average of all the capital market assumptions of the investment consultants in our sample can be attributed to the relationship between the two different inflation assumptions and the risk adjustment.

<u>Assumption Element</u>	<u>Risk Adjusted Method</u>	<u>Average of Investment Consultant Sample</u>	<u>Difference</u>
Inflation	3.50%	2.61%	0.89%
Risk Adjustment	(0.32)%	0.00%	(0.32)%
Real Rate of Return	4.87%	4.87%	0.00%
Expenses	<u>(0.30)%</u>	<u>(0.30)%</u>	<u>0.00%</u>
Total	7.75%	7.18%	+0.57%

The 0.57% (57 basis points) difference between the two calculations represents about a 7% lower confidence level under the higher inflation, risk adjusted method, as compared to the lower inflation result without the risk adjustment.

### ***Comparing with Other Public Retirement Systems***

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

We note that an investment return assumption of 7.75% is within the most common range for this assumption among most California public sector retirement systems. That range, with few exceptions, is from 7.75% to 8.00%. In particular two of the largest California systems, CalPERS and LACERA<sup>3</sup>, use a 7.75% earnings assumption. Note that compared to MCERA, CalPERS used

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<sup>3</sup> It is our understanding that LACERA has recently adopted a 7.50% assumption, but phased-in over a period of 3 years.

a lower inflation rate of 3.00% while LACERA uses a comparable inflation assumption of 3.50% that we are recommending for the June 30, 2011 valuation. Also note that the asset allocation at CalPERS and LACERA may not be comparable to MCERA.

The following table compares the Association’s recommended net investment return assumption against those of the nationwide public retirement systems that participated in the National Association of State Retirement Administrators (NASRA) 2010 Public Fund Survey:

<u>Assumption</u>	<u>MCERA</u>	<u>NASRA 2010 Public Fund Survey</u>		
		<u>Low*</u>	<u>Median</u>	<u>High*</u>
Net Investment Return	7.75%	7.25%	8.00%	8.50%

*\* After eliminating very lowest and highest as outliers.*

As you can see, the recommended return assumption of 7.75% is somewhere between the low and the median. The detailed survey results show 58 systems at 8.00%, 33 at 7.50% or 7.75%, and 31 at 8.25% or 8.50%. The survey also notes that several plans have reduced their investment return assumption during the last year, and others are considering doing so. Here again, the MCERA asset allocation may not be comparable to that used by these other systems.

In summary, we believe that both the risk adjustment model and other considerations indicate a lower earnings assumption. The recommended investment earnings assumption of 7.75% continues to provide for some risk margin within the risk adjustment model and is consistent with the Association’s current practice relative to other public systems.

**C. SALARY INCREASE**

Salary increases impact plan costs in two ways: (i) by increasing members’ benefits (since benefits are a function of the members’ highest average pay) and future normal cost collections; and (ii) by increasing total active member payroll which in turn generates higher UAAL amortization payments (or greater rate credit demands if the UAAL is negative). 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. Price 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 employees’ standards of living.

**As discussed earlier in this report, we are recommending a reduction in the inflation rate from 4.00% to 3.50%. This inflation component will be used as part of the salary increase assumption.**

2. Real “Across the Board” Pay Increases – These increases are typically termed productivity increases since they are considered to be derived from an organization’s ability to produce goods and services in a more efficient manner. As that occurs, 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 0.7% - 1.0% annually during the last 10 - 20 years.

We also referred to the annual report on the financial status of the Social Security program published in August 2010. In that report, real “across the board” pay increases are forecast to be 1.2% per year under immediate assumptions.

Like price inflation, the real pay increase assumption is generally considered a more “macroeconomic” assumption, that is not necessarily based on individual plan experience. However, we note that the most recent salary increase experience indicates that actual average salary increases were higher than the actual change in CPI for the 4-year period:

<u>Valuation Date</u>	<u>Actual Average Increase<sup>(1)</sup></u>	<u>Actual Change in CPI<sup>(2)</sup></u>
June 30, 2008	6.42%	3.84%
June 30, 2009	4.96%	0.02%
June 30, 2010	4.29%	2.61%
June 30, 2011	<u>(1.76)%</u>	<u>1.52%</u>
Average	3.48%	2.00%

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

<sup>(2)</sup> Based on the change in the December CPI for the San Francisco-Oakland-San Jose Area compared to the prior year.

**We recommend that a real “across the board” salary increase assumption of 0.50% be introduced for the June 30, 2011 valuation.**

3. Promotional and Merit Increases – As the name implies, these increases come from an employee’s career advances. This form of pay increase differs from the previous two, since it is specific to the individual. The assumption is typically structured as a function of an employee’s age and/or service, and it is derived from employee-specific information as part of the triennial experience study. The promotional and merit increases are determined by measuring the actual salary increases by employees, net of inflationary and across the board components.

For the June 30, 2009 valuation, the Association’s prior actuary utilized the following age-based promotional and merit increase assumptions:

<b>Promotional and Merit Increase Assumptions Used in the June 30, 2009 Valuation</b>		
<u>Ages</u>	<u>General Members</u>	<u>Safety and Probation Members</u>
20-24	4.26%	2.73%
25-29	2.99%	1.92%
30-34	2.25%	1.30%
35-39	0.47%	0.45%
40-44	0.46%	0.55%
45-49	0.45%	0.53%
50-54	0.55%	0.52%
55-59	0.53%	0.51%
60-64	0.52%	-
65-69	0.51%	-

These promotional and merit increase assumptions were removed by the Association’s prior actuary in the June 30, 2010 valuation. As we have previously discussed with the Board, MCERA’s lack of promotional and merit increase assumptions in the June 30, 2010 valuation is unique among the 1937 Act Counties to which we provide actuarial services, and even among other County Systems not served by Segal.

We have compiled some information regarding the current salary increase assumptions adopted by the surrounding 1937 Act Counties to MCERA, in order to provide a base for developing MCERA's promotional and merit increase assumptions. It should be noted that based on our recent experience with similar public retirement systems to MCERA, promotional and merit increases are generally correlated more closely with service than with age. The current service-based promotional and merit increase assumptions adopted by the 1937 Act Counties surrounding MCERA are as follows:

**Promotional and Merit Increase Assumptions - General Members**

Years of Service	County Retirement System					Average
	Alameda	Contra Costa	Marin	San Mateo	Sonoma	
0-1	3.20%	9.00%	5.00%	6.00%	6.00%	5.84%
1-2	3.20%	6.00%	4.00%	4.00%	5.00%	4.44%
2-3	2.90%	4.75%	3.00%	3.00%	4.00%	3.53%
3-4	2.10%	3.25%	2.00%	2.50%	3.00%	2.57%
4-5	2.00%	2.25%	1.00%	2.00%	2.00%	1.85%
5+	1.70% - 0.60%	1.50% - 0.75%	0.50%	1.75% - 0.50%	0.50%	1.19% - 0.57%

**Promotional and Merit Increase Assumptions - Safety Members**

Years of Service	County Retirement System					Average
	Alameda	Contra Costa	Marin	San Mateo	Sonoma	
0-1	6.20%	9.50%	8.00%	6.00%	8.00%	7.54%
1-2	6.20%	6.25%	3.00%	4.00%	4.75%	4.84%
2-3	5.40%	5.25%	1.50%	3.00%	3.75%	3.78%
3-4	3.60%	4.00%	1.00%	2.50%	2.75%	2.77%
4-5	3.00%	2.00%	0.75%	2.00%	1.75%	1.90%
5+	2.70% - 0.70%	0.75%	0.75%	1.75% - 0.50%	0.75%	1.34% - 0.69%

Note that the promotional and merit increase assumptions for the County Retirement Systems shown above exclude the following wage inflation assumptions:

**Wage Inflation Assumptions**

<b>County Retirement System</b>					
<b>Alameda</b>	<b>Contra Costa</b>	<b>Marin</b>	<b>San Mateo*</b>	<b>Sonoma</b>	<b>Average</b>
4.00%	4.25%	3.50%	4.00%	4.25%	4.00%

*\* Salary components are compounded, rather than additive.*

Based on the experience at MCERA over the three-year experience study period from July 1, 2008 through June 30, 2011, we have observed the following actual promotional and merit increases. Note that the actual average promotional and merit increases were determined by netting the actual average total salary increases by the average inflation plus real across the board increases for MCERA (which, estimated using the change in average salary, were about 2.69% for General members and 1.38% for Safety and Probation members), over the three-year period ending June 30, 2011. Of note is that there were actual salary reductions from 2010/2011 that were included in this average.

**Actual Promotional and Merit Increases for MCERA  
for the Period July 1, 2008 through June 30, 2011**

<u>Years of Service</u>	<u>General Members</u>	<u>Safety and Probation Members</u>
0-1	4.82%	2.64%
1-2	3.16%	2.51%
2-3	3.48%	2.10%
3-4	3.07%	1.75%
4-5	2.86%	(0.25)%
5+	(0.03)%	0.05%

These results indicate that members with five or more years of service have received virtually little or no salary increases on average due to career advances, over the most recent 3-year period. As the promotional and merit increase assumptions should be developed with the long-term in mind, we have partially utilized the recent experience for the Counties surrounding MCERA to develop the promotional and merit increase assumptions for MCERA. In addition,

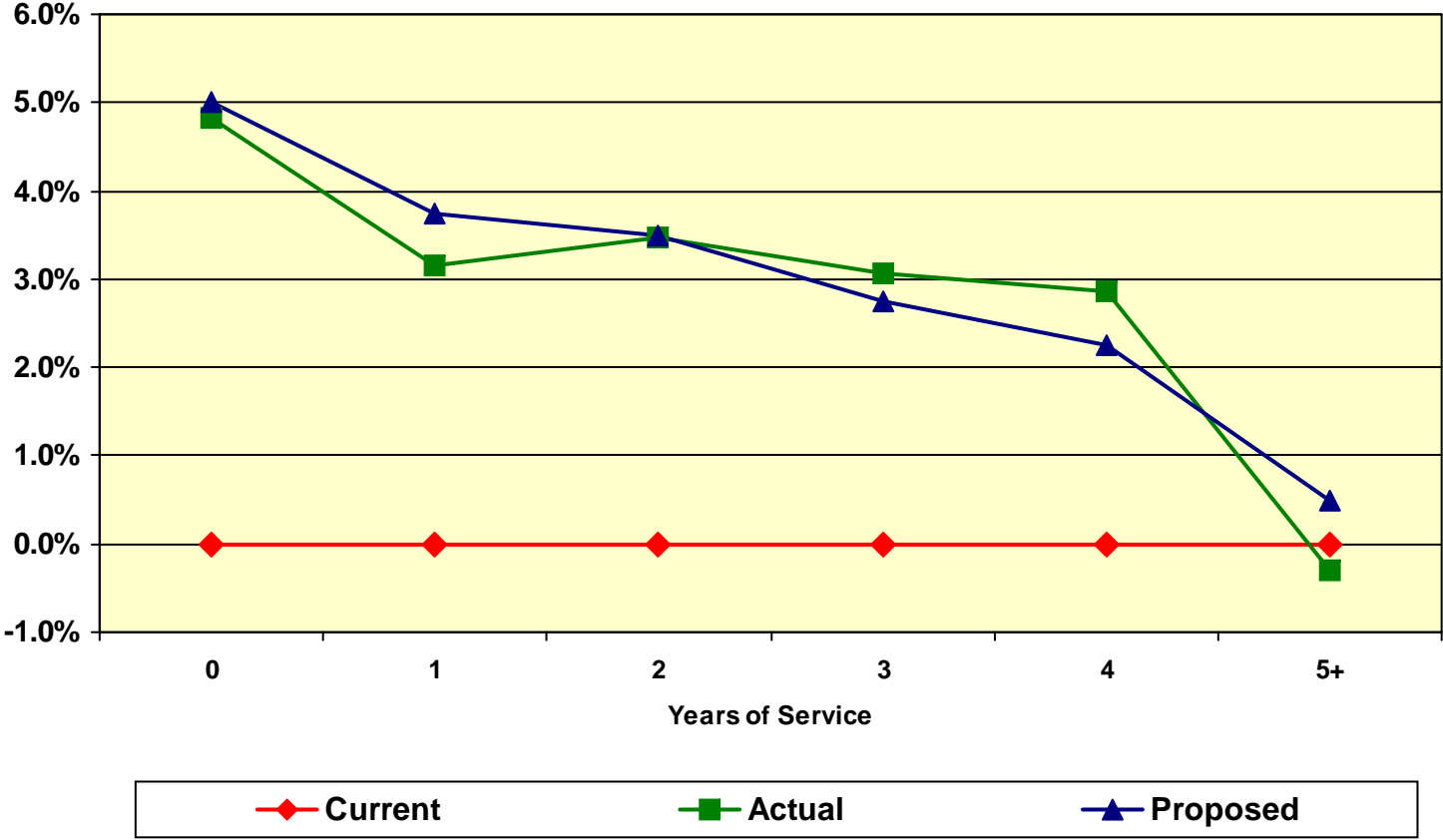
we have factored in the assumptions used by the Association’s prior actuary for the June 30, 2009 valuation in the development of our recommended assumptions (the prior actuary’s assumptions were developed as part of their July 1, 2005 – June 30, 2008 experience study, based on MCERA’s observed experience over that period).

Based on all of the information provided above, we have developed the following proposed promotional and merit increase assumptions for MCERA:

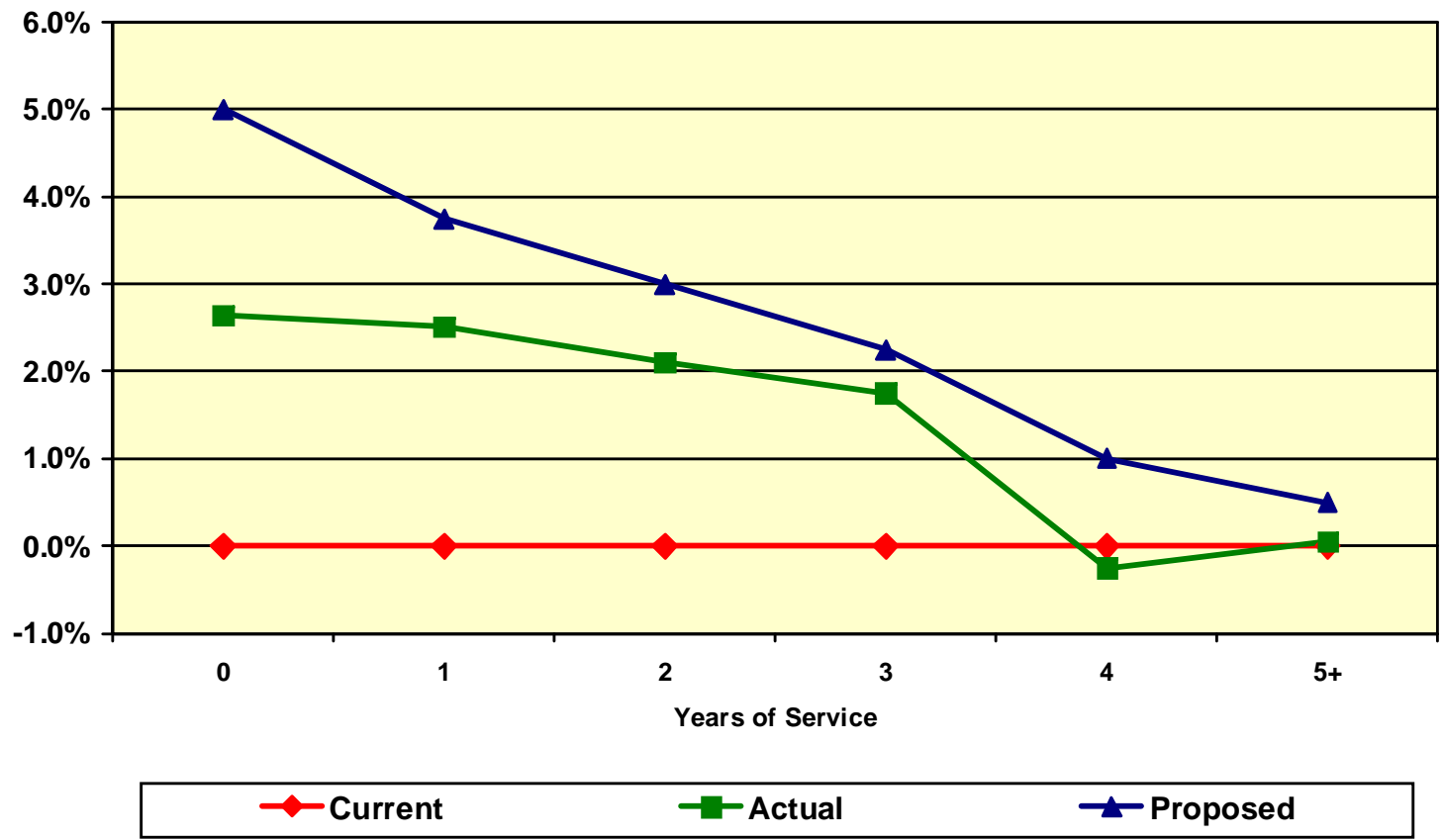
<b>Proposed Promotional and Merit Increases</b>		
<b><u>Years of Service</u></b>	<b><u>General Members</u></b>	<b><u>Safety and Probation Members</u></b>
0-1	5.00%	5.00%
1-2	3.75%	3.75%
2-3	3.50%	3.00%
3-4	2.75%	2.25%
4-5	2.25%	1.00%
5+	0.50%	0.50%

Charts 1 and 2 provide a graphical comparison of the actual promotional and merit increases, compared to current and proposed assumptions. Chart 1 shows this information for General members and Chart 2 shows this information for Safety and Probation members.

**Chart 1**  
**Promotional and Merit Salary Increase Rates**  
**General Members**



**Chart 2**  
**Promotional and Merit Salary Increase Rates**  
**Safety and Probation Members**



*Active Member Payroll*

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

**We recommend that an annual active member payroll increase assumption of 4.00% be used in the June 30, 2011 valuation, consistent with the combined 3.50% inflation assumption and the 0.50% across the board salary increase assumption.**

#### IV. DEMOGRAPHIC ASSUMPTIONS

##### A. RETIREMENT RATES

The age at which a member retires 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.

Currently, there are separate retirement rates for General male, General female, Safety, and Probation members. We have combined the General male and female rates and have adjusted them to more closely reflect recent actual experience, reflecting earlier retirements. Safety rates before age 55 and Probation rates on and after age 55 have been increased to reflect earlier retirements, since actual retirements before age 60 were more than expected over the experience study period.

The service (non-disability) retirement experience for the active participants over the past three years (from July 1, 2008 to June 30, 2011) is provided below.

The rates of actual General retirements compared to both the rates expected for the last three years and the proposed rates are as follows:

##### Actual and Expected Rates of Retirement for General Members

##### Rate (%)

Age	Actual Retirements	Current Expected Retirements <sup>(1)</sup>	Proposed Expected Retirements
50	5.66	3.00	5.00
51	7.41	3.00	5.00
52	7.27	3.00	5.00
53	6.00	3.00	5.00
54	7.02	3.00	5.00
55	5.08	4.93	7.00
56	7.69	3.97	7.00
57	10.81	3.89	7.00
58	4.23	6.00	7.00
59	14.93	6.56	7.00
60	9.68	6.60	10.00
61	21.31	9.91	15.00
62	30.77	13.77	20.00
63	15.79	6.81	15.00
64	26.67	8.19	15.00
65	50.00	25.55	38.00
66	57.14	30.00	38.00

**Actual and Expected Rates of Retirement for General Members - continued**

**Rate (%)**

<b>Age</b>	<b>Actual Retirements</b>	<b>Current Expected Retirements<sup>(1)</sup></b>	<b>Proposed Expected Retirements</b>
67	16.67	30.31	38.00
68	44.44	45.00	38.00
69	33.33	43.54	38.00
70 and over	11.11	100.00	100.00

<sup>(1)</sup> The current assumption is a sex-distinct assumption. The results provided above are calculated by taking the weighted average of the separate sex-distinct assumptions for members within each of the specified age categories. For a table of the current sex-distinct assumptions, see Appendix A.

The rates of actual Safety retirements compared to both the rates expected for the last three years and the proposed rates are as follows:

**Actual and Expected Rates of Retirement for Safety Members**

**Rate (%)**

<b>Age</b>	<b>Actual Retirements</b>	<b>Current Expected Retirements</b>	<b>Proposed Expected Retirements</b>
50	2.70	0.59 <sup>(1)</sup>	5.00
51	0.00	2.30	5.00
52	0.00	2.30	5.00
53	14.29	4.60	5.00
54	60.00	5.18	5.00
55	0.00	6.31	6.31
56	0.00	7.50	7.50
57	0.00	10.00	10.00
58	0.00	12.50	12.50
59	0.00	37.50	37.50
60 and over	30.00	100.00	100.00

<sup>(1)</sup> The current assumptions start at age 45. The results provided above are calculated by taking the weighted average of the separate age-based assumptions for members between ages 45-50. For a table of the current assumptions starting at age 45, see Appendix A.

The rates of actual Probation retirements compared to both the rates expected for the last three years and the proposed rates are as follows:

**Actual and Expected Rates of Retirement for Probation Members**

**Rate (%)**

<b>Age</b>	<b>Actual Retirements</b>	<b>Current Expected Retirements</b>	<b>Proposed Expected Retirements</b>
50	25.00	4.00	5.00
51	0.00	4.00	5.00
52	0.00	4.00	5.00
53	0.00	8.00	5.00
54	0.00	9.00	5.00
55	50.00	12.50	28.00
56	100.00	3.75	28.00
57	50.00	5.00	28.00
58	0.00	6.25	28.00
59	0.00	9.38	28.00
60 and over	25.00	100.00	100.00

Chart 3 compares actual experience with the current and proposed rates of retirement for General members. Chart 4 displays the same data for Safety members, and Chart 5 for Probation members.

In prior valuations, inactive vested members were assumed to retire at age 62 for General members and age 55 for Safety and Probation members. The average age at retirement over the prior three years was about 59 for General members and about age 56 for Safety and Probation members combined. We recommend lowering the assumed retirement age for General inactive vested participants to age 60 and maintaining the assumed retirement age for Safety and Probation inactive vested participants at age 55.

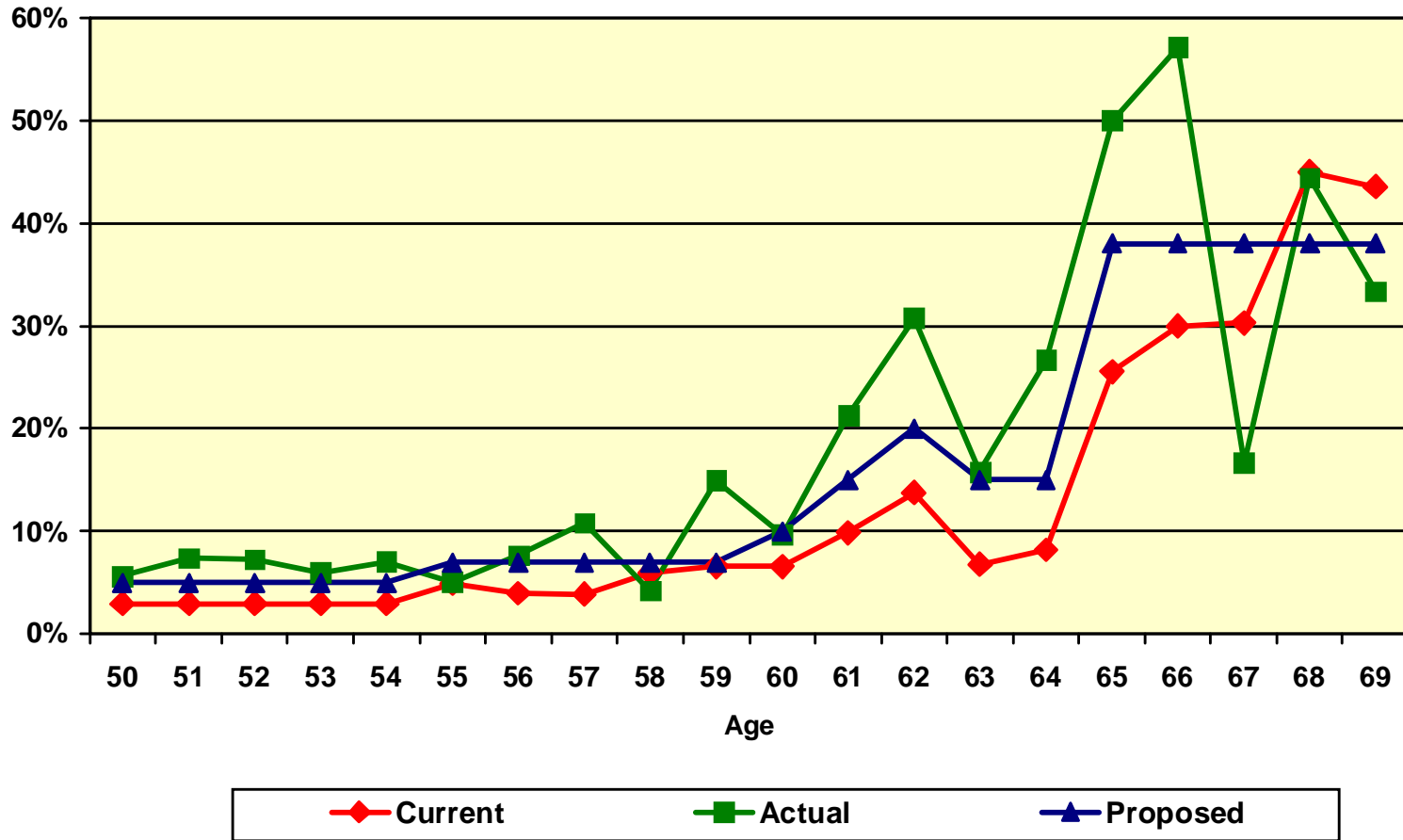
Currently, 50% of members who terminate and are entitled to deferred vested benefits are assumed to establish reciprocity with another employer upon termination. As of June 30, 2011, the proportion of inactive vested members entitled to future benefits who are working for a reciprocal employer was observed to be about 61%. Based on this experience, we recommend increasing the reciprocity assumption from 50% to 60% for the June 30, 2011 valuation.

In prior retirement plan valuations, it was assumed that 90% of all active and inactive vested male members and 50% of all active and inactive vested female members would be married or have a

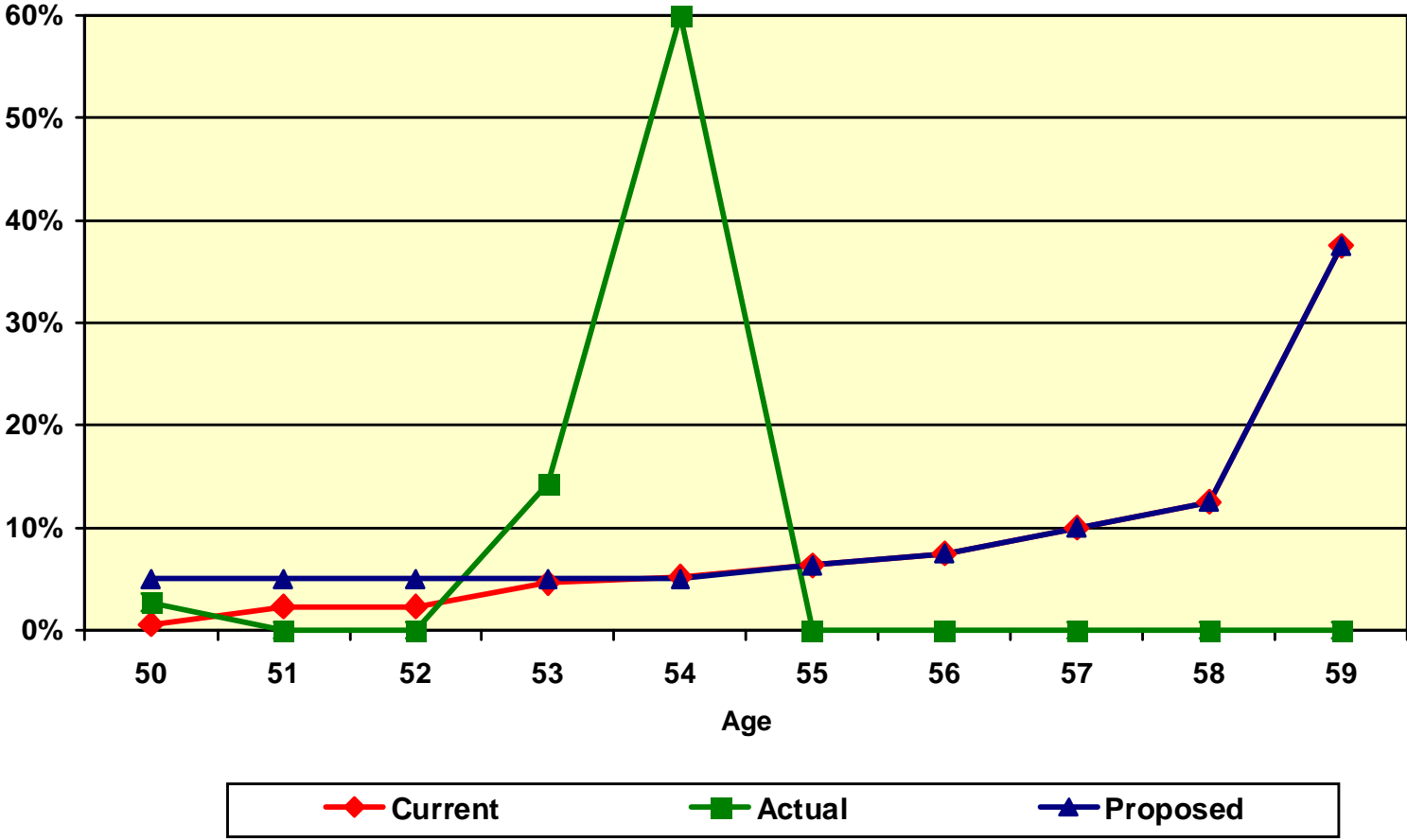
domestic partner eligible for the 60% automatic retirement continuance benefit when they retired. According to the experience of members who retired during the last three years, about 67% of all male members and 49% of all female members were married at retirement. We recommend lowering the marriage assumption to 80% for male members and maintaining the current marriage assumption for females at 50%.

Based on observed experience for members who retired during the last three years, we also recommend maintaining the assumption that female spouses are three years younger than their male spouses. Spouses are assumed to be of the opposite sex to the member.

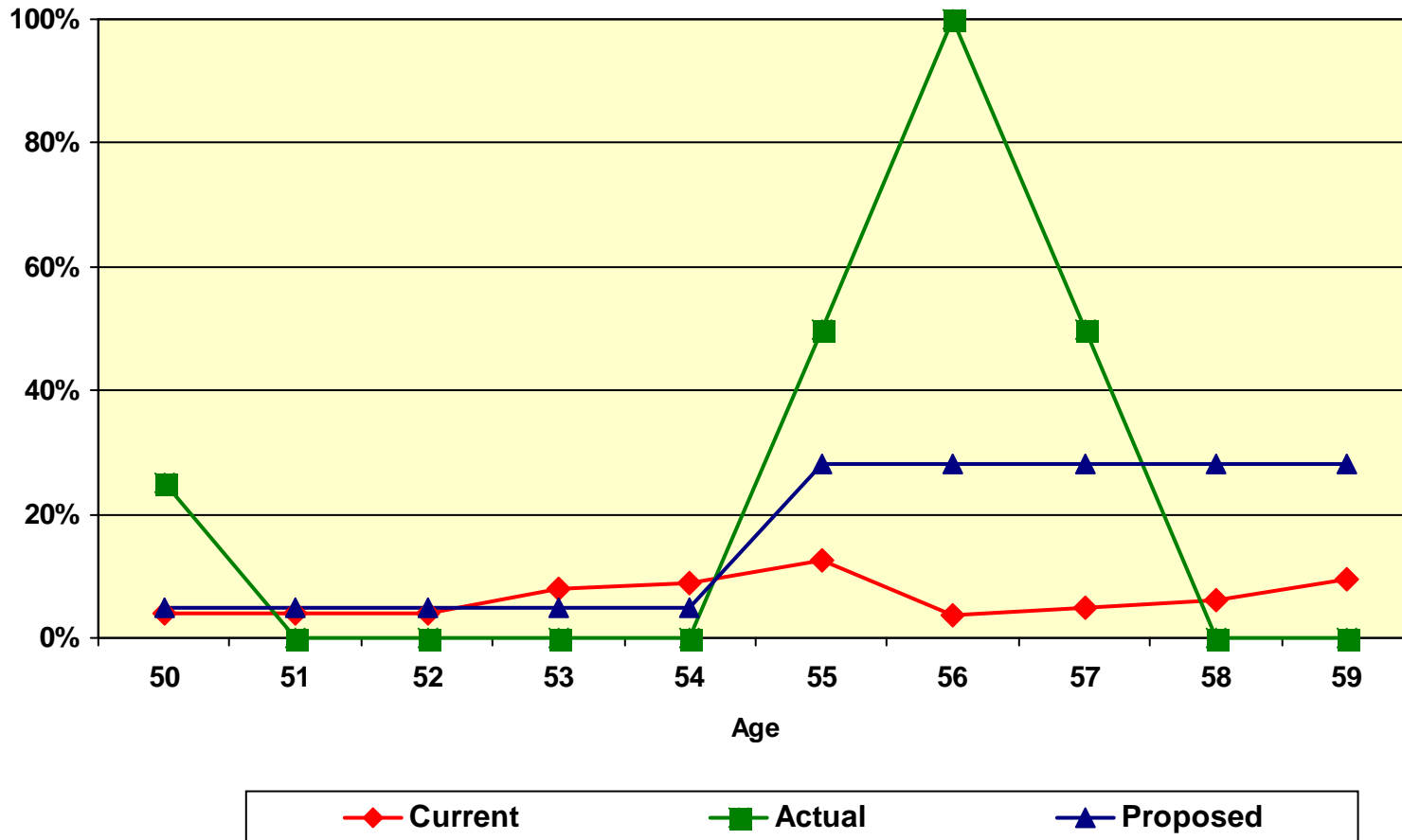
Chart 3  
Retirement Rates - General Members



**Chart 4**  
**Retirement Rates - Safety Members**



**Chart 5**  
**Retirement Rates - Probation Members**



## B. MORTALITY RATES - HEALTHY

The “healthy” mortality rates project what proportion of members will die before retirement as well as the life expectancy of a member who retires for service (i.e., who did not retire on a disability pension). For all groups, the tables currently being used for post-service retirement mortality rates are the 1994 Group Annuity Mortality Tables for Males and Females, each without a setback. For Safety and Probation, all members are currently assumed to be males, so only the male mortality table applies for these members.

For retirees, we are recommending a change to the RP-2000 Combined Healthy Mortality Tables for Males and Females, set back 2 years for General males, set back 1 year for General females, with no setback for Safety and Probation males, and set forward 1 year for Safety and Probation females. As noted, we no longer assume that all Safety and Probation members are males.

For all beneficiaries, we are recommending the use of the same tables as recommended above for General members. Specifically, these tables are the RP-2000 Combined Healthy Mortality Tables for Males (set back 2 years) and Females (set back 1 year).

### Post-service Retirement Mortality

Among healthy service retired members and all beneficiaries, the actual deaths compared to the expected deaths under the current and proposed assumptions for the last three years are as follows:

Year Ending June 30,	Healthy General Pensioners and All Beneficiaries			Healthy Safety & Probation Pensioners Only		
	Actual Deaths	Current Expected Deaths	Proposed Expected Deaths	Actual Deaths	Current Expected Deaths	Proposed Expected Deaths
2009	29	23	22	2	1	1
2010	20	24	23	1	1	1
2011	<u>27</u>	<u>25</u>	<u>23</u>	<u>2</u>	<u>1</u>	<u>1</u>
Total	76	72	68	5 <sup>(1)</sup>	3	3
Actual / Expected		106%	112%		167%	167%

<sup>(1)</sup> There were 5 actual deaths reported during the last experience study.

Actuarial Standards of Practice strongly encourage that mortality assumptions reflect the expectation of continued mortality improvement in the future. To achieve this, we prefer to include a margin of at least 10% (i.e., an actual/expected ratio of at least 110%) in our proposed mortality assumptions. This preferred margin leads to our recommendation of the RP-2000 Combined Healthy Mortality Tables for Males and Females, set back 2 years for General males, set back 1 year for General females, with no setback for Safety and Probation males, and set forward 1 year for Safety and Probation females (all beneficiary mortality will be based on the tables recommended for General members).

Charts 6 and 7 summarize the above information.

Charts 8 and 9 show the life expectancies under both the current and proposed tables.

#### Pre-Retirement Mortality

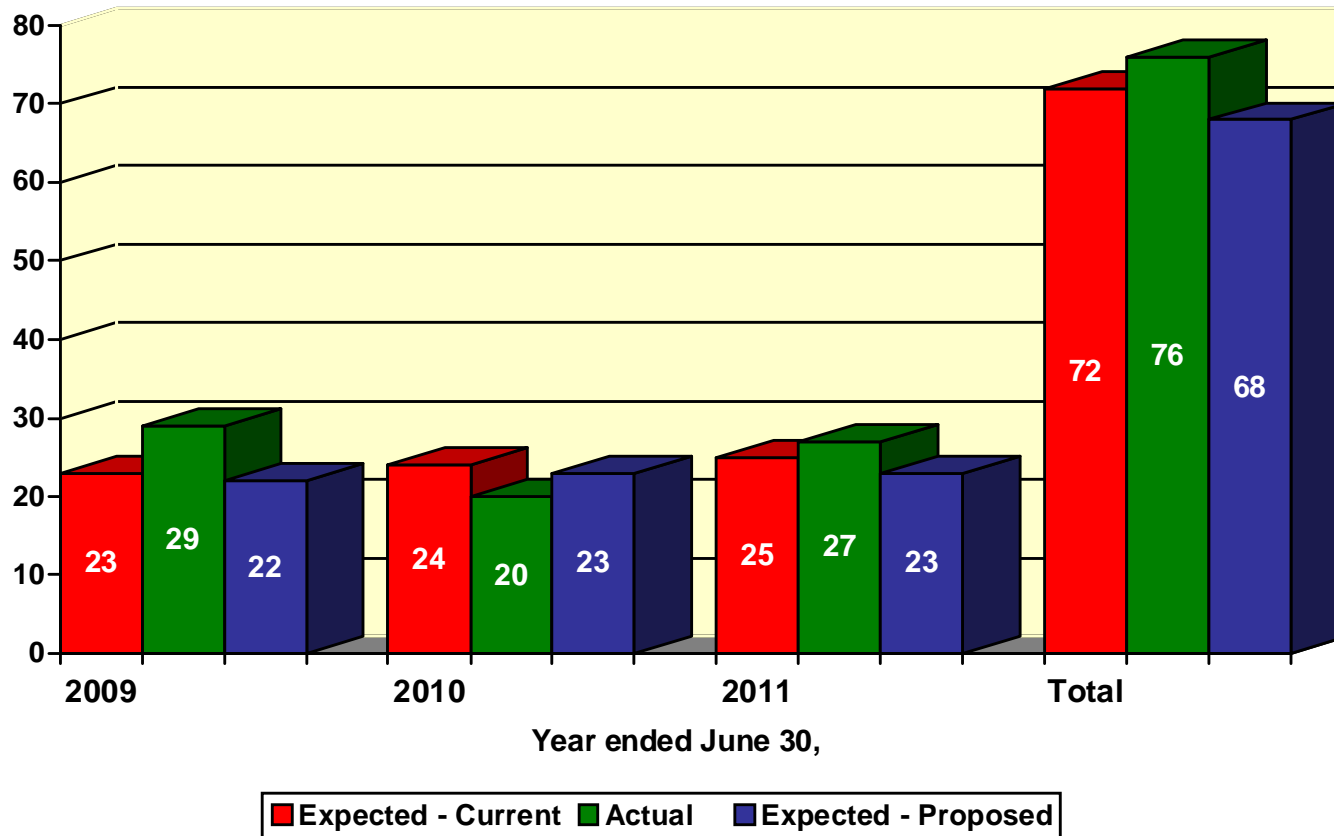
The number of deaths among active members is not large enough to provide credible statistics to develop a unique table. Therefore, we propose pre-retirement mortality follow the tables used for post-service retirement mortality.

#### Mortality Table for Member Contributions

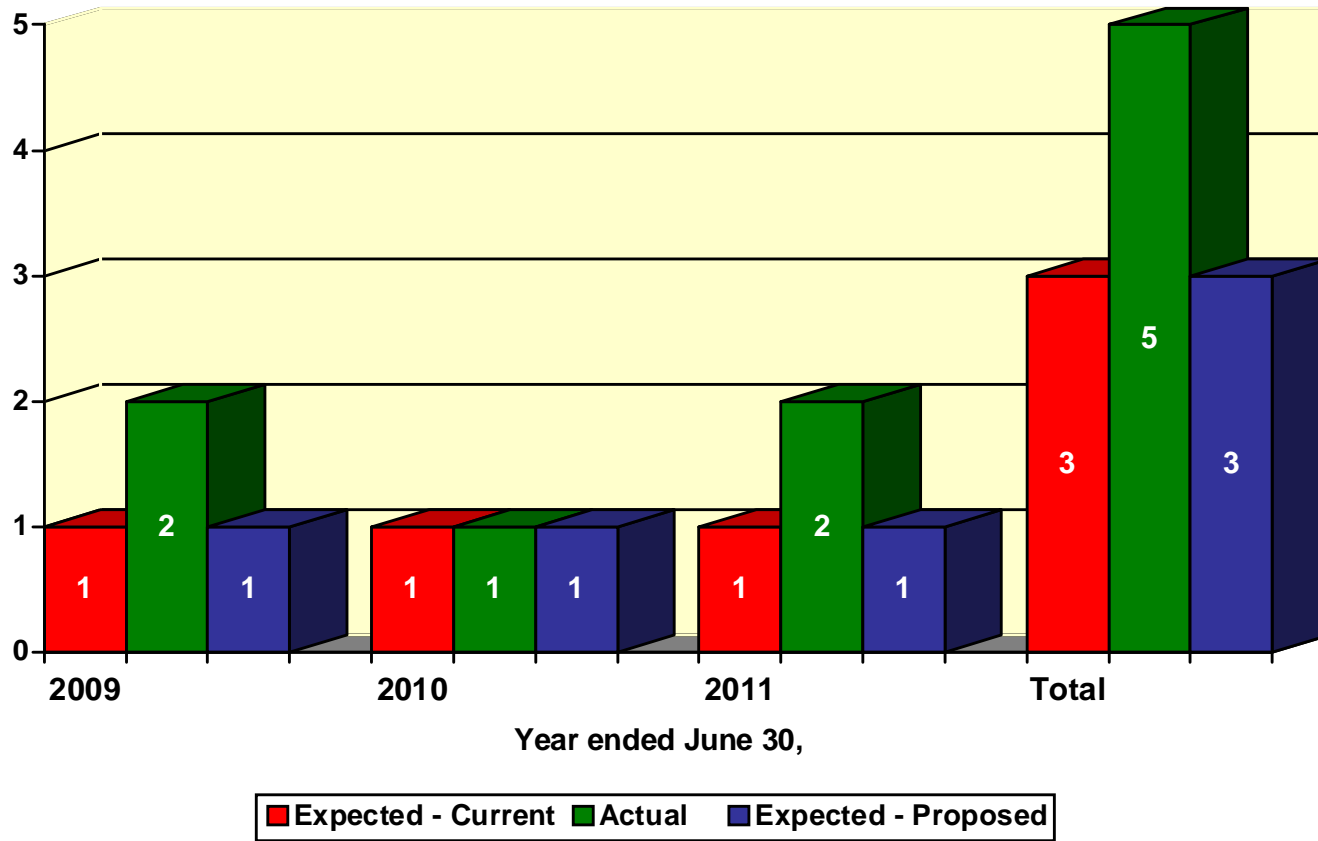
We recommend that the mortality table used for determining contributions for General members be changed from the 1994 Group Annuity Mortality Table for Males, with a three year setback, to the RP-2000 Combined Healthy Mortality Tables for Males and Females, set back 2 years for General males and 1 year for General females, weighted 30% male and 70% female. This is based on the proposed mortality tables for General members and the actual sex distribution for the current active General members.

For Safety and Probation members, we recommend the mortality table be changed from the 1994 Group Annuity Mortality Table for Males, without a setback, to the RP-2000 Combined Healthy Mortality Tables for Males and Females, with no setback for males and set forward 1 year for females, weighted 80% male and 20% female. This is based on the proposed mortality tables for Safety and Probation members and the actual sex distribution for the current active Safety and Probation members.

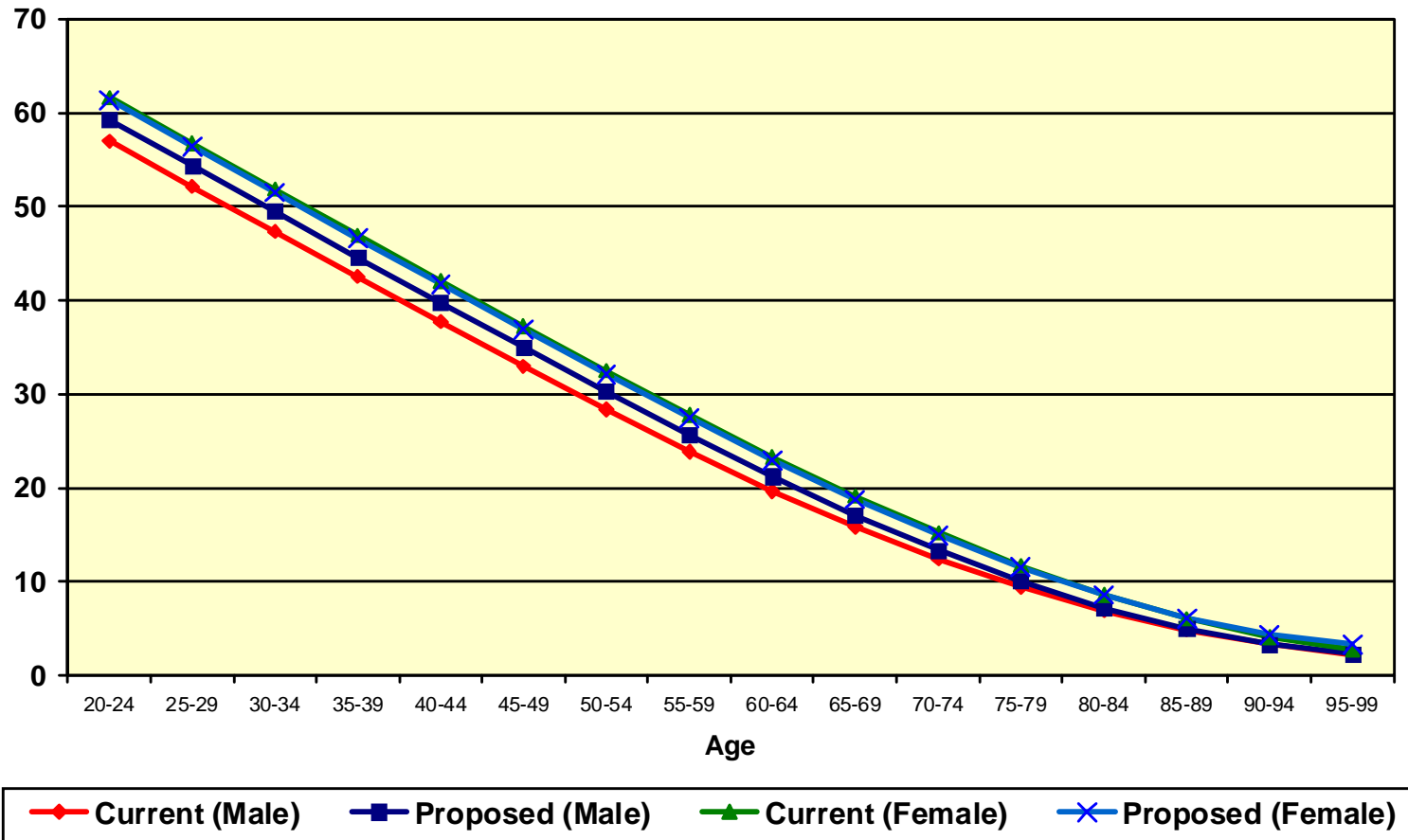
**Chart 6**  
**Post-Retirement Deaths**  
**General Healthy (Non-Disabled) Pensioners**  
**and All Beneficiaries**



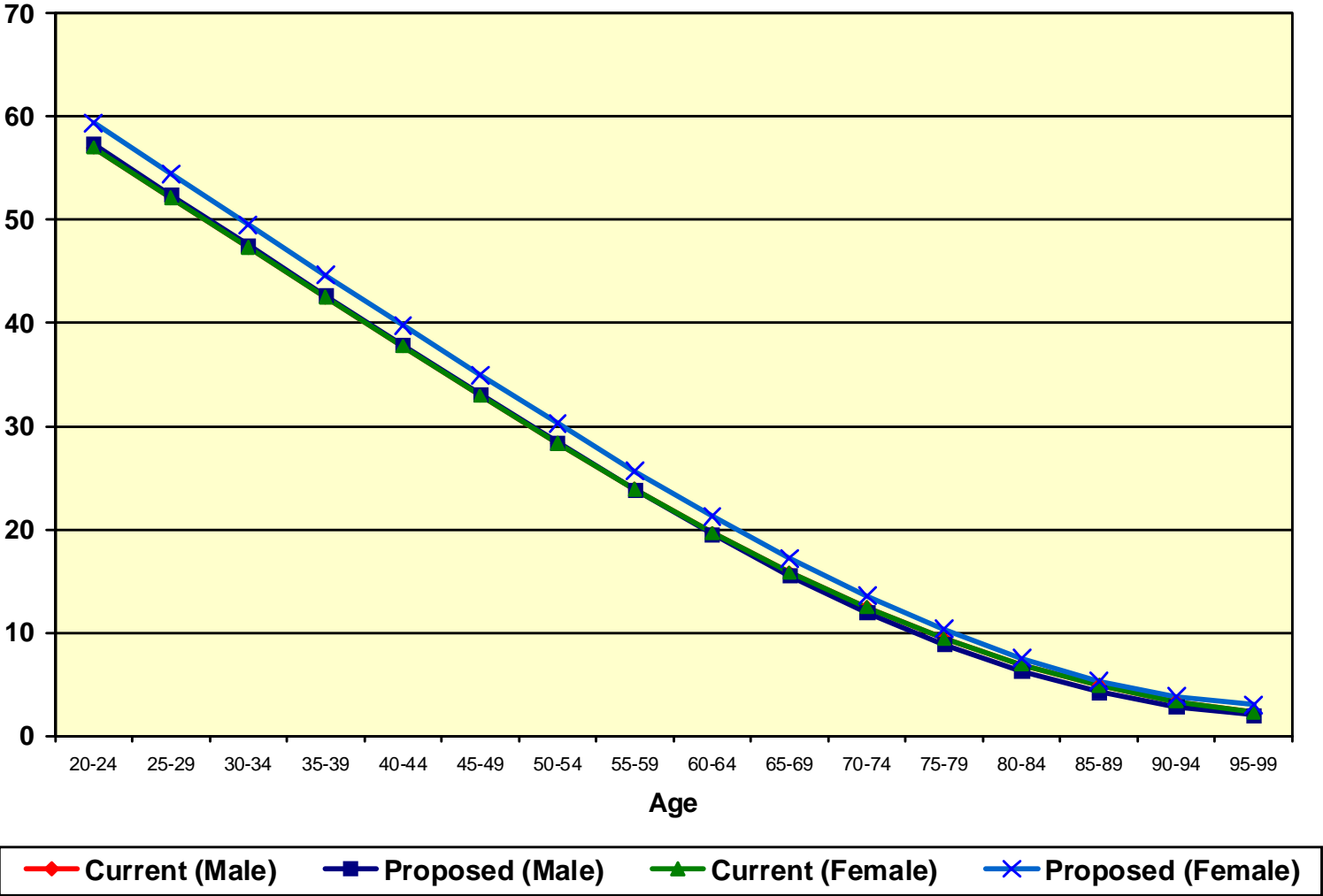
**Chart 7**  
**Post-Retirement Deaths**  
**Safety and Probation Healthy (Non-Disabled) Pensioners**



**Chart 8**  
**Life Expectancies**  
**General Healthy Pensioners and All Beneficiaries**



**Chart 9**  
**Life Expectancies**  
**Safety and Probation Healthy Pensioners**



### C. MORTALITY RATES - DISABLED

Since death rates for disabled members can be higher than for healthy members, a different mortality assumption is often used. The tables currently being used are the 1981 Group Annuity Mortality Table for General members, set back 5 years for males and 2 years for females, and the 1981 Group Annuity Mortality Table for Safety members (which is also being used for Probation members), set back 4 years for males (again, all Safety and Probation members are currently assumed to be males).

We are recommending a change to the RP-2000 Combined Healthy Mortality Tables for Males and Females, set forward 2 years for General males and females and set forward 4 years for Safety and Probation males and females (we no longer assume that all Safety and Probation members are males).

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

Year Ending June 30,	Disabled General Pensioners			Disabled Safety & Probation Pensioners		
	Actual Deaths	Current Expected Deaths	Proposed Expected Deaths	Actual Deaths	Current Expected Deaths	Proposed Expected Deaths
2009	2	4	2	0	1	1
2010	3	4	2	2	2	2
2011	<u>5</u>	<u>4</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>2</u>
Total	10 <sup>(1)</sup>	12	7	3 <sup>(2)</sup>	5	5
Actual / Expected		83%	143%		60%	60%

<sup>(1)</sup> There were 5 actual deaths reported during the last experience study.

<sup>(2)</sup> There were 7 actual deaths reported during the last experience study.

Experience shows that there were fewer deaths than predicted by the current tables. Based on this experience, we are recommending a change to the RP-2000 Combined Healthy Mortality Tables for Males and Females, set forward 2 years for General males and females, and set forward 4 years for Safety and Probation males and females. Note that the proposed disability mortality tables for Safety and Probation members will provide less than our preferred margin of 10% based on the experience over the latest three-year period.

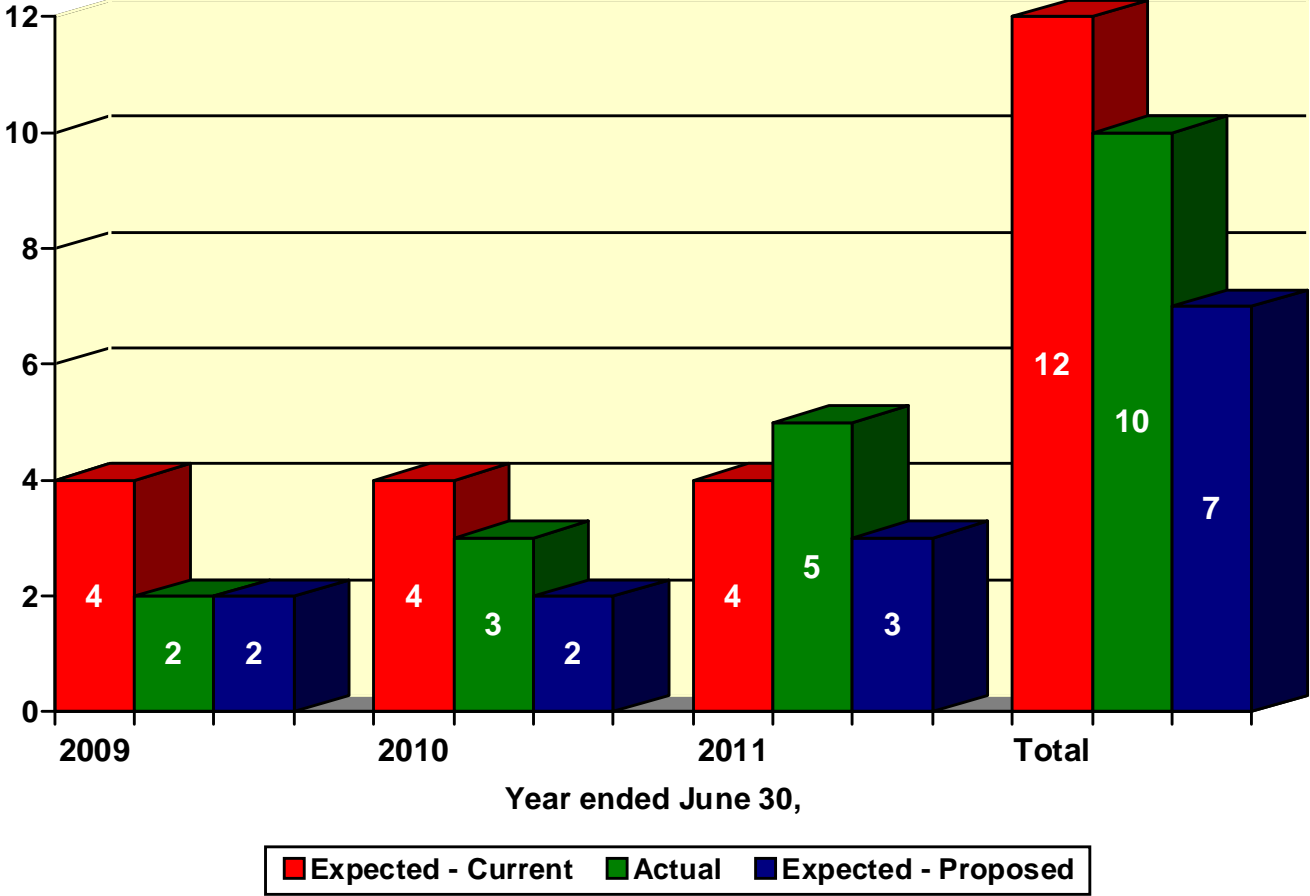
As we noted, the actual number of Safety disability deaths over the prior three years was 7. When the number of actual deaths for Safety disabled members is averaged out over the last two

experience studies, the average is 5. This means that the ratio of actual to expected deaths under the proposed assumption is 100%. If we combine the experience for the healthy and disabled Safety members, the ratio of actual to expected deaths under the proposed assumption is over the 110% ratio that we prefer. We will continue to monitor this assumption in the future, especially for the disabled Safety members.

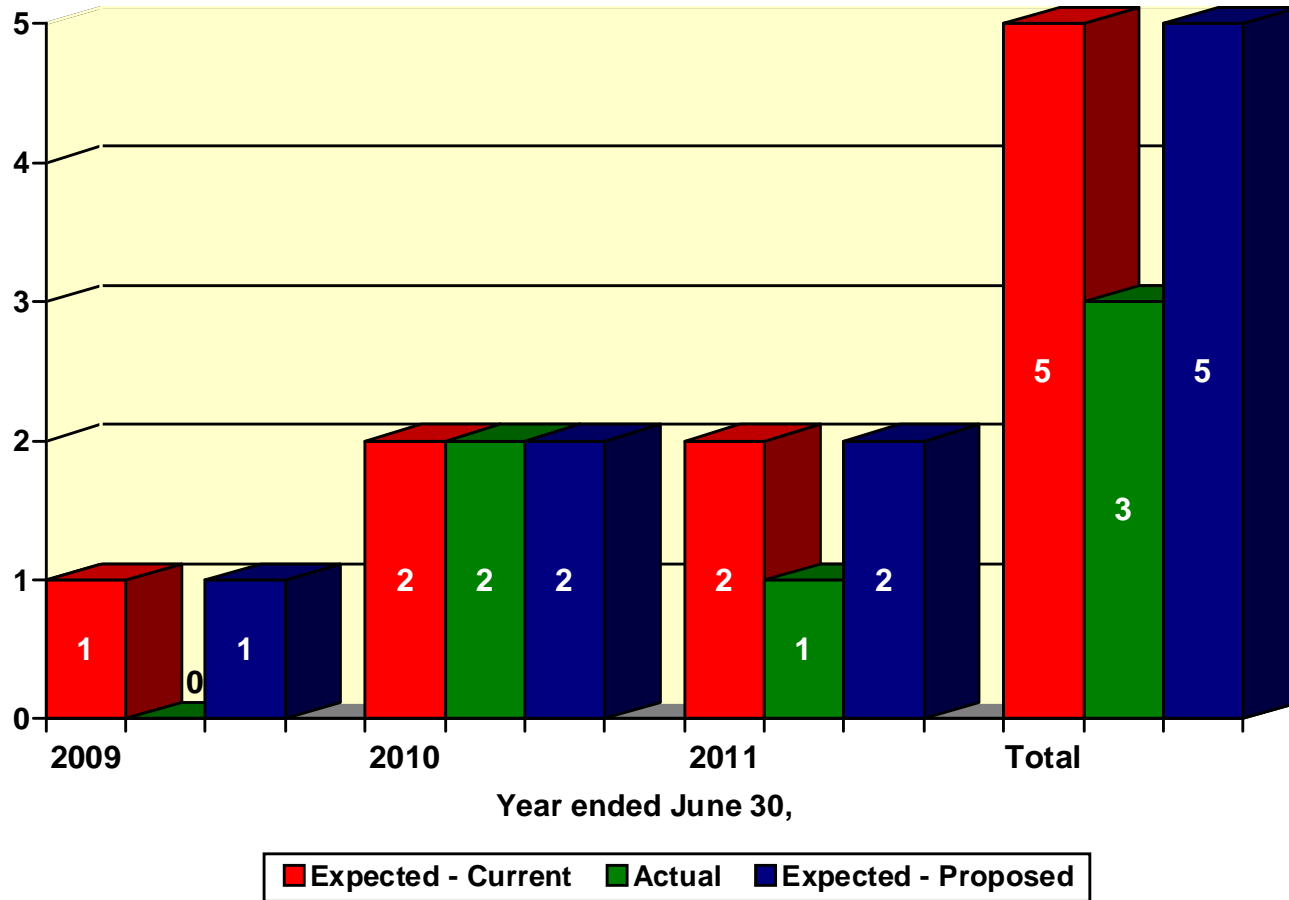
Charts 10 and 11 compare actual to expected deaths under both the current and proposed assumptions for disabled members over the last three years.

Charts 12 and 13 show the life expectancies under both the current and proposed tables.

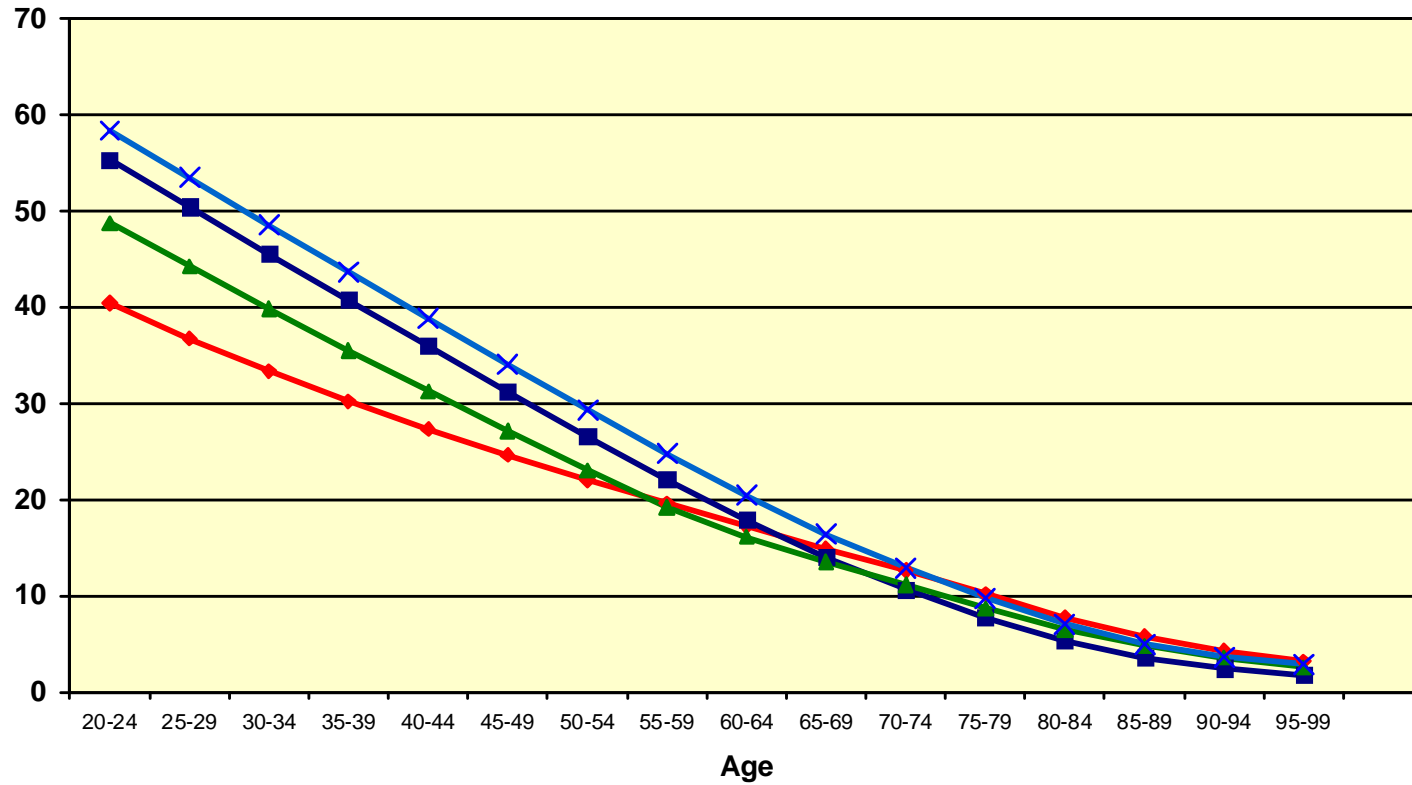
**Chart 10**  
**Post - Retirement Deaths**  
**Disabled General Members**



**Chart 11**  
**Post - Retirement Deaths**  
**Disabled Safety and Probation Members**

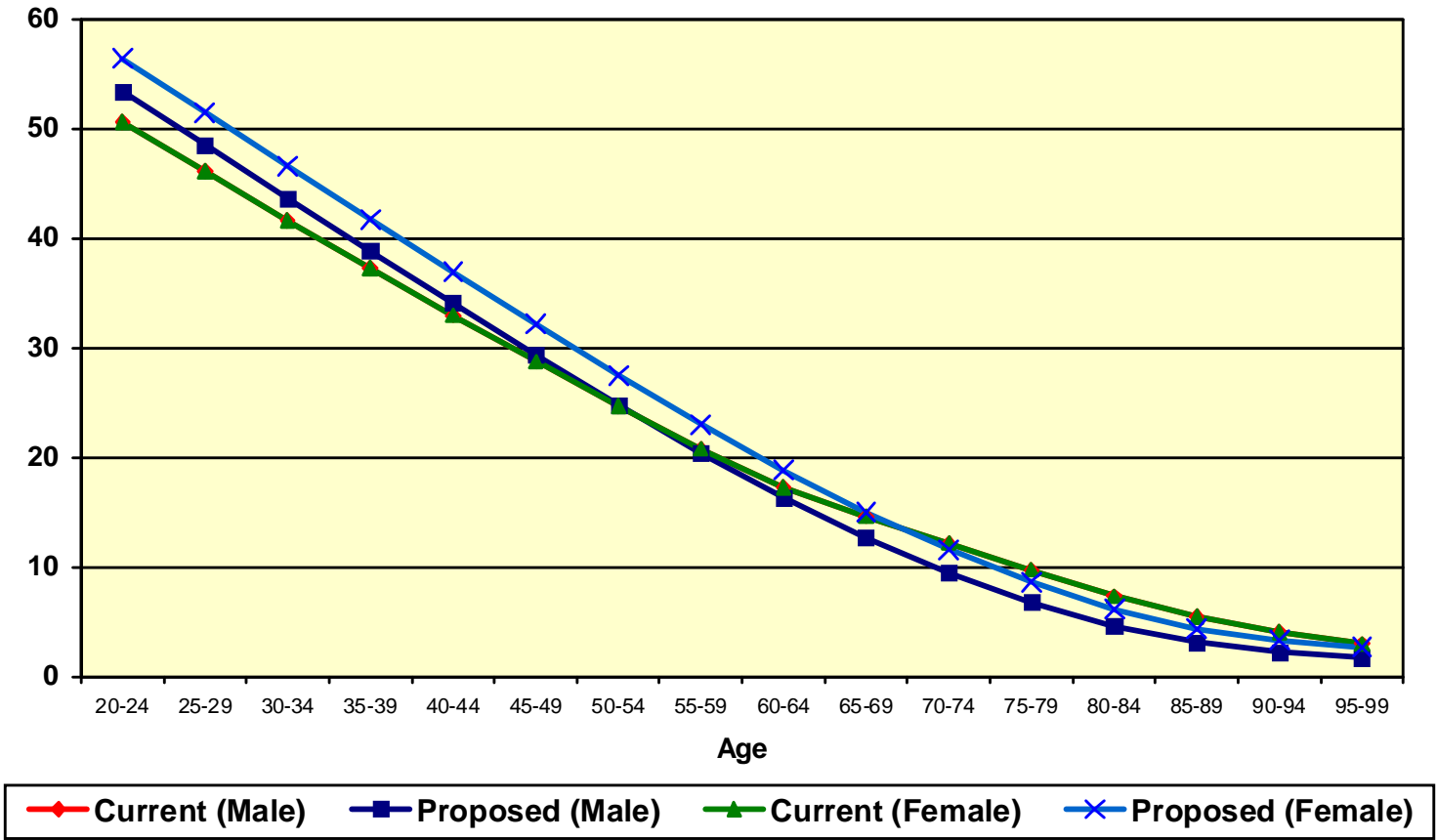


**Chart 12**  
**Life Expectancies**  
**Disabled General Pensioners**



◆ Current (Male)   
 ■ Proposed (Male)   
 ▲ Current (Female)   
 × Proposed (Female)

**Chart 13**  
**Life Expectancies**  
**Disabled Safety and Probation Pensioners**



## D. TERMINATION RATES

Termination rates include all terminations for reasons other than death, disability, or retirement. The current assumptions are based on the gender (General members only) and age of the member. Under the current assumptions, all members who terminate according to that age-based assumption but with less the five years of service are assumed to receive a refund of contributions. For members who terminate according to that age-based assumption but with five or more years of service, a certain percentage is assumed to choose a refund of contributions (varying by group, gender, and age), with the remainder choosing a deferred vested benefit.

Recent experience at MCERA and at Segal’s other California public retirement system clients have indicated that service is a better predictor of termination for members with less than five years of service. We would recommend a service-based termination assumption for members with less than five years of service and retaining the current age-based assumption structure for members with over five years of service. We are also recommending a unisex table for all General members.

The termination experience over the last three years for those members with less than five years of service is shown below.

### Rates of Termination – General Members (Less Than Five Years of Service)

<u>Years of Service</u>	<u>Actual Rate</u>	<u>Current Assumption</u> <sup>(1)(2)</sup>	<u>Proposed Assumption</u>
0	20.62%	8.43%	14.50%
1	12.46%	8.51%	11.50%
2	14.48%	8.14%	10.50%
3	11.18%	7.39%	9.50%
4	9.87%	7.15%	8.50%

<sup>(1)</sup> The current assumption is an age-based assumption. The results provided above are calculated by taking the weighted average of the separate age-based assumptions for members within each of the specified service categories. For a table of the current age-based assumptions, see Appendix A.

<sup>(2)</sup> The current assumption is a sex-distinct assumption. The results provided above are calculated by taking the weighted average of the separate sex-distinct assumptions for members within each of the specified service categories. For a table of the current sex-distinct assumptions, see Appendix A.

**Rates of Termination – Safety and Probation Members  
(Less Than Five Years of Service)**

<u>Years of Service</u>	<u>Actual Rate</u>	<u>Current Assumption</u> <sup>(1)(2)</sup>	<u>Proposed Assumption</u>
0	15.38%	6.74%	11.00%
1	12.20%	7.59%	9.50%
2	8.77%	6.94%	7.50%
3	1.92%	6.72%	6.50%
4	9.38%	6.02%	5.50%

<sup>(1)</sup> The current assumption is an age-based assumption. The results provided above are calculated by taking the weighted average of the separate age-based assumptions for members within each of the specified service categories. For a table of the current age-based assumptions, see Appendix A.

<sup>(2)</sup> There are currently separate assumptions for Safety and Probation members. The results provided above are calculated by taking the weighted average of the separate Safety and Probation assumptions for members within each of the specified service categories. For a table of the current Safety and Probation assumptions, see Appendix A.

The termination experience over the last three years for those members with five or more years of service is shown below.

**Rates of Termination – General Members  
(Five or More Years of Service)**

<u>Age</u>	<u>Actual Rate</u>	<u>Current Assumption</u> <sup>(1)</sup>	<u>Proposed Assumption</u>
20 – 24	0.00%	3.24%	4.50%
25 – 29	4.76%	2.97%	4.50%
30 – 34	5.10%	4.26%	4.50%
35 – 39	4.82%	4.37%	4.50%
40 – 44	5.66%	4.64%	4.50%
45 – 49	5.86%	4.39%	4.50%
50 – 54	5.06%	3.97%	4.50%
55 – 59	4.46%	1.57%	2.50%
60 – 64	12.90%	0.87%	2.00%
65 – 69	4.35%	0.00%	1.00%

<sup>(1)</sup> The current assumption is a sex-distinct assumption. The results provided above are calculated by taking the weighted average of the separate sex-distinct assumptions for members within each of the specified age categories. For a table of the current sex-distinct assumptions, see Appendix A.

**Rates of Termination – Safety and Probation Members  
(Five or More Years of Service)**

<u>Age</u>	<u>Actual Rate</u>	<u>Current Assumption</u> <sup>(1)</sup>	<u>Proposed Assumption</u>
20 – 24	0.00%	0.00%	5.00%
25 – 29	25.00%	3.38%	4.50%
30 – 34	3.23%	3.46%	3.50%
35 – 39	3.23%	3.55%	3.50%
40 – 44	3.03%	3.44%	3.00%
45 – 49	0.00%	2.36%	2.00%
50 – 54	0.00%	0.78%	0.50%
55 – 59	0.00%	0.00%	0.00%

<sup>(1)</sup> *There are currently separate assumptions for Safety and Probation members. The results provided above are calculated by taking the weighted average of the separate Safety and Probation assumptions for members within each of the specified age categories. For a table of the current Safety and Probation assumptions, see Appendix A.*

Chart 14 compares actual to expected terminations of the past three years for both the current and proposed assumptions.

Chart 15 shows the current and proposed termination rates for General members with less than five years of service. Chart 16 shows the same information as Chart 15, but for Safety and Probation members combined.

Chart 17 shows the current and proposed termination rates for General members with five or more years of service. Chart 18 shows the same information as Chart 17, but for Safety and Probation members combined.

Based upon the recent experience, the proposed termination rates have been increased mainly for members with less than five years of service. We continue to assume that all termination rates are zero for all members eligible to retire, that is, members eligible to retire at termination will retire rather than elect a refund or defer their benefit.

The following table shows the recommended percentages for members who are anticipated to withdraw their contributions and members who will leave their contributions on deposit and receive a deferred vested benefit. The current assumption is that 100% of all members who terminate with less than five years of service would withdraw and receive a refund and 0% would choose a deferred vested benefit. For the members with five or more years of service, the current assumptions for choosing a withdrawal of contributions or a deferred vested benefit are based on

group (i.e., General, Safety, and Probation), gender, and age. We are recommending a single withdrawal/termination assumption for members with over five years of service as there was not a lot of experience (especially among Safety and Probation) to set the withdrawal/deferred vested benefit assumption by group and by age category.

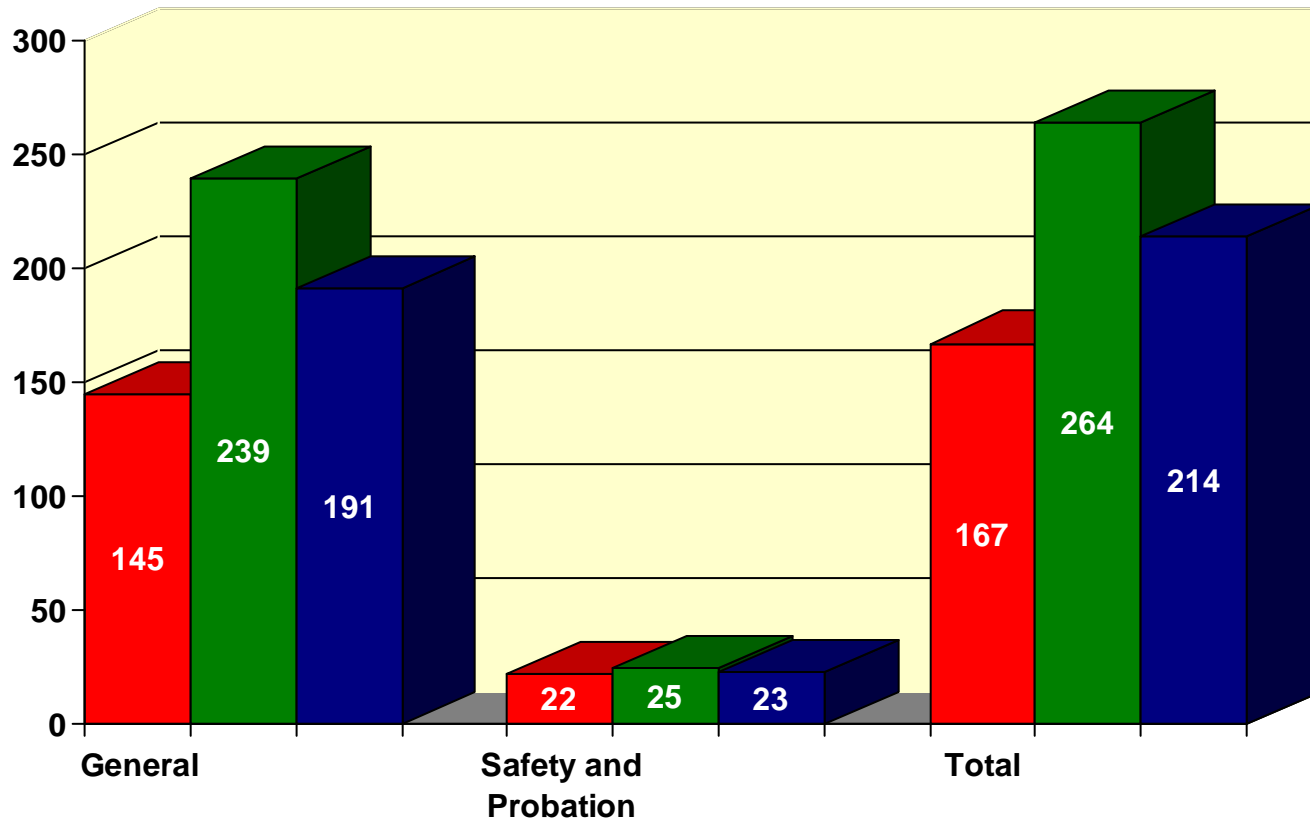
**Members with Less than Five Years of Service**

<b>Group</b>	<b>Observed Withdrawal</b>	<b>Observed Vested Termination</b>	<b>Current Withdrawal</b>	<b>Current Vested Termination</b>	<b>Proposed Withdrawal</b>	<b>Proposed Vested Termination</b>
All Combined	86%	14%	100%	0%	85%	15%

**Members with Five or More Years of Service**

<b>Group</b>	<b>Observed Withdrawal</b>	<b>Observed Vested Termination</b>	<b>Current Withdrawal</b>	<b>Current Vested Termination</b>	<b>Proposed Withdrawal</b>	<b>Proposed Vested Termination</b>
General Males	-	-	20% under age 50	remainder	-	-
General Females	-	-	40% under age 40; 30% over age 40	remainder	-	-
Safety	-	-	25% under age 40	remainder	-	-
Probation	-	-	50% under age 50	remainder	-	-
All Combined	27%	73%	-	-	25%	75%

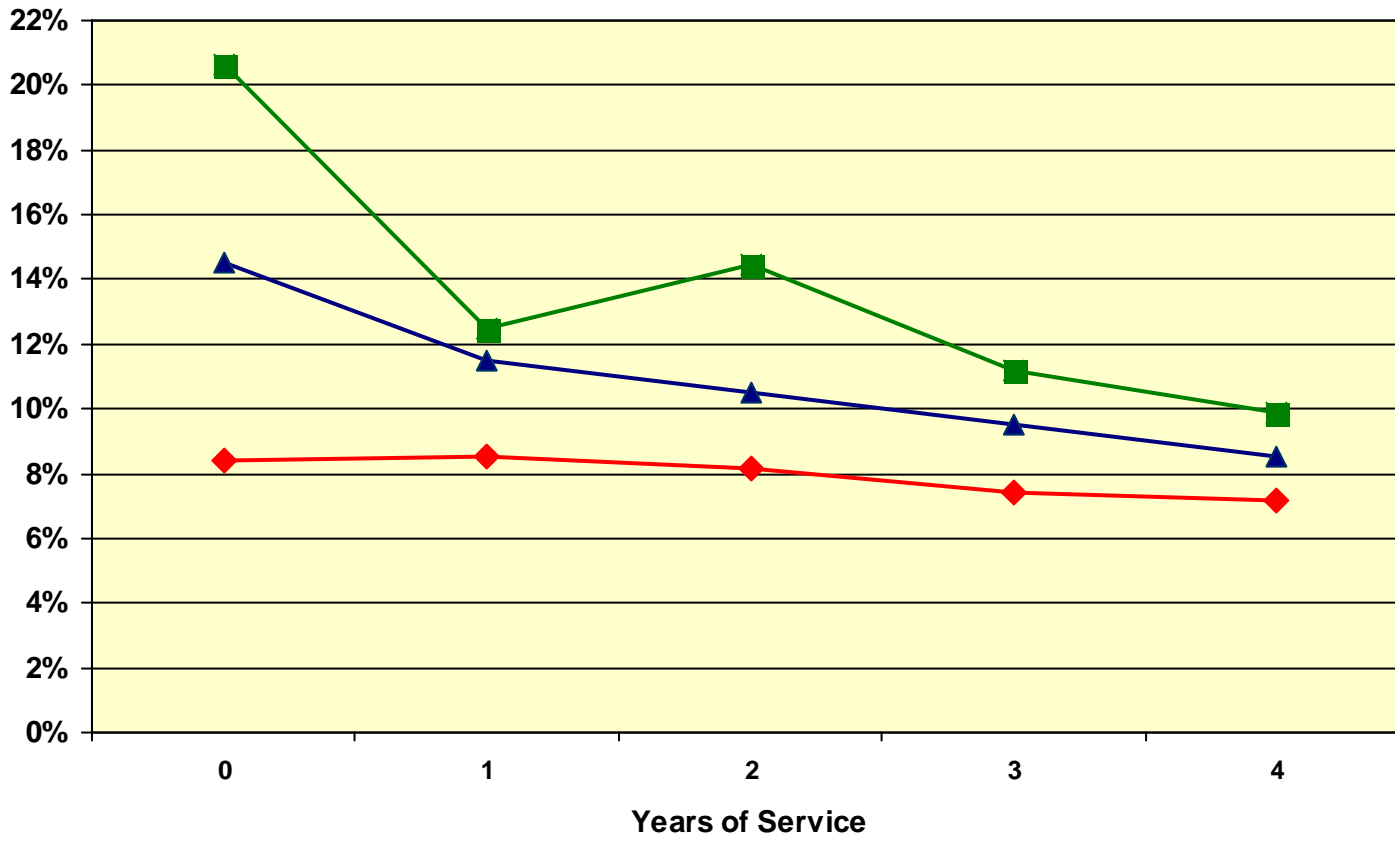
**Chart 14**  
**Actual Number of Terminations Compared to Expected**



June 30, 2008 - 2011

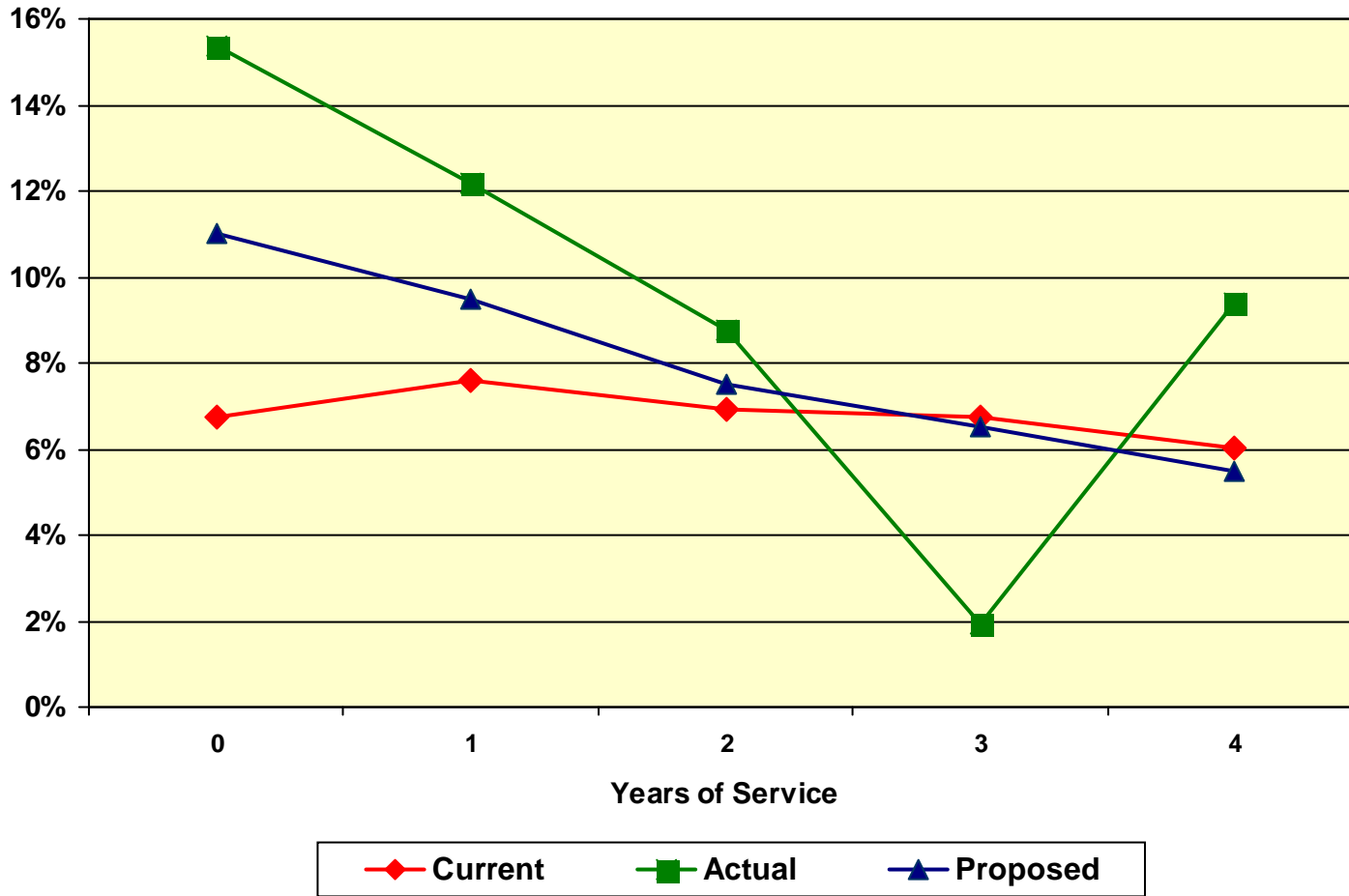
Expected - Current    Actual    Expected - Proposed

**Chart 15**  
**Termination Rates - General Members**  
**(Less Than Five Years of Service)**

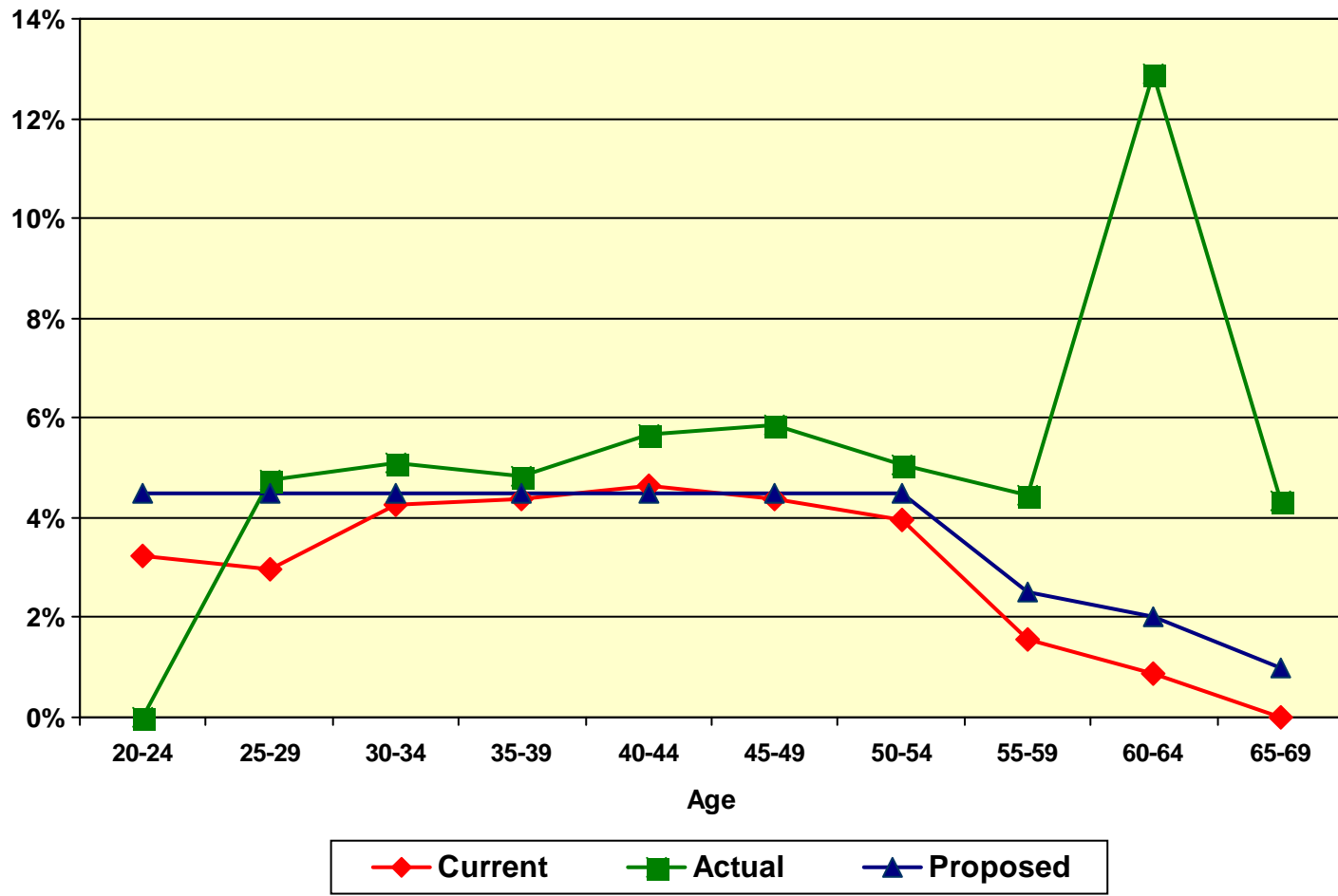


◆ Current    ■ Actual    ▲ Proposed

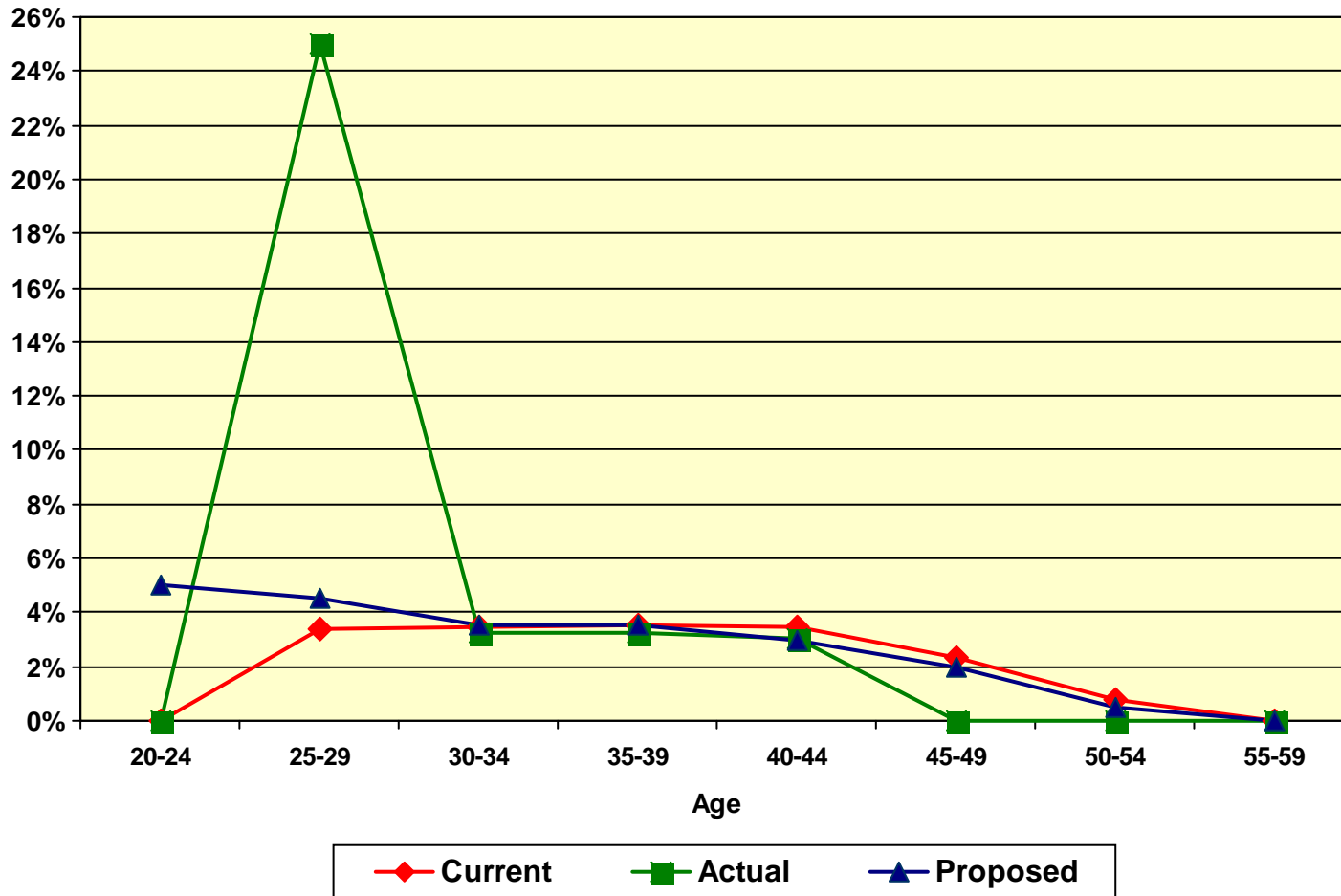
**Chart 16**  
**Termination Rates - Safety and Probation Members**  
**(Less Than Five Years of Service)**



**Chart 17**  
**Termination Rates - General Members**  
**(Five or More Years of Service)**



**Chart 18**  
**Termination Rates - Safety and Probation Members**  
**(Five or More Years of Service)**



## E. DISABILITY INCIDENCE RATES

When a member becomes disabled, he or she may be entitled to either a 50% of final average compensation pension (service connected disability), or a pension that depends upon the member's years of service (non-service connected disability). Currently, there are separate rates for service connected disability and for non-service connected disability at each age. We have combined the experience of both types of disabilities into one disability assumption and we have developed the recommended proportion of the disability rates to be used to anticipate service connected versus non-service connected disabilities, based on the observed experience from members at all ages. We have also combined the experience for General males and females into a unisex disability assumption (the current General disability rates are sex-distinct), and we have developed a set of disability assumptions that applies to both Safety and Probation members.

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

### Rates of Combined Disability Incidence (General)

<u>Age</u>	<u>Observed Rate</u>	<u>Current Rate</u> <sup>(1),(2)</sup>	<u>Proposed Rate</u>
20 – 24	0.00%	0.02%	0.01%
25 – 29	0.00%	0.03%	0.02%
30 – 34	0.00%	0.05%	0.02%
35 – 39	0.00%	0.08%	0.04%
40 – 44	0.00%	0.15%	0.08%
45 – 49	0.64%	0.33%	0.50%
50 – 54	0.50%	0.61%	0.55%
55 – 59	0.45%	0.89%	0.65%
60 – 64	0.40%	1.21%	0.80%
65 – 69	0.00%	1.08%	0.55%

<sup>(1)</sup> There are currently separate assumptions for service connected and non-service connected disabilities. The results provided above are calculated by taking the weighted average of the separate disability assumptions for members within each of the specified age categories. For a table of the current service connected and non-service connected disability assumptions, see Appendix A.

<sup>(2)</sup> The current assumption is a sex-distinct assumption. The results provided above are calculated by taking the weighted average of the separate sex-distinct assumptions for members within each of the specified age categories. For a table of the current sex-distinct assumptions, see Appendix A.

**Rates of Combined Disability Incidence (Safety)**

<u>Age</u>	<u>Observed Rate</u>	<u>Current Rate<sup>(1)</sup></u>	<u>Proposed Rate</u>
20 – 24	0.00%	0.35%	0.20%
25 – 29	0.00%	0.49%	0.25%
30 – 34	0.00%	0.80%	0.40%
35 – 39	0.00%	1.24%	0.60%
40 – 44	1.00%	1.98%	1.50%
45 – 49	0.00%	2.91%	1.70%
50 – 54	2.00%	4.27%	3.00%
55 – 59	0.00%	6.08%	3.00%

**Rates of Combined Disability Incidence (Probation)**

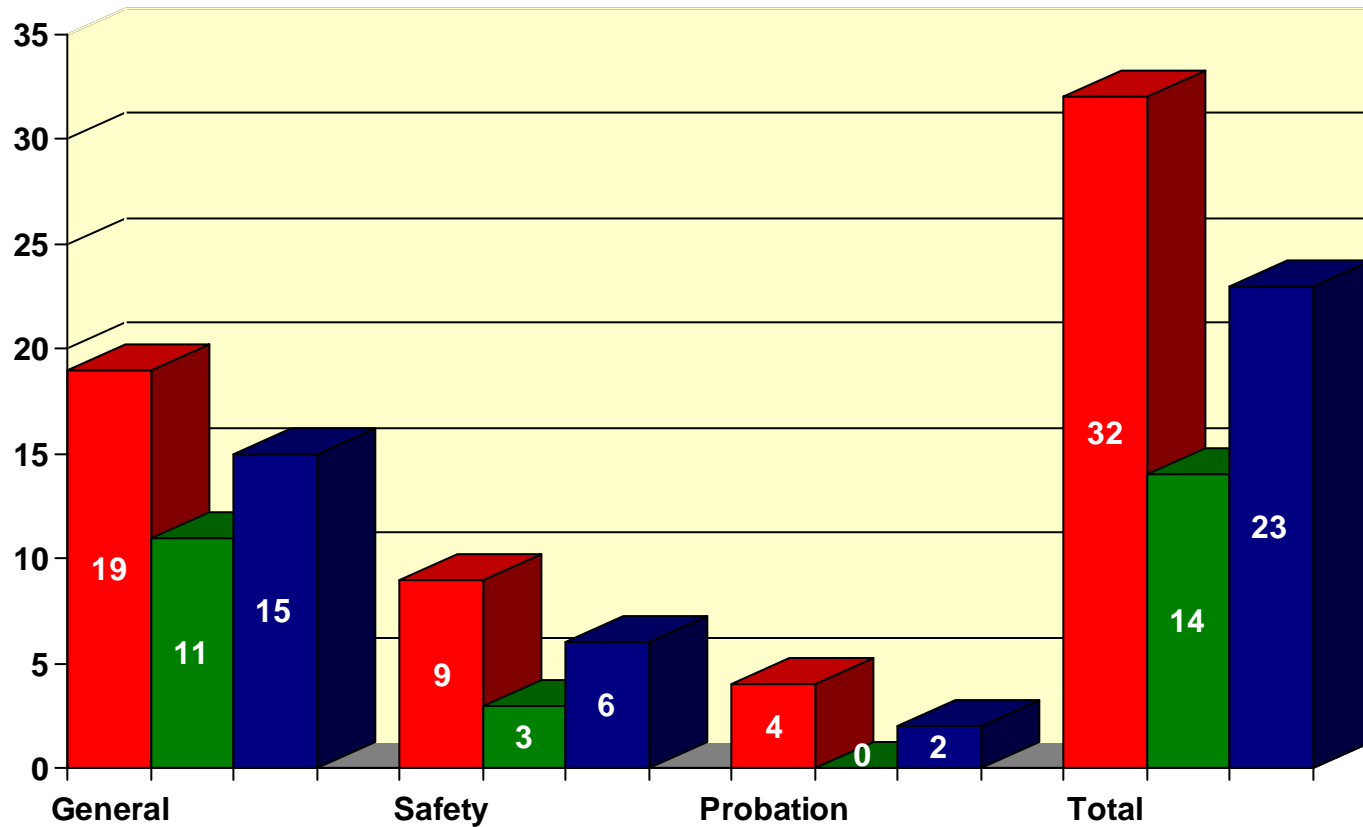
<u>Age</u>	<u>Observed Rate</u>	<u>Current Rate<sup>(1)</sup></u>	<u>Proposed Rate</u>
20 – 24	0.00%	0.32%	0.20%
25 – 29	0.00%	0.48%	0.25%
30 – 34	0.00%	0.78%	0.40%
35 – 39	0.00%	1.28%	0.60%
40 – 44	0.00%	2.17%	1.50%
45 – 49	0.00%	3.55%	1.70%
50 – 54	0.00%	4.55%	3.00%
55 – 59	0.00%	6.48%	3.00%

<sup>(1)</sup> *There are currently separate assumptions for service connected and non-service connected disabilities. The results provided above are calculated by taking the weighted average of the separate disability assumptions for members within each of the specified age categories. For a table of the current service connected and non-service connected disability assumptions, see Appendix A.*

For General members, the current assumptions anticipate about an equal proportion of service connected and non-service connected disabilities. This is in line with observed experience covering the current and prior three-year experience study periods. Therefore, we are recommending that 50% of the proposed General disability rates be used to anticipate service connected disability. The remaining 50% of the rates will be used to anticipate non-service connected disability. For Safety and Probation members, we recommend that 90% of the proposed disability rates be used to anticipate service connected disability, with the remaining 10% to be used to anticipate non-service connected disability, based on observed experience.

Chart 19 compares the actual number of service connected and non-service connected disabilities over the past three years to that expected under both the current and proposed assumptions. The proposed disability rates were adjusted to reflect the past three years experience. Chart 20 shows actual disablement rates, compared to the assumed and proposed rates for General members. Charts 21 and 22 show the same information for Safety and Probation members, respectively.

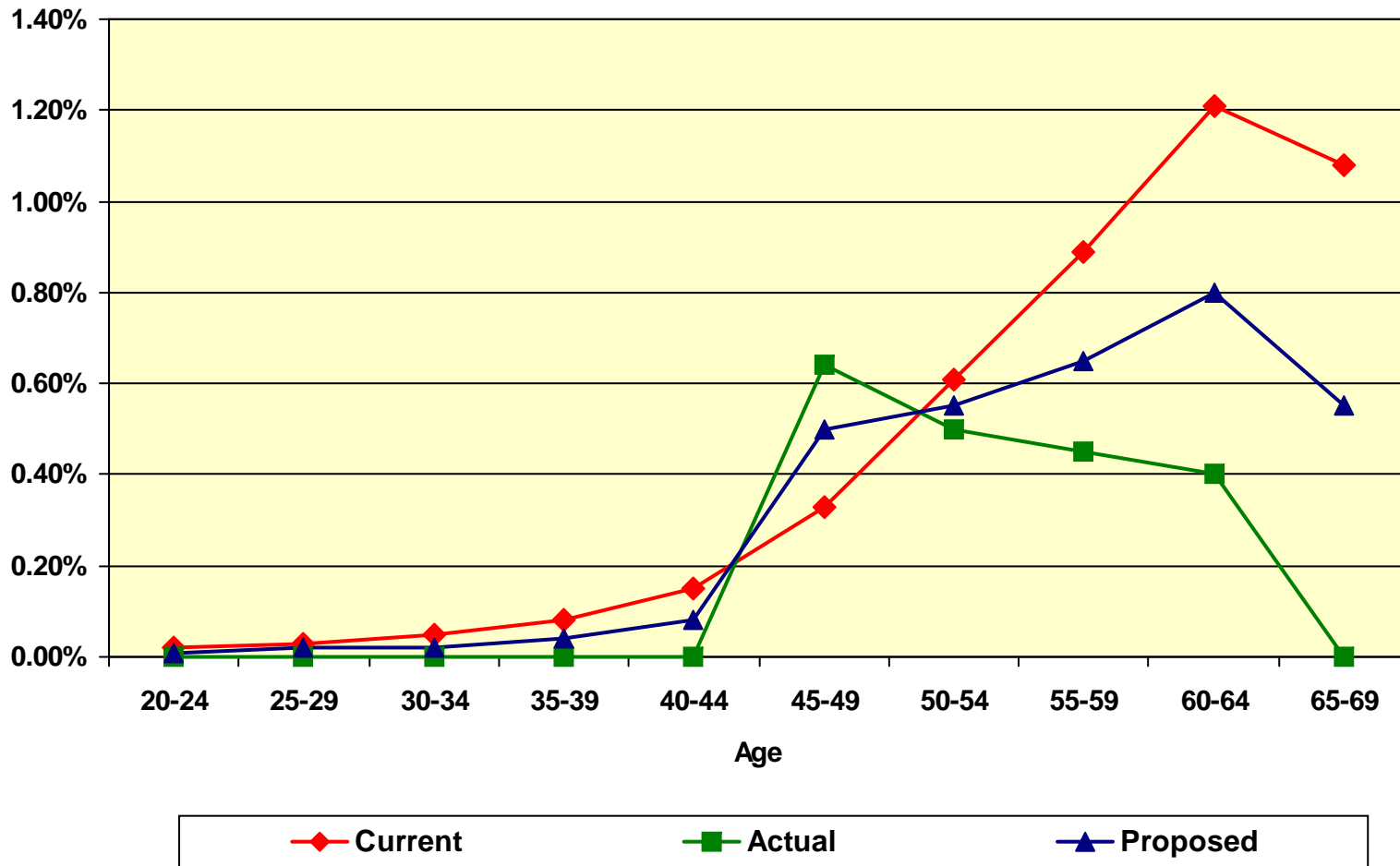
**Chart 19**  
**Actual Number of Disabilities Compared to Expected**



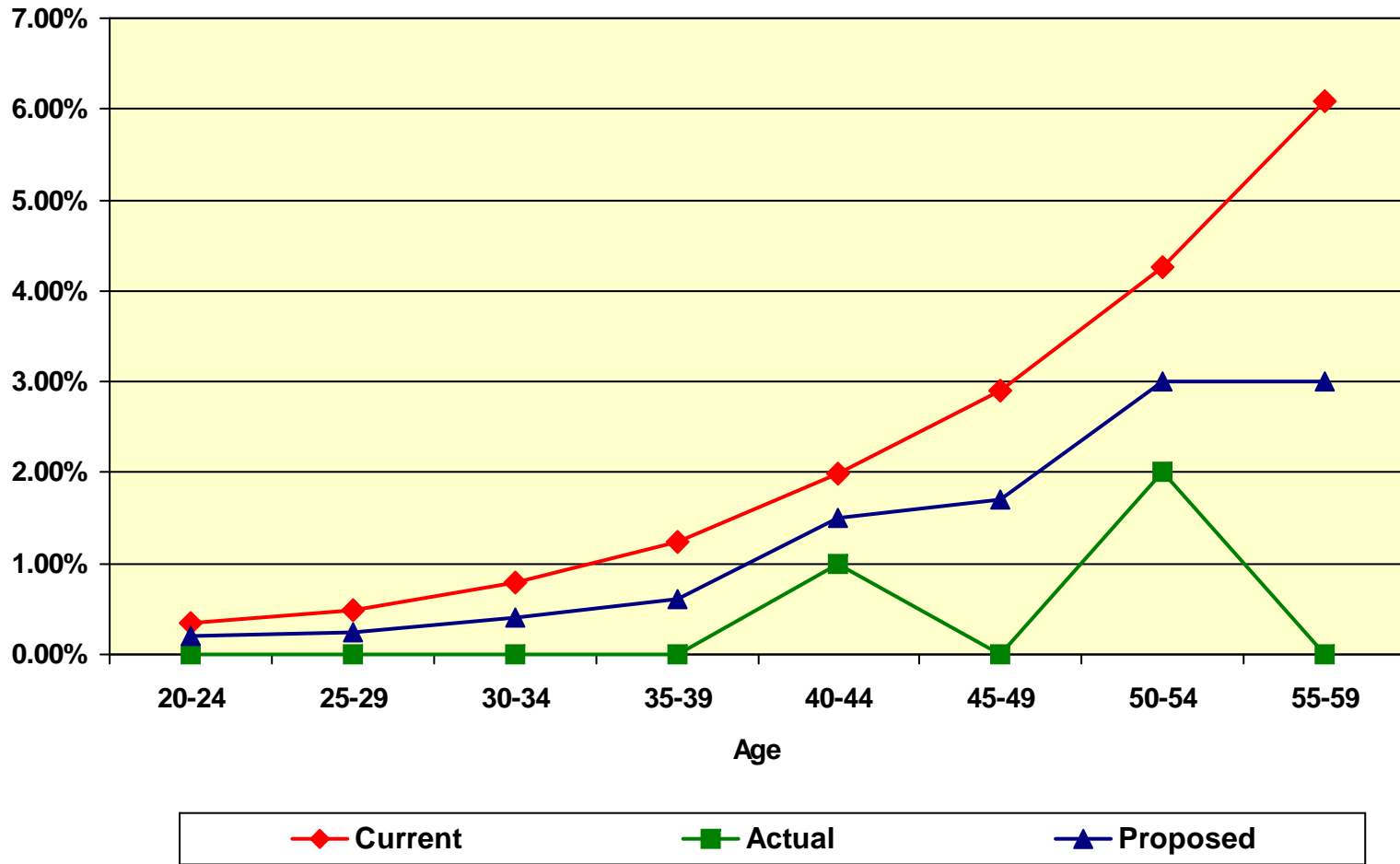
**June 30, 2008 - 2011**

■ Expected - Current   
 ■ Actual   
 ■ Expected - Proposed

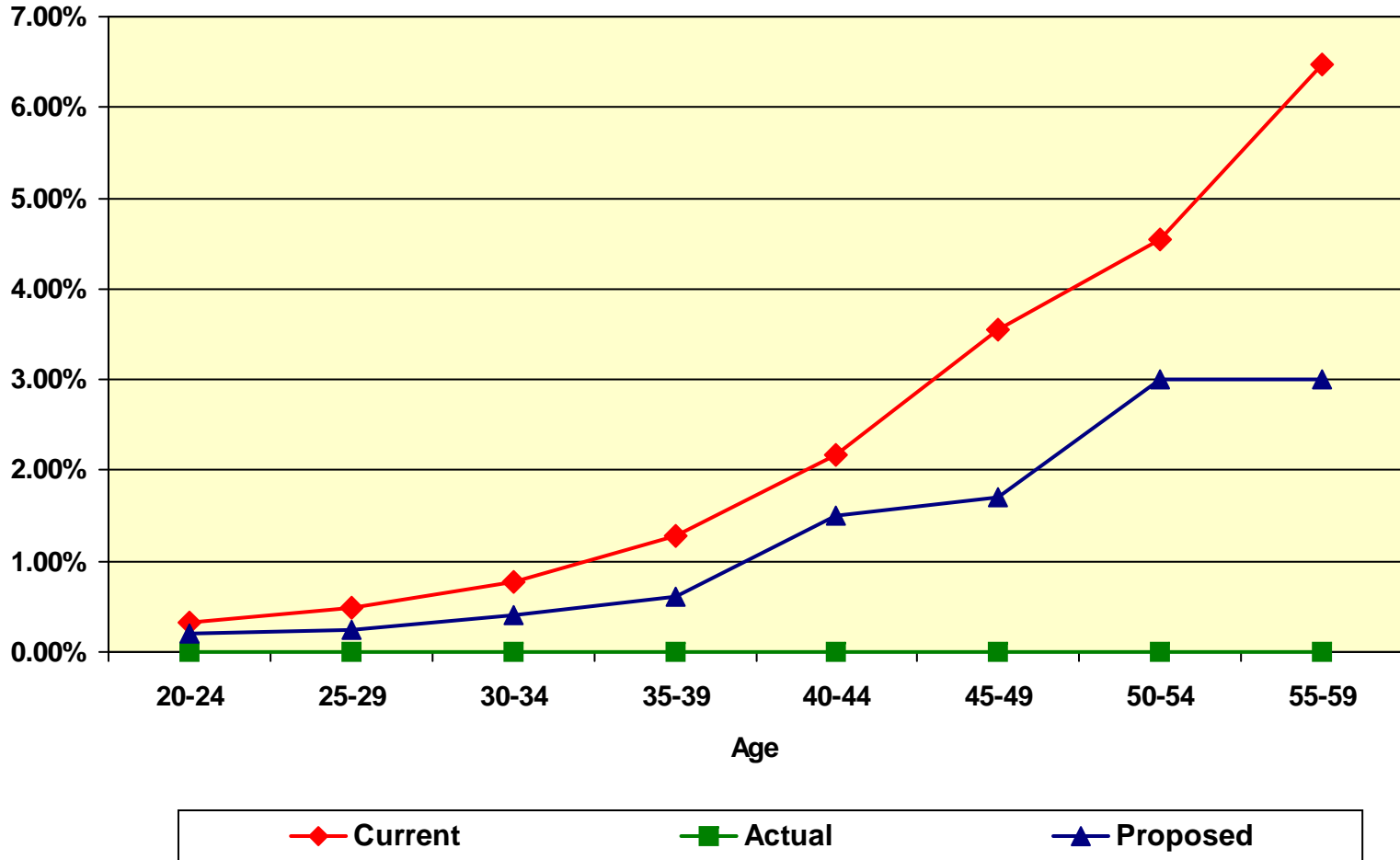
**Chart 20**  
**Disablement Rates - General Members**



**Chart 21**  
**Disablement Rates - Safety Members**



**Chart 22**  
**Disablement Rates - Probation Members**



## **F. ACTUARIAL COST METHOD**

The total contribution requirement for each rate group has two components - an annual Normal Cost, and a payment with respect to the Unfunded Actuarial Accrued Liability (UAAL). These cost components are based on an actuarial cost method. The actuarial cost method is the procedure used to allocate the value of projected benefits for active members over the members' years of service. The value attributed to each year is the Normal Cost for that year. The Normal Costs for service to date determine the portion of the value of benefits attributable to past service (Actuarial Accrued Liability), with the remainder (Present Value of Future Normal Costs) attributable to future service. Actuarial valuations for the Association have been based on the actuarial cost method known as the Entry Age Normal actuarial cost method. This method produces Normal Costs that are determined as a level percentage of covered payroll over each member's career.

As described above, the Association's Actuarial Accrued Liability is calculated on an individual basis and is based on each individual's past Normal Costs, allocated as a level percent of compensation. However, the Normal Cost for each rate group is calculated on an aggregate basis by taking the Present Value of Future Normal Costs divided by Present Value of Future Salaries to obtain a normal cost rate for each rate group of employees. This normal cost rate is then multiplied by the total of current salaries for that rate group.

The aggregate Normal Cost described above is generally close to the individual Normal Cost that is calculated to determine the Actuarial Accrued Liability. However, to be more consistent with the liability calculation (and with generally accepted actuarial practice), we recommend the Board consider adopting an individual approach where the Entry Age Normal Cost for each rate group is calculated as the sum of the individual Normal Costs for members in the rate group. Note that this change would not result in a change in the Actuarial Accrued Liability, so no additional payment towards the UAAL would be required. The only change to the contribution requirement would be to the Normal Cost component.

Compared to other cost methods, the Entry Age Normal method produces costs that are more stable as a percentage of compensation. That is why, in the public fund survey published in 2009 by the National Association of State Retirement Administrators, the Entry Age Normal cost method was used by approximately 75% of the large public retirement funds in their 2008 valuations. Therefore, we recommend the Association continue to use the Entry Age Normal actuarial cost method, but consider calculating the annual Normal Cost by summing the Normal Costs determined on an individual basis rather than the aggregate calculation described earlier.

**APPENDIX A**

**CURRENT ACTUARIAL ASSUMPTIONS**

**Post-Retirement Mortality Rates:**

*Healthy:* For General members and all beneficiaries: 1994 Group Annuity Mortality Table, with no setback.  
 For Safety and Probation members: 1994 Group Annuity Mortality Table for males, with no setback.

*Disabled:* For General members: 1981 Disability Table for General members, set back 5 years for males and set back 2 years for females.  
 For Safety and Probation members: 1981 Disability Table for Safety members, set back 4 years.

*Employee Contribution Rates:*

For General members: 1994 Group Annuity Mortality Table for males, set back 3 years.  
 For Safety and Probation members: 1994 Group Annuity Mortality Table for males, with no setback.

**Termination Rates Before Retirement:**

Rate (%)				
Ordinary Death				
Age	General		Safety	Probation
	Male	Female		
25	0.050	0.039	0.040	0.040
30	0.060	0.052	0.050	0.050
35	0.080	0.065	0.060	0.060
40	0.100	0.078	0.080	0.080
45	0.120	0.091	0.130	0.130
50	0.150	0.117	0.180	0.180
55	0.190	0.143	0.230	0.230
60	0.240	0.182	0.000	0.000
65	0.290	0.208	0.000	0.000

**CURRENT ACTUARIAL ASSUMPTIONS**

(continued)

**Termination Rates Before Retirement (continued):**

**Rate (%)**  
**Duty Death**

---

<b>Age</b>	<b>General</b>		<b>Safety</b>	<b>Probation</b>
	<b>Male</b>	<b>Female</b>		
25	0.010	0.010	0.100	0.100
30	0.010	0.010	0.100	0.100
35	0.020	0.010	0.110	0.110
40	0.020	0.010	0.130	0.130
45	0.020	0.010	0.170	0.170
50	0.020	0.010	0.210	0.210
55	0.020	0.010	0.250	0.250
60	0.020	0.010	0.000	0.000
65	0.020	0.010	0.000	0.000

**Rate (%)**  
**Death While Eligible**

---

<b>Age</b>	<b>General</b>		<b>Safety</b>	<b>Probation</b>
	<b>Male</b>	<b>Female</b>		
25	0.010	0.010	0.010	0.010
30	0.020	0.010	0.020	0.020
35	0.030	0.020	0.030	0.030
40	0.040	0.020	0.040	0.040
45	0.060	0.030	0.090	0.090
50	0.110	0.050	0.140	0.140
55	0.210	0.100	0.190	0.190
60	0.310	0.150	0.000	0.000
65	0.410	0.200	0.000	0.000

**CURRENT ACTUARIAL ASSUMPTIONS**

(continued)

**Termination Rates Before Retirement (continued):**

**Rate (%)**  
**Ordinary Disability**

---

<b>Age</b>	<b>General</b>		<b>Safety</b>	<b>Probation</b>
	<b>Male</b>	<b>Female</b>		
20	0.000	0.000	0.005	0.010
25	0.003	0.008	0.020	0.040
30	0.013	0.017	0.045	0.090
35	0.038	0.034	0.075	0.150
40	0.086	0.067	0.175	0.350
45	0.156	0.151	0.330	0.660
50	0.239	0.269	0.510	1.020
55	0.328	0.378	0.710	1.420
60	0.405	0.512	0.000	0.000

**Rate (%)**  
**Duty Disability**

---

<b>Age</b>	<b>General</b>		<b>Safety</b>	<b>Probation</b>
	<b>Male</b>	<b>Female</b>		
20	0.014	0.028	0.238	0.238
25	0.029	0.028	0.400	0.400
30	0.043	0.028	0.605	0.605
35	0.072	0.028	0.983	0.983
40	0.130	0.058	1.512	1.512
45	0.231	0.115	2.246	2.246
50	0.434	0.258	3.283	3.283
55	0.723	0.403	4.752	4.752
60	1.069	0.547	0.000	0.000

**CURRENT ACTUARIAL ASSUMPTIONS**

(continued)

**Termination Rates Before Retirement (continued):**

<b>Rate (%)</b>				
<b>Withdrawal</b>				
<b>Age</b>	<b>General</b>		<b>Safety</b>	<b>Probation</b>
	<b>Male</b>	<b>Female</b>		
20	21.120	25.000	18.750	18.750
25	18.612	15.000	14.400	14.400
30	14.520	12.900	10.350	10.350
35	11.088	11.000	6.600	6.600
40	10.296	9.000	4.350	4.350
45	6.600	7.800	2.100	2.100
50	3.960	5.100	0.300	0.300
55	3.168	2.400	0.000	0.000
60	5.544	4.200	0.000	0.000

<b>Rate (%)</b>				
<b>Terminated Vested<sup>(1)</sup></b>				
<b>Age</b>	<b>General</b>		<b>Safety</b>	<b>Probation</b>
	<b>Male</b>	<b>Female</b>		
20	1.800	1.699	0.000	0.000
25	3.420	1.800	0.450	1.350
30	5.400	3.888	1.575	4.725
35	3.780	4.464	2.475	7.425
40	5.040	4.464	2.700	8.100
45	4.680	4.608	2.250	6.750
50	6.120	3.744	0.900	2.700
55	2.160	2.721	0.000	0.000
60	0.900	0.864	0.000	0.000

<sup>(1)</sup> 20% of General males under age 50; 40% of General females under age 40; 30% of General females over age 40; 25% of Safety males under age 40; and 50% of Probation males and females under age 50 are assumed to receive a refund of their contributions. The remainder are assumed to receive a deferred annuity. No termination is assumed after a member is eligible for retirement.

**CURRENT ACTUARIAL ASSUMPTIONS**

(continued)

**Retirement Rates:**

Age	Rate (%)			
	General Male	General Female	Safety	Probation
45	0.00	0.00	0.25	0.00
46	0.00	0.00	0.29	0.00
47	0.00	0.00	0.33	0.00
48	0.00	0.00	0.38	0.00
49	0.00	0.00	0.44	0.00
50	3.00	3.00	2.30	4.00
51	3.00	3.00	2.30	4.00
52	3.00	3.00	2.30	4.00
53	3.00	3.00	4.60	8.00
54	3.00	3.00	5.18	9.00
55	9.00	3.00	6.31	12.50
56	6.00	3.00	7.50	3.75
57	6.00	3.00	10.00	5.00
58	6.00	6.00	12.50	6.25
59	7.50	6.00	37.50	9.38
60	7.50	6.00	100.00	100.00
61	9.75	10.00	100.00	100.00
62	11.25	15.00	100.00	100.00
63	5.63	7.50	100.00	100.00
64	9.38	7.50	100.00	100.00
65	26.25	25.00	100.00	100.00
66	30.00	30.00	100.00	100.00
67	31.88	30.00	100.00	100.00
68	33.75	45.00	100.00	100.00
69	35.63	47.50	100.00	100.00
70	100.00	100.00	100.00	100.00

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

For deferred vested members, retirement age assumptions are as follows:

General Age: 62  
 Safety and Probation Age: 55

We assume that 50% of future deferred vested members will continue to work for a reciprocal employer. For reciprocals, we assume 4.00% compensation increases per annum.

**Future Benefit Accruals:**

1.0 year of service per year of employment.

## CURRENT ACTUARIAL ASSUMPTIONS

(continued)

<b>Unknown Data for Members:</b>	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
<b>Inclusion of Deferred Vested Members:</b>	All deferred vested members are included in the valuation.
<b>Percent Married:</b>	90% of male members; 50% of female members.
<b>Age of Spouse:</b>	Female (or male) spouses are 3 years younger (or older) than their spouses.
<b>Net Investment Return:</b>	8.00% per annum
<b>Employee Contribution Crediting Rate:</b>	8.00% per annum
<b>Consumer Price Index:</b>	Increase of 4.00% per year, retiree COLA increases due to CPI subject to a 3% maximum change per year.

**Salary Increases:**

Annual Rate of Compensation Increase (%)

Inflation: 4.00%; an additional 0.00% “across the board” salary increases (other than inflation); plus the following Merit and Promotional increases based on age.

Age	General	Safety	Probation
25	0.00%	0.00%	0.00%
30	0.00%	0.00%	0.00%
35	0.00%	0.00%	0.00%
40	0.00%	0.00%	0.00%
45	0.00%	0.00%	0.00%
50	0.00%	0.00%	0.00%
55	0.00%	0.00%	0.00%
60	0.00%	0.00%	0.00%
65	0.00%	0.00%	0.00%



**PROPOSED ACTUARIAL ASSUMPTIONS**

(continued)

**Termination Rates Before Retirement (continued):**

<b>Age</b>	<b>Rate (%)</b>		
	<b>Disability</b>		
	<b>General<sup>(1)</sup></b>	<b>Safety<sup>(2)</sup></b>	<b>Probation<sup>(2)</sup></b>
20	0.01	0.20	0.20
25	0.02	0.23	0.23
30	0.02	0.34	0.34
35	0.03	0.52	0.52
40	0.06	1.14	1.14
45	0.33	1.62	1.62
50	0.53	2.48	2.48
55	0.61	3.00	3.00
60	0.74	0.00	0.00

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

<sup>(2)</sup> 90% of Safety and Probation disabilities are assumed to be service connected disabilities. The other 10% are assumed to be non-service connected disabilities.

**PROPOSED ACTUARIAL ASSUMPTIONS**

(continued)

**Termination Rates Before Retirement (continued):**

<b>Years of Service</b>	<b>Rate (%)</b>		
	<b>Termination (Less than 5 Years of Service)<sup>(1)</sup></b>		
	<b>General</b>	<b>Safety</b>	<b>Probation</b>
0	14.50	11.00	11.00
1	11.50	9.50	9.50
2	10.50	7.50	7.50
3	9.50	6.50	6.50
4	8.50	5.50	5.50

<b>Age</b>	<b>Rate (%)</b>		
	<b>Termination (5+ Years of Service)<sup>(2)</sup></b>		
	<b>General</b>	<b>Safety</b>	<b>Probation</b>
20	4.50	5.00	5.00
25	4.50	4.70	4.70
30	4.50	3.90	3.90
35	4.50	3.50	3.50
40	4.50	3.20	3.20
45	4.50	2.40	2.40
50	4.50	1.10	1.10
55	3.30	0.20	0.20
60	2.20	0.00	0.00

<sup>(1)</sup> 85% of all terminated members will choose a refund of contributions and 15% will choose a deferred vested benefit. No termination is assumed after a member is eligible for retirement.

<sup>(2)</sup> 25% of all terminated members will choose a refund of contributions and 75% will choose a deferred vested benefit. No termination is assumed after a member is eligible for retirement.

**PROPOSED ACTUARIAL ASSUMPTIONS**

(continued)

**Retirement Rates:**

Age	Rate (%)		
	General	Safety	Probation
50	5.00	5.00	5.00
51	5.00	5.00	5.00
52	5.00	5.00	5.00
53	5.00	5.00	5.00
54	5.00	5.00	5.00
55	7.00	6.31	28.00
56	7.00	7.50	28.00
57	7.00	10.00	28.00
58	7.00	12.50	28.00
59	7.00	37.50	28.00
60	10.00	100.00	100.00
61	15.00	100.00	100.00
62	20.00	100.00	100.00
63	15.00	100.00	100.00
64	15.00	100.00	100.00
65	38.00	100.00	100.00
66	38.00	100.00	100.00
67	38.00	100.00	100.00
68	38.00	100.00	100.00
69	38.00	100.00	100.00
70	100.00	100.00	100.00

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

For deferred vested members, retirement age assumptions are as follows:

General Age:	60
Safety and Probation Age:	55

For future deferred vested members who terminate with less than five years of service and are not vested, we assume they will retire at age 70 if they decide to leave their contributions on deposit.

We assume that 60% of future deferred vested members will continue to work for a reciprocal employer. For reciprocals, we assume 4.50% compensation increases per annum.

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**Future Benefit Accruals:**

1.0 year of service per year of employment.

## PROPOSED ACTUARIAL ASSUMPTIONS

(continued)

<b>Unknown Data for Members:</b>	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
<b>Inclusion of Deferred Vested Members:</b>	All deferred vested members are included in the valuation.
<b>Percent Married:</b>	80% of male members; 50% of female members.
<b>Age of Spouse:</b>	Female (or male) spouses are 3 years younger (or older) than their spouses.
<b>Net Investment Return:</b>	7.75% per annum
<b>Employee Contribution Crediting Rate:</b>	7.75% per annum
<b>Consumer Price Index:</b>	Increase of 3.50% per year, retiree COLA increases due to CPI subject to a 3% maximum change per year.

**Salary Increases:**

Annual Rate of Compensation Increase (%)		
Inflation: 3.50%; an additional 0.50% “across the board” salary increases (other than inflation); plus the following Merit and Promotional increases based on age.		
Years of Service	General	Safety and Probation
0 - 1	5.00%	5.00%
1 - 2	3.75%	3.75%
2 - 3	3.50%	3.00%
3 - 4	2.75%	2.25%
4 - 5	2.25%	1.00%
5+	0.50%	0.50%