

Federated City Employees' Retirement System



Preliminary Demographic Experience Study Results Review of Economic Assumptions

October 15, 2015

Bill Hallmark, ASA, EA, FCA, MAAA

Jacqui King, ASA, EA, MAAA

Agenda



- Overview
- Demographic Assumptions
 - Mortality
 - Retirement
 - Other Assumptions
 - Cost Impact
- Economic Assumptions
 - Discount Rate
 - Wage Inflation
 - Price Inflation
- Questions

Overview



- Economic assumptions are reviewed every year
- Demographic experience study was last performed in 2010
- Reviews all non-economic assumptions
 - There is a lot of data and analysis
 - This presentation is intended to capture the most important findings
 - Additional information is in the appendix, but please refer to the forthcoming report for details on assumptions not covered in this presentation
- The assumptions adopted based on this experience study and review of economic assumptions will be used for the 2015 actuarial valuation
- We will also be recommending a change in the definition of actuarial equivalence for the calculation of optional benefit forms once assumptions are adopted for the valuation



- Key findings and recommendations
 - No changes recommended to economic assumptions
 - Mortality has improved faster than expected
 - New base mortality tables
 - New mortality improvement projection scales to be applied generationally
 - Retirement and termination rates have been higher than expected
 - The period of study (7/1/2010 – 6/30/2015) was an unusual period with the number of active employees declining by about 20% and the number of members receiving benefits increasing by 22%
 - Our recommendations are tempered by the belief that the period of study is not entirely representative of what we expect in the future



Assumption	Estimated % Change in Actuarial Liability	Estimated Change in Contribution Rate
Mortality	4.6%	5.8%
Retirement	2.3%	3.4%
Termination and Other	0.0%	-1.0%
Total	6.9%	8.2%

- Estimates are based on 2014 valuation and each assumption was estimated independently (doesn't capture combined effects)
- Estimated impact on normal cost rate is an increase of about 1%
- Remaining impact on contribution rate is due to amortization of change in actuarial liability over 20 years

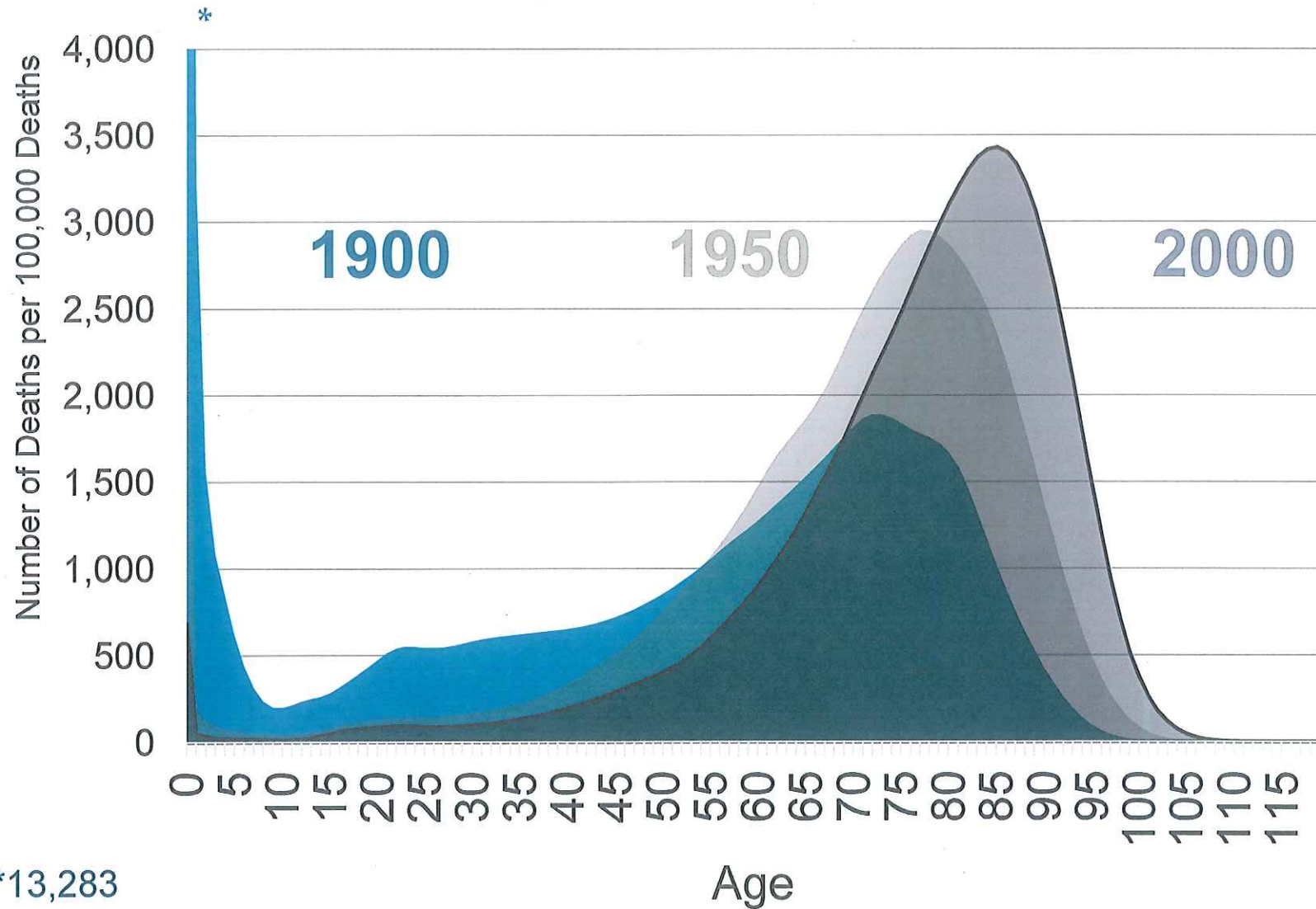


Demographic Experience Study

Mortality Improvement Overview



Changes in Age at Death



*13,283

Data: SSA Actuarial Study 120 – Periods 1900-2000, 50% male, 50% female

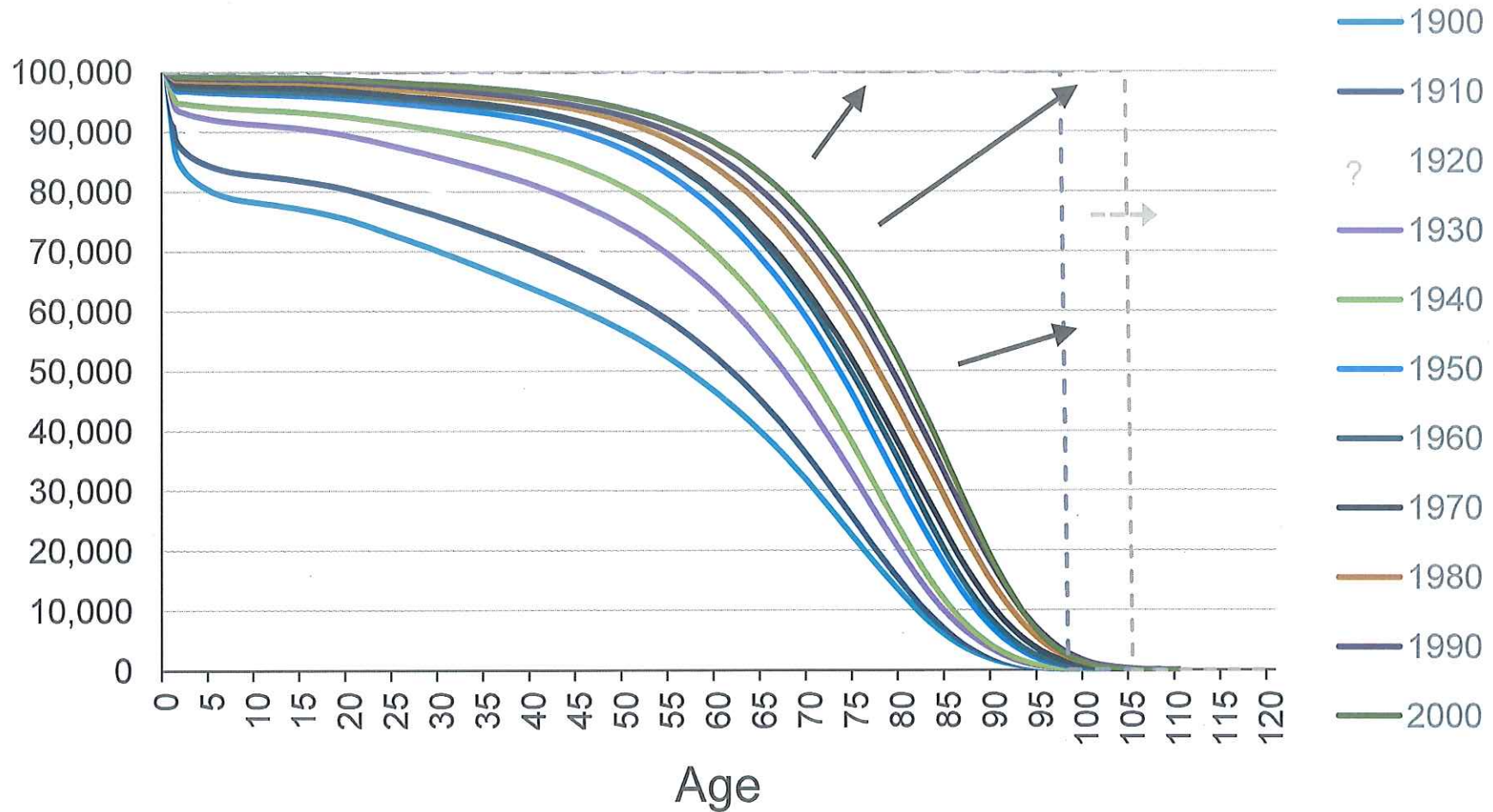
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Mortality Improvement Overview



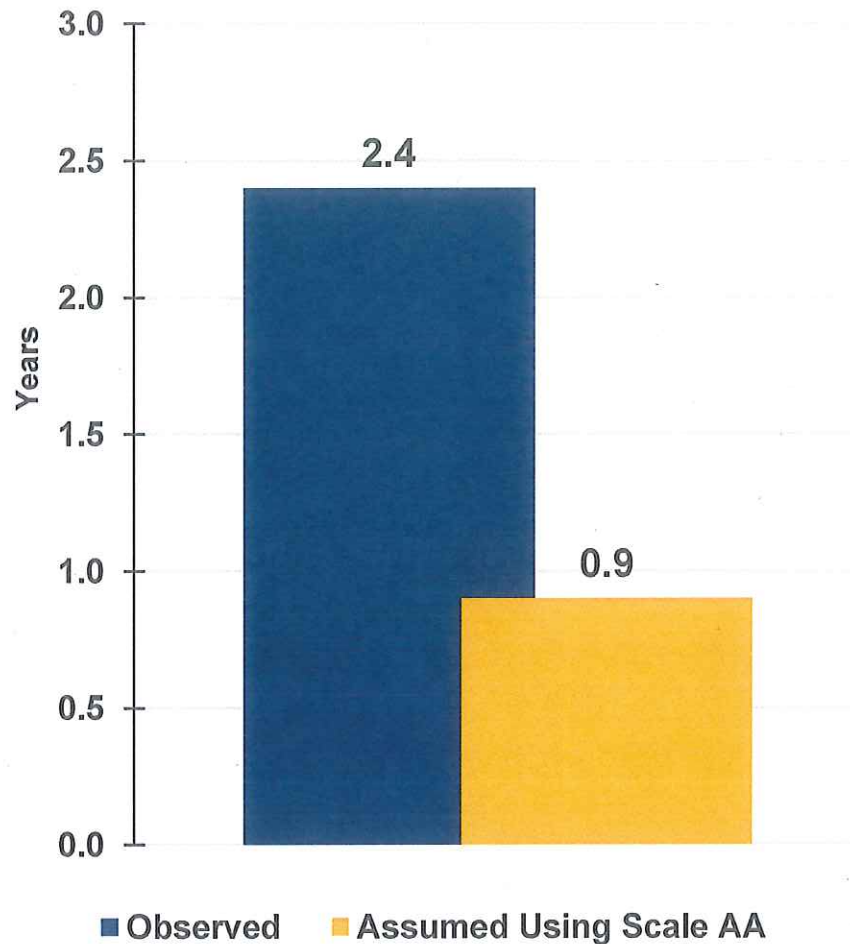
Number of Persons Living at Each Age



Mortality Improvement Overview



Assumed Mortality Improvement vs.
Observed Mortality Improvement in
US From 1990 - 2010



- Scale AA has been the primary basis for mortality improvement projections since 1995
- Actual mortality improvement in the US has been significantly greater than assumed
- Federated experience similarly shows faster improvement than expected

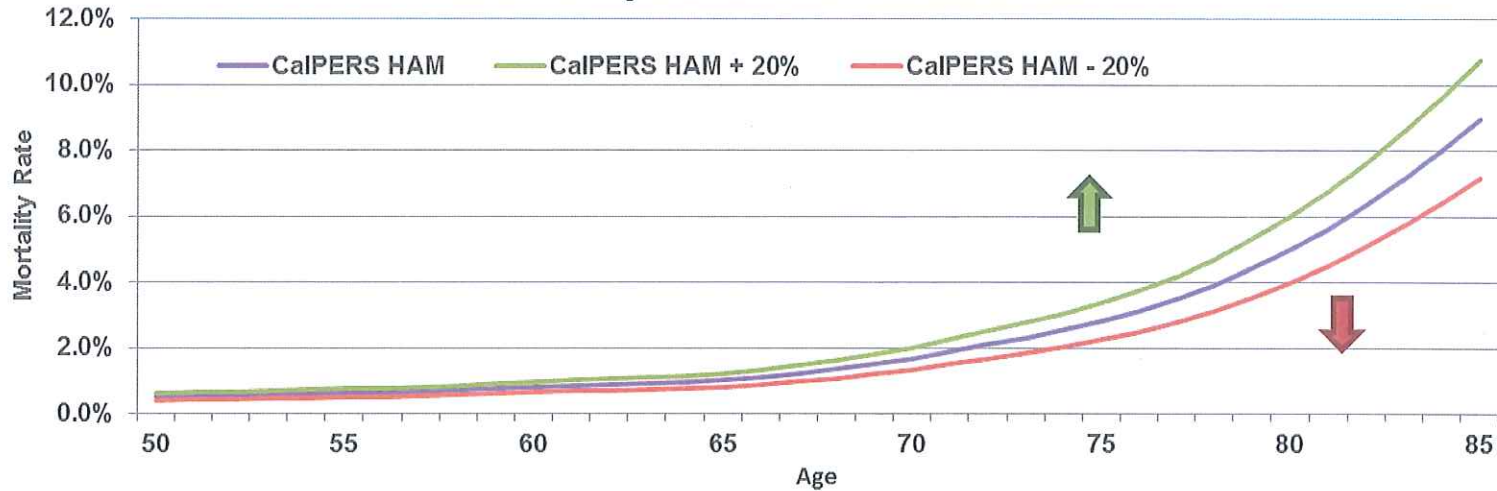


- Separate rates were developed for males and females for:
 - Healthy annuitants
 - Disabled annuitants
 - Non-annuitants
- Similar process used for each group
 - Develop base table
 - Apply projection scale

Mortality Base Table

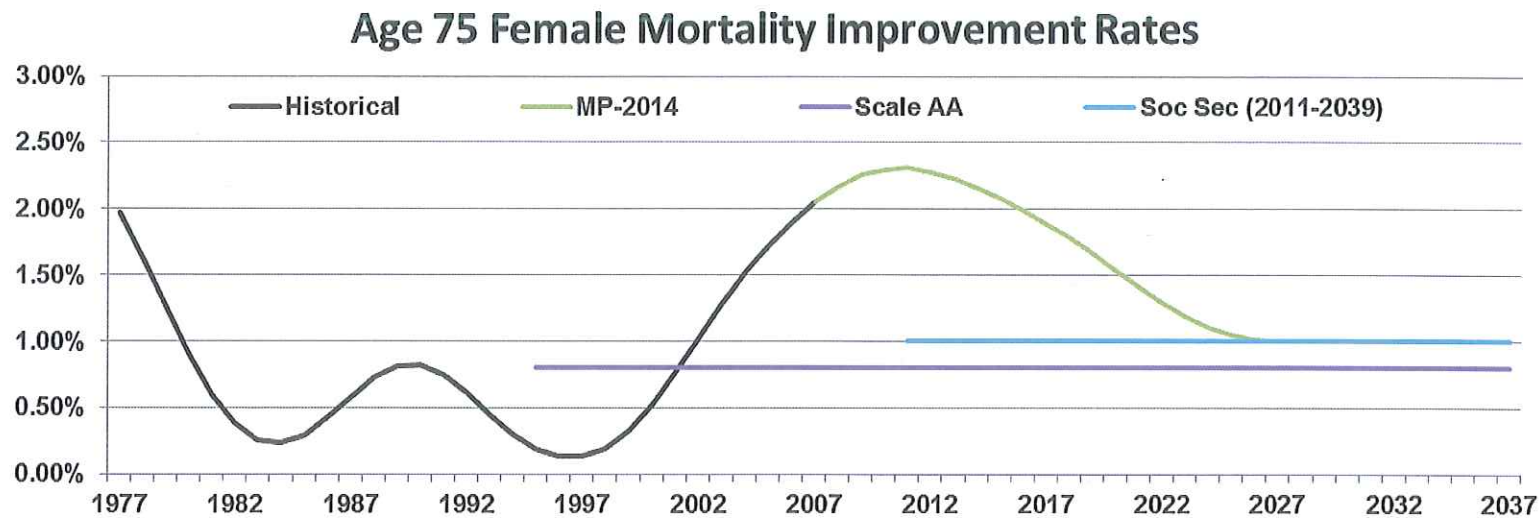


Illustrative Adjustments to Standard Table



Group	Exposures	Actual Deaths	Credibility Percentage	A/E Ratio Compared to CalPERS Weighting		Recommended Adjustment Factor
				Counts	Benefits	
<u>Healthy Annuitants</u>						
Male	8,353	214	44%	96.1%	91.0%	96.0%
Female	8,152	180	41%	90.6%	82.8%	93.0%
<u>Disabled Annuitants</u>						
Male	619	29	16%	121.0%	133.6%	105.5%
Female	379	8	10%	94.1%	104.7%	100.5%
<u>Non-Annuitants</u>						
Male	10,897	17	13%	100.4%	100.4%	100.1%
Female	9,790	12	11%	133.9%	133.9%	103.6%

Mortality Projection Scales



- The chart above shows historical and projected mortality improvement rates for females at age 75
 - Example used to illustrate the differences between improvement scales, but relationships will vary for males and for other ages
- Society of Actuaries Retirement Plans Experience Committee's best estimate is MP-2014
- Debates within actuarial community over appropriate rates of improvement and emerging data

Mortality - Generational vs. Static



- Since 2000, generational mortality assumptions have been considered best practice
 - Complications for valuation and administrative systems
- Recent guidance emphasizes the importance of generational mortality
- Under static assumptions
 - Project mortality improvements to a fixed future date
 - Apply to everyone in valuation
 - Update every experience study to keep current
 - Expect increased cost when update
- Under generational assumptions
 - Project mortality improvements separately for each year of birth

Static vs. Generational Illustration Probability of Death at Age 80

Birth Year	Static	Generational
1935	3.213%	4.126%
1945	3.213%	3.553%
1955	3.213%	3.213%
1965	3.213%	2.906%
1975	3.213%	2.628%
1985	3.213%	2.376%

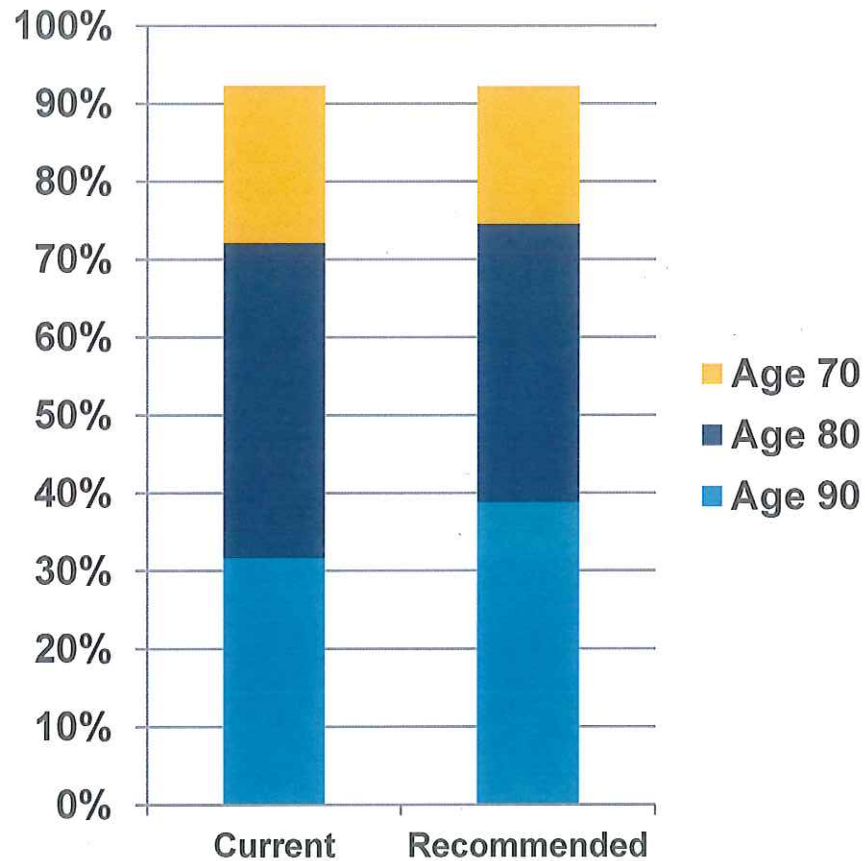
- Static mortality assumptions tend to overvalue retiree liabilities and under value active liabilities
- We recommend using a generational assumption

Mortality

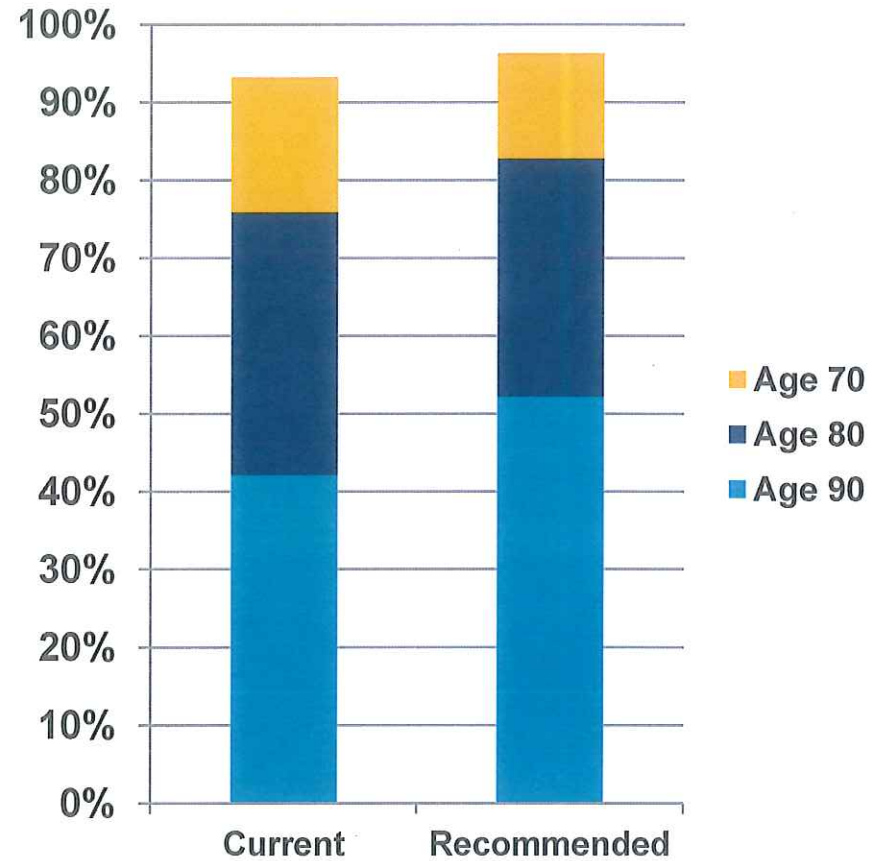


Probability of a 60-Year Old Healthy Annuitant Living to 70, 80 or 90 Current Mortality Assumption vs. Recommended

Males



Females



Tier 1 Retirement Rates

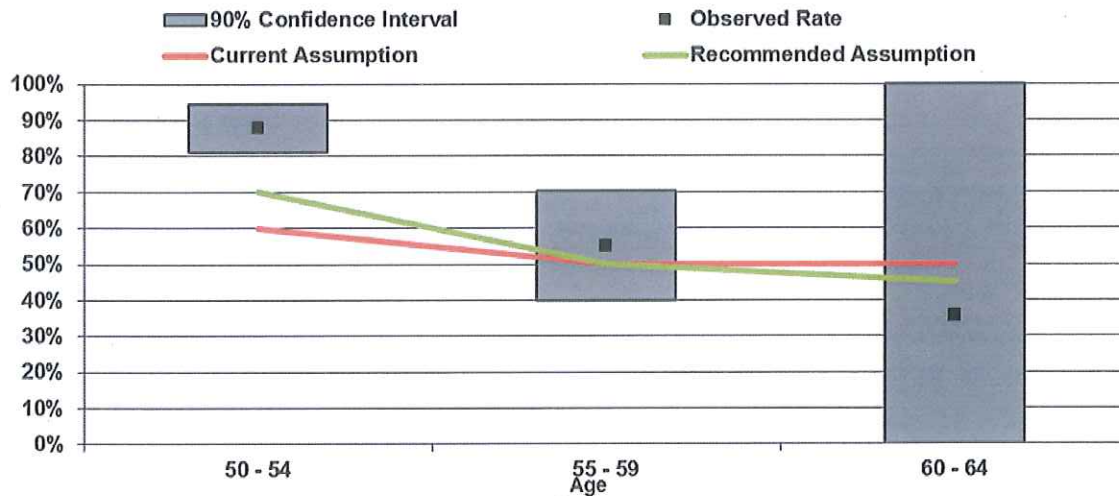


- Tier 1 Eligibility
 - Age 55 and 5 years of service or any age with 30 years of service
 - 15 years of service – eligible for retiree medical benefits
 - 30 years of service – maximum multiplier
- Assumptions are set separately for:
 - 30 or more years of service
 - 15 to 29 years of service
 - Less than 15 years of service
- Current assumptions are the same for everyone with less than 30 years of service

Tier 1 Retirement Rates



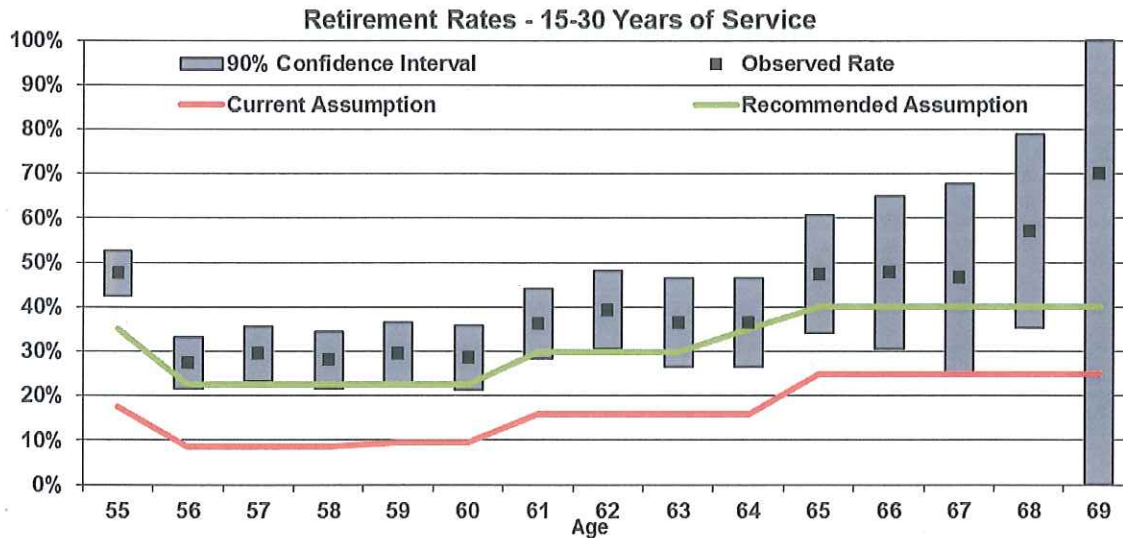
Retirement Rates - 30+ Years of Service



Age	Current	Recommended	Actual
50	60.00%	70.00%	87.88%
55	50.00%	50.00%	55.17%
60	50.00%	45.00%	35.71%
65	60.00%	45.00%	0.00%

- Younger members who reach 30 years of service have been retiring at extraordinarily high rates
- This pattern may continue in the near term, but we expect it to moderate over the long-term

Tier 1 Retirement Rates



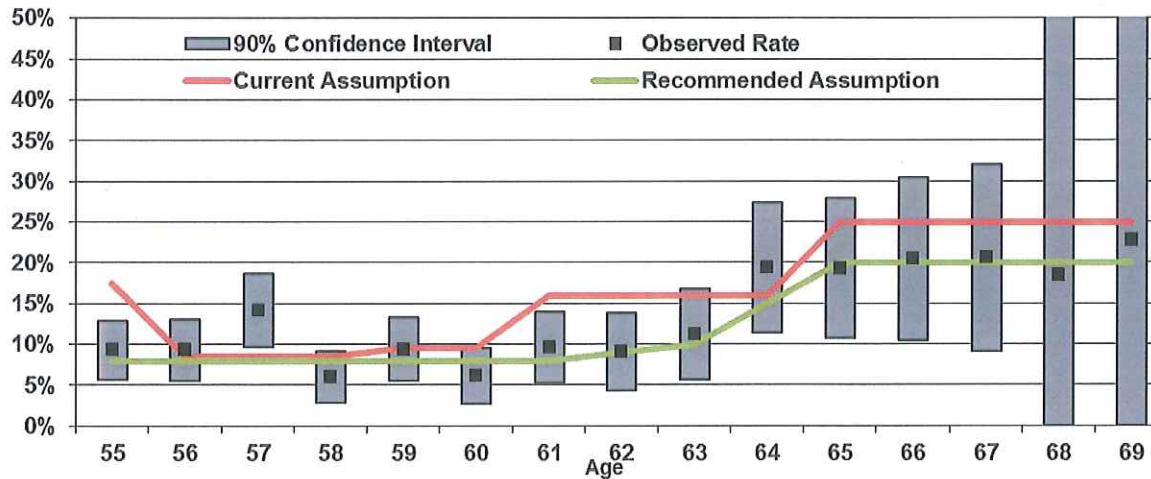
Age	Current	Recommended	Actual
55	17.50%	35.00%	47.53%
56	8.50%	22.50%	27.50%
57	8.50%	22.50%	29.45%
58	8.50%	22.50%	28.03%
59	9.50%	22.50%	29.57%
60	9.50%	22.50%	28.57%
61	16.00%	30.00%	36.27%
62	16.00%	30.00%	39.29%
63	16.00%	30.00%	36.51%
64	16.00%	35.00%	36.51%
65	25.00%	40.00%	47.37%
66	25.00%	40.00%	47.83%
67	25.00%	40.00%	46.67%
68	25.00%	40.00%	57.14%
69	25.00%	40.00%	70.00%

- Prior assumption didn't differentiate between those eligible for retiree medical benefits and those who are not
- Members who are eligible for retiree medical benefits have been retiring at much higher rates

Tier 1 Retirement Rates



Retirement Rates - Fewer Than 15 Years of Service



Age	Current	Recommended	Actual
55	17.50%	8.00%	9.30%
56	8.50%	8.00%	9.32%
57	8.50%	8.00%	14.11%
58	8.50%	8.00%	6.00%
59	9.50%	8.00%	9.40%
60	9.50%	8.00%	6.11%
61	16.00%	8.00%	9.60%
62	16.00%	9.00%	9.09%
63	16.00%	10.00%	11.24%
64	16.00%	15.00%	19.40%
65	25.00%	20.00%	19.30%
66	25.00%	20.00%	20.45%
67	25.00%	20.00%	20.59%
68	25.00%	20.00%	18.52%
69	25.00%	20.00%	22.73%

- Prior assumption didn't differentiate between those eligible for retiree medical benefits and those who are not
- Members who are not eligible for retiree medical benefits have been retiring at lower rates

Other Assumptions



Assumption	Change
Tier 2 retirement rates	No change
Vested terminated retirement age	Reduce from 58 to 57
Termination rates	Increase rates
Refund rates	Decrease rates, particularly at older ages
Reciprocity	Increase from 20% to 25%
Disability rates	Reduce incidence rates and reduce percentage assumed to be duty-related
Merit salary scale	No change
Percent married	No change
Spouse's age difference	No change
Administrative expenses	Increase from 0.7% to 1.0% of pay

Economic Assumption Review



- We believe the current economic assumptions remain reasonable
 - Based on 20-year assumptions provided by Meketa, the median return is approximately 7.4% for the pension assets and 7.3% for the OPEB assets (115 trust). The likelihood of achieving or exceeding the current assumption of 7.0% is about 56% under these assumptions
 - While the City has agreed to provide annual pay increases of 3.0% for 3 years, the current wage inflation assumption of 2.85% remains reasonable over the long term
 - The current price inflation assumption of 2.5% has no direct impact on the valuation and remains reasonable
- Full analysis is shown in the appendix

Estimated Cost Impact



Assumption	Estimated % Change in Actuarial Liability	Estimated Change in Contribution Rate
Mortality	4.6%	5.8%
Retirement	2.3%	3.4%
Termination and Other	0.0%	-1.0%
Total	6.9%	8.2%

- We will return next month with estimated impacts on the pension plan based on the preliminary 6/30/2015 actuarial valuation results
- Options the Board may wish to consider
 - Phase in the impact of assumption changes on contribution rates
 - Consider an alternative mortality improvement projection scale



Board Discussion

Required Disclosures



- The purpose of this presentation is to review the demographic experience study for the City of San José Federated City Employees' Retirement System.
- In preparing our presentation, we relied on information (some oral and some written) supplied by the System. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.
- To the best of our knowledge, this presentation and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this presentation. This presentation does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.
- This presentation was prepared exclusively for the City of San José Federated City Employees' Retirement System for the purpose described herein. Other users of this presentation are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.

William R. Hallmark, ASA, FCA, EA, MAAA
Consulting Actuary

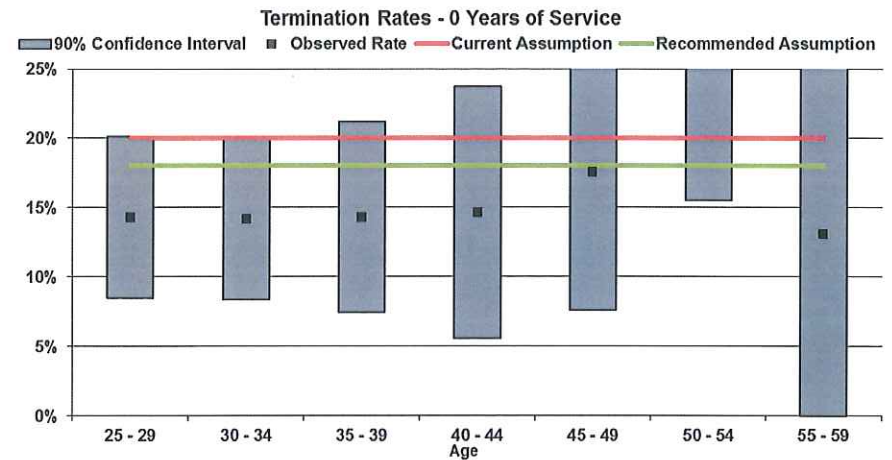
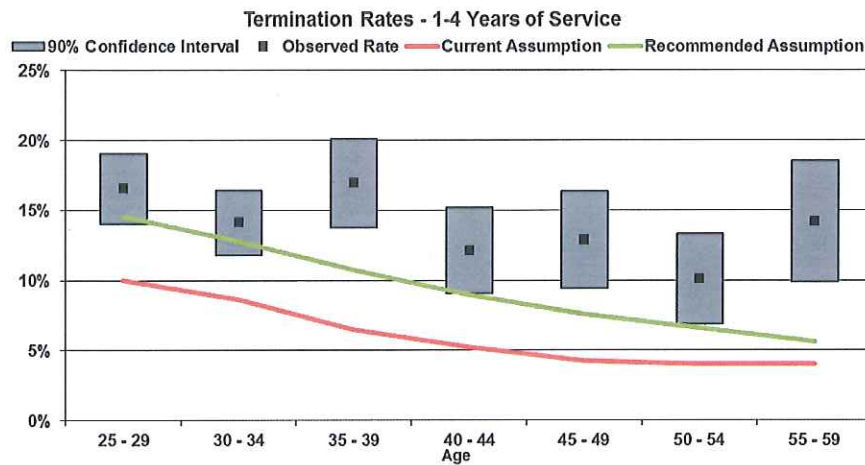
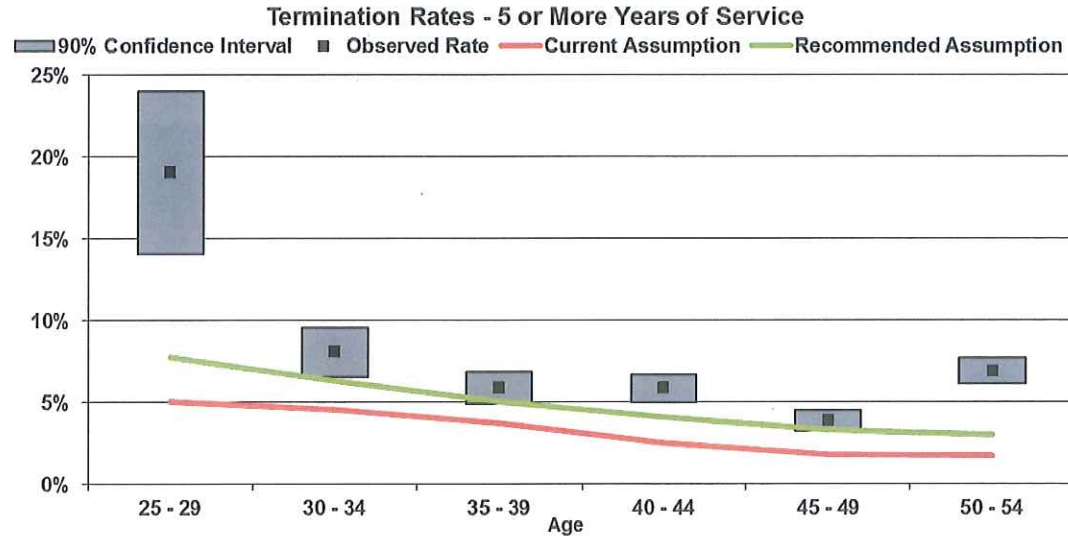
Jacqui King, ASA, EA, MAAA
Associate Actuary



Demographic Assumptions

Termination Rates
Refund Rates
Disability Rates
Merit Salary Increases
Administrative Expenses

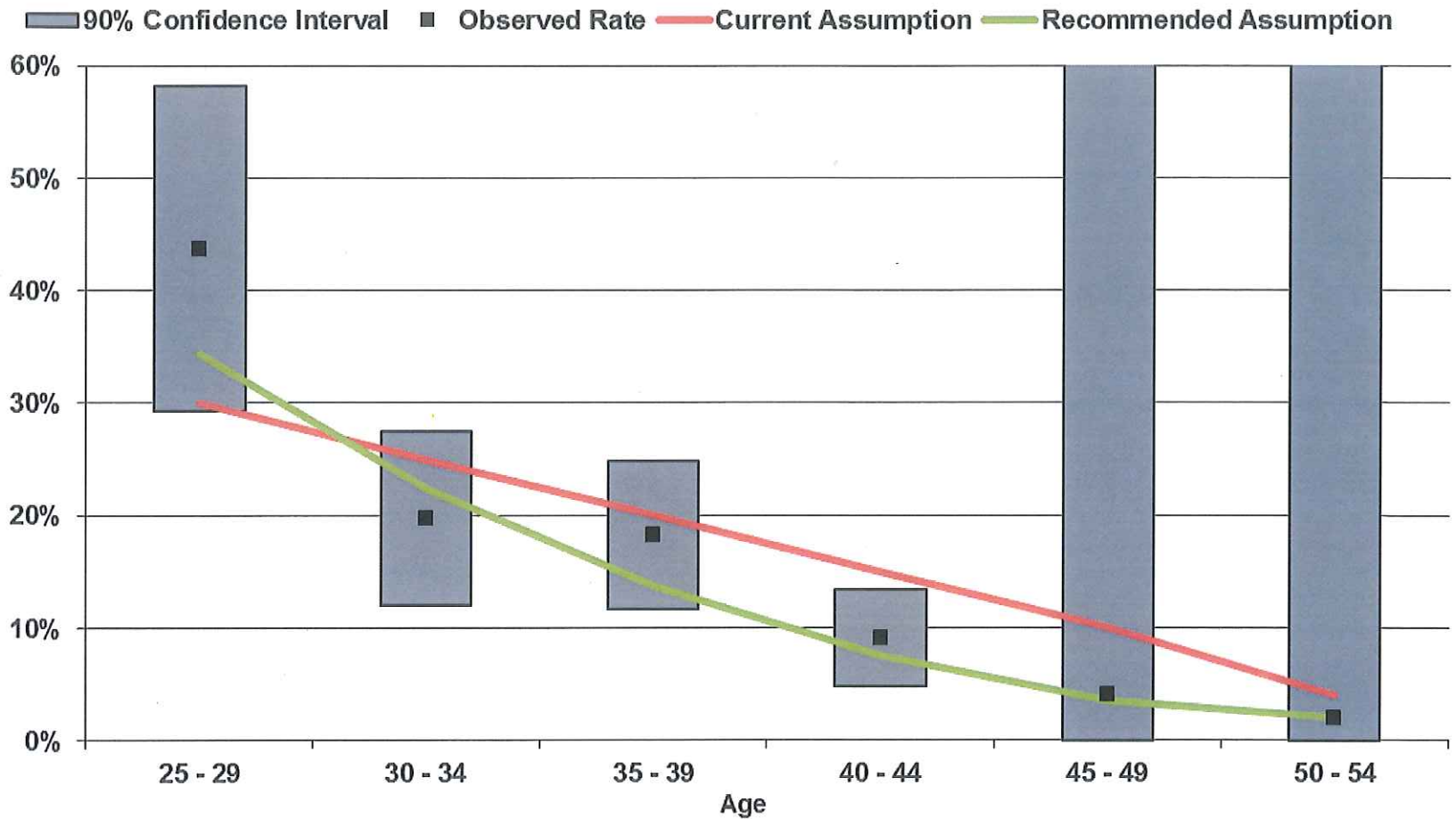
Appendix – Termination Rates



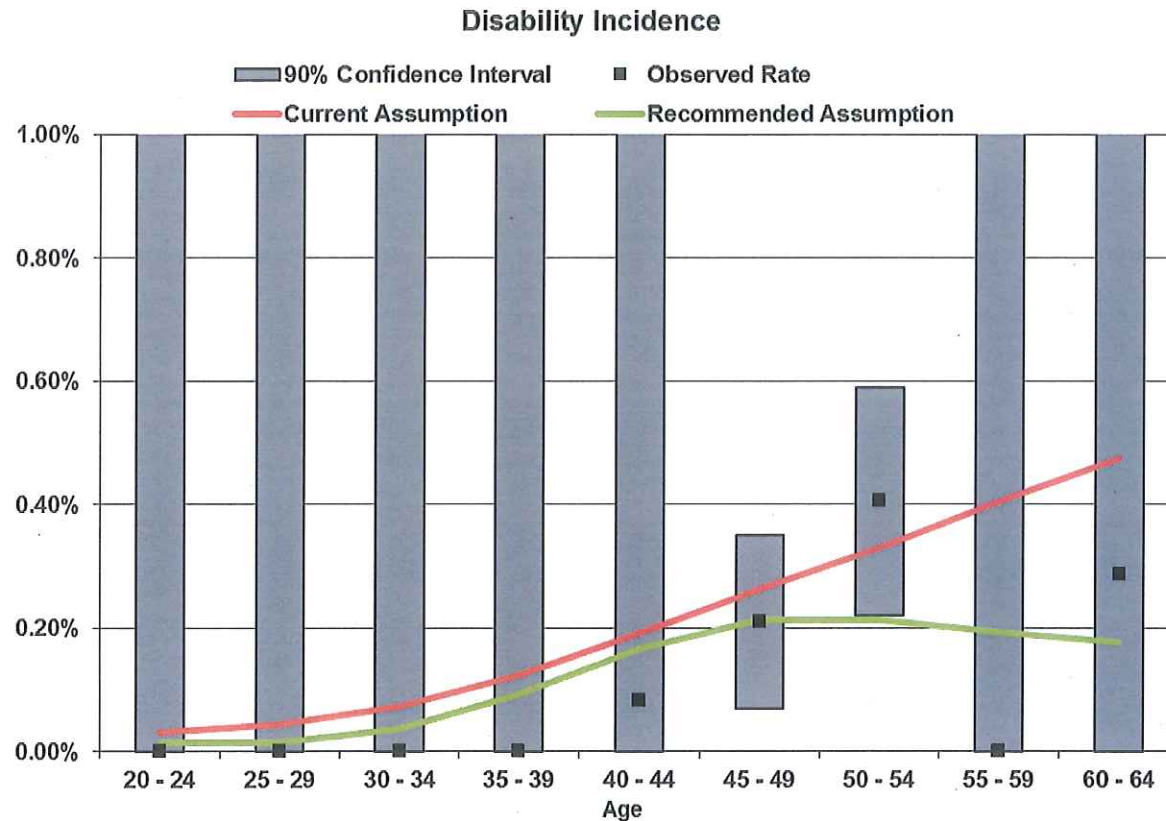
Appendix – Refund Rates



Refund Rates - 5 or More Years of Service



Appendix – Disability Rates

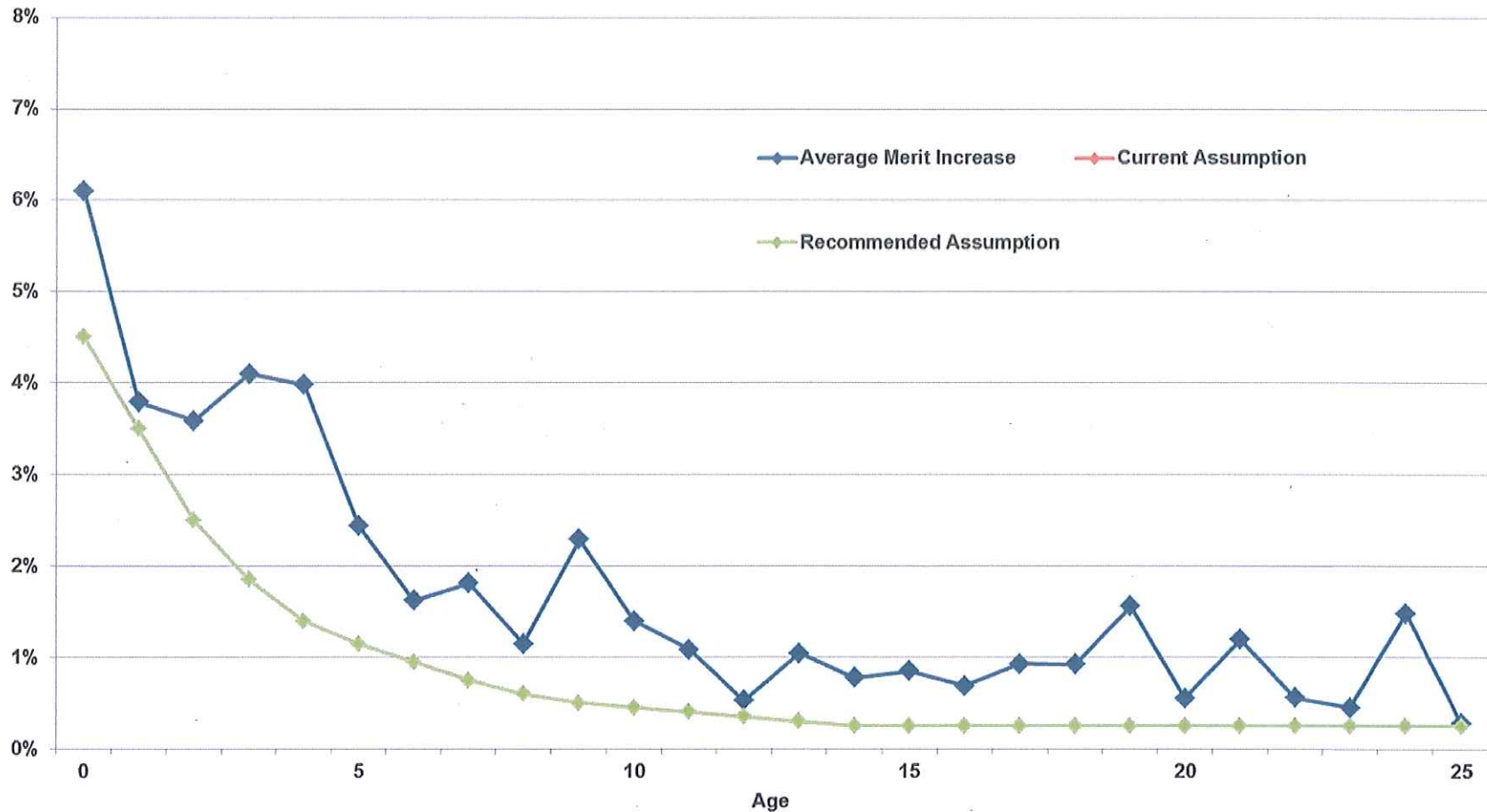


- The recommended assumption is 99% of the CalPERS ordinary disability rates for miscellaneous employees of public agencies weighted 55% male and 45% female.
- Only 6 of the 24 disabilities in the last 5 years have been duty-related. We recommend reducing the assumed percentage that are duty-related from 50% to 40%, the 95th percentile incidence rate based on the experience.

Appendix – Merit Salary Increases



Merit Salary Increase by Service



Due to the extreme experience in some years of the study, including large across the board pay cuts and significant reductions in the number of employees, we do not believe the analysis of merit increases reflects the level of increases during the period or those anticipated in the future. As a result, we recommend no change to the merit scale at this time.

Appendix – Administrative Expenses



- Administrative expenses are assumed to be approximately 0.7% of payroll
- Since 2010, total annual payroll has declined by about \$70 million while administrative expenses have increased by about \$1.3 million
- We recommend partially reflecting these changes and increasing the administrative expense assumption to 1.0% of payroll (the 10-year average rate)
- If total payroll doesn't recover somewhat, an additional increase may be needed in the future



Economic Assumption Review

Discount Rate
Price Inflation
Wage Inflation

Appendix – Discount Rate



- Most powerful single assumption
 - Higher expected return → Lower expected contributions
 - Over time, actual contributions will depend on actual investment returns (not expected)
 - Current discount rate is 7.00% (was at 8.25%, then lowered to 7.75% in 2009, 7.95% in 2010, 7.5% in 2011, 7.25% in 2013, and 7.00% in 2014)
- Context for selecting the discount rate
 - Historical experience
 - Industry trends
- Primary factors considered in selecting the discount rate
 - Expectations for the future
 - Board's risk preference

Appendix – Declining Interest Rates



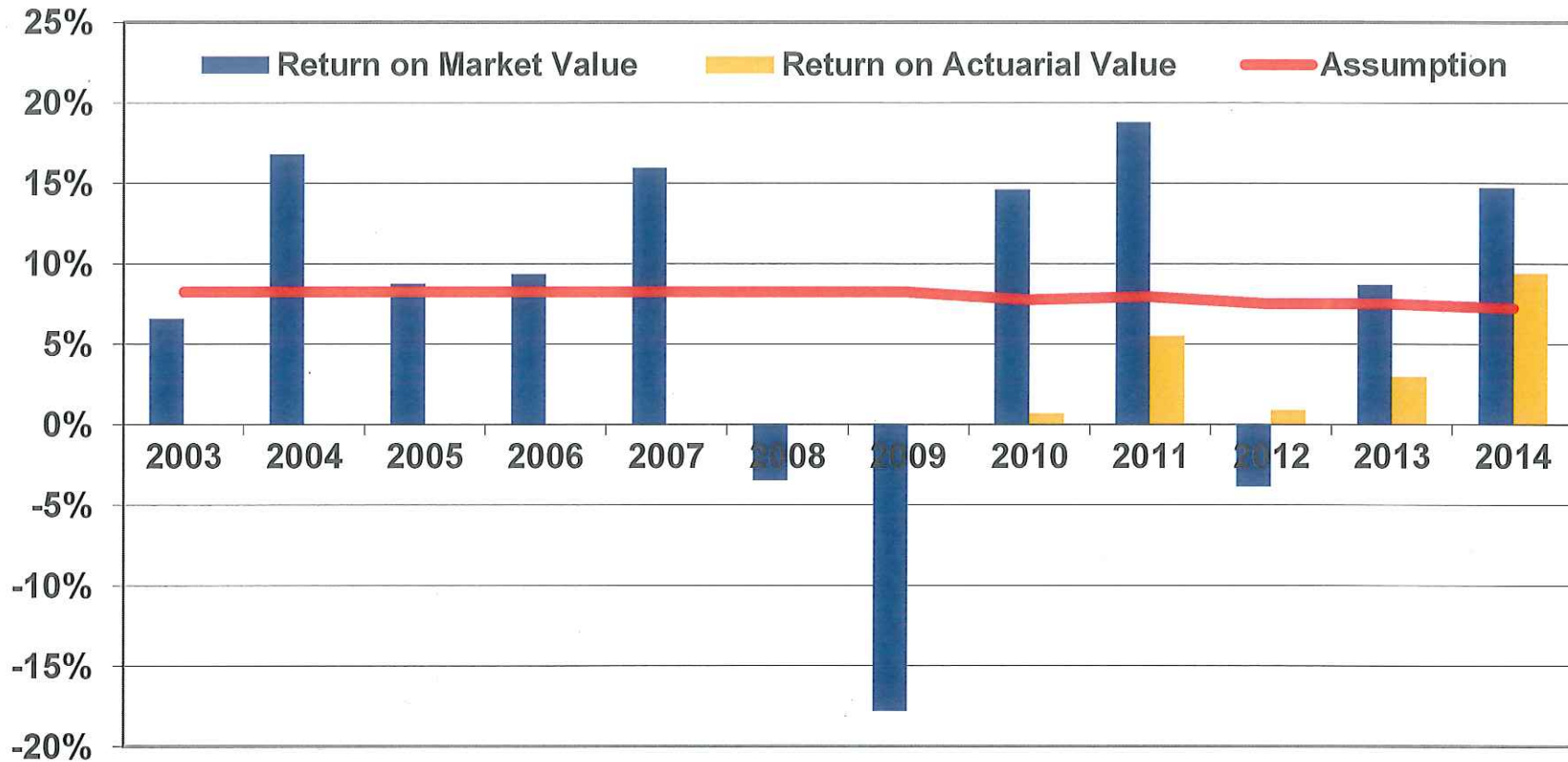
- As interest rates have declined, pension plans have been forced to take on more investment risk in order to achieve their assumed return

	1974	1985	1995	2005	2015
Assumed Return	7.00%	8.50%	8.25%	8.25%	7.00%
Yield on 10-Year Treasury	7.65%	10.19%	6.21%	4.06%	2.32%
Implied Risk Premium	-0.65%	-1.69%	2.04%	4.19%	4.68%

Appendix – Historical Performance



Net Investment Return on Assets

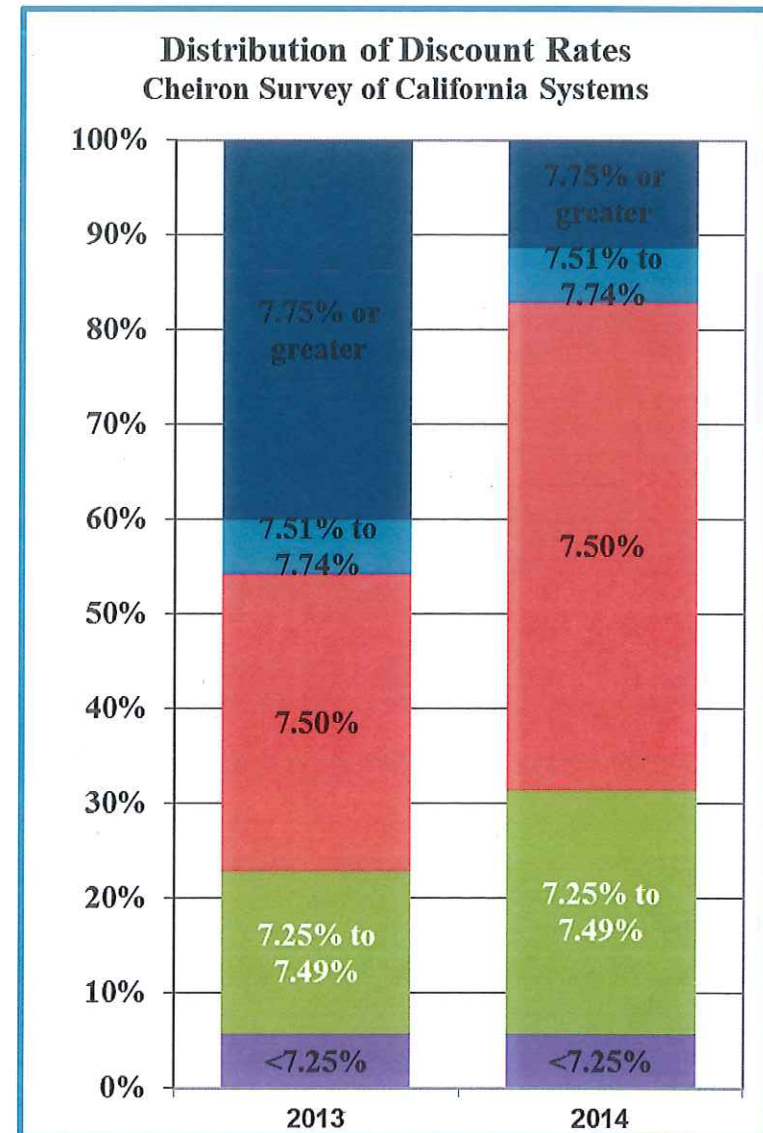


Year Ending June 30,

Appendix – California Survey



- Survey covers 35 retirement systems in California for valuation dates from 6/30/2013 to 1/1/2015
- Minimum = 7.0%
- Median = 7.50% (used by 18 systems compared to 11 last year)
- Maximum = 7.75% (used by 4 systems compared to 14 last year)



Appendix – Expected Return on Assets



Pension Portfolio Assumptions				
Asset Category	Target Allocation	Arithmetic Return	Geometric Return	Standard Deviation
Investment Grade Bonds	5.0%	3.20%	3.10%	4.50%
TIPS	5.0%	3.00%	2.73%	7.50%
Emerging Market Bonds (major)	2.5%	6.80%	6.02%	13.00%
Emerging Market Bonds (local)	2.5%	7.00%	6.10%	14.00%
Global Equity	22.0%	10.60%	8.92%	19.50%
Private Equity	9.0%	12.40%	9.92%	24.00%
Mezzanine Debt	5.0%	9.00%	7.21%	20.00%
Core Private Real Estate	4.0%	7.20%	6.48%	12.50%
Value-Added Real Estate	2.0%	9.70%	7.92%	20.00%
Opportunistic Real Estate	1.0%	12.40%	9.72%	25.00%
Timberland	1.0%	7.10%	6.43%	12.00%
Farmland	1.0%	7.70%	6.92%	13.00%
Oil & Gas E&P	2.0%	12.80%	9.70%	27.00%
Mining	1.0%	13.30%	9.76%	29.00%
Commodities (naive)	6.0%	6.60%	4.77%	20.00%
Core Infrastructure	5.0%	8.20%	7.04%	16.00%
Long-Short	6.0%	5.32%	4.64%	12.00%
Global Macro	6.0%	6.60%	6.26%	8.50%
Fixed Income/Long-Short Credit	4.0%	4.40%	3.92%	10.00%
Relative Value/Arbitrage	5.0%	7.30%	6.79%	10.50%
Tactical Asset Allocation	5.0%	5.90%	5.17%	12.50%
Total	100.0%	8.05%	7.40%	11.91%

Health Portfolio Assumptions				
Asset Category	Target Allocation	Arithmetic Return	Geometric Return	Standard Deviation
Investment Grade Bonds	12.65%	3.20%	3.10%	4.50%
TIPS	12.65%	3.00%	2.73%	7.50%
Emerging Market Bonds (major)	2.50%	6.80%	6.02%	13.00%
Emerging Market Bonds (local)	2.50%	7.00%	6.10%	14.00%
Global Equity	46.70%	10.60%	8.92%	19.50%
Core Private Real Estate	7.00%	7.20%	6.48%	12.50%
Public Natural Resources	5.00%	11.60%	9.11%	24.00%
Commodities (naive)	6.00%	6.60%	4.77%	20.00%
Public Infrastructure	5.00%	9.90%	8.21%	19.50%
Total	100.00%	8.05%	7.31%	12.76%

- Capital market assumptions are 20-year assumptions provided by Meketa
- Separate analysis for Pension and Health asset allocations
- Forward-looking geometric returns for both portfolios are similar and support the current assumption of 7.0%



- In the past, usually set discount rate equal to expected return on assets
- There is an increasing trend to set a lower discount rate than expected return on assets
 - Significant uncertainty in what actual future investment returns will turn out to be
 - Board risk preference may be to meet the assumption more than 50% of the time
 - Impact of risk further suggests setting the discount rate lower than the expected rate of return

Appendix – Expected Return on Assets



- Based on these assumptions, there is a 56% chance of achieving the current assumed rate of return of 7.0%
- Depending on the Board's risk tolerance, the margin between the 50th percentile and the assumption can be adjusted

Expected Distribution of Average Annual Passive Investment Returns

20 Years

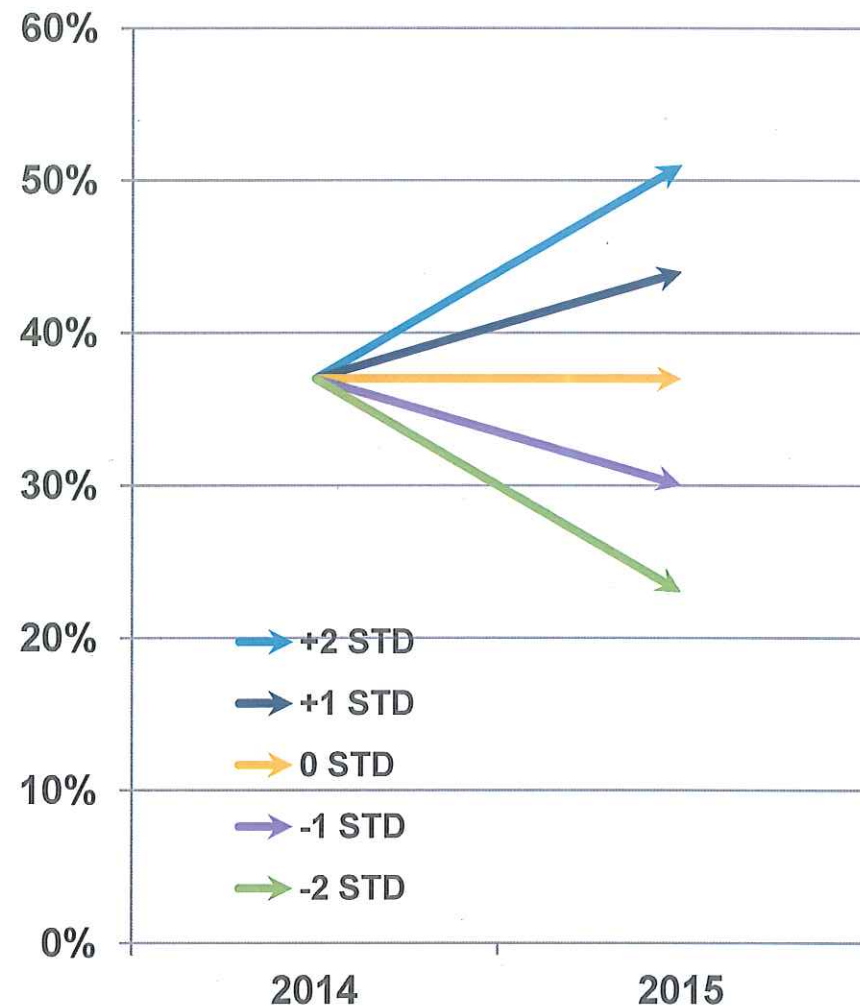
Percentile	Pension	Health
95th	11.83%	12.06%
75th	9.20%	9.23%
50th	7.40%	7.31%
44th	7.00%	6.88%
40th	6.75%	6.61%
25th	5.64%	5.42%
5th	3.15%	2.76%

Appendix – Interest Cost of UAL



- Interest for one year on the UAL is about 37% of payroll in the 6/30/14 valuation
- The standard deviation of investment returns is estimated to be about 12% and assets are about 8.4 times payroll
- A one standard deviation event (about 17% chance) would increase or decrease the interest on the UAL by about 7% of payroll
- A two standard deviation event would increase or decrease the interest on the UAL by about 14% of payroll
- We call this the **Interest Cost at Risk (ICaR)**

Interest on UAL

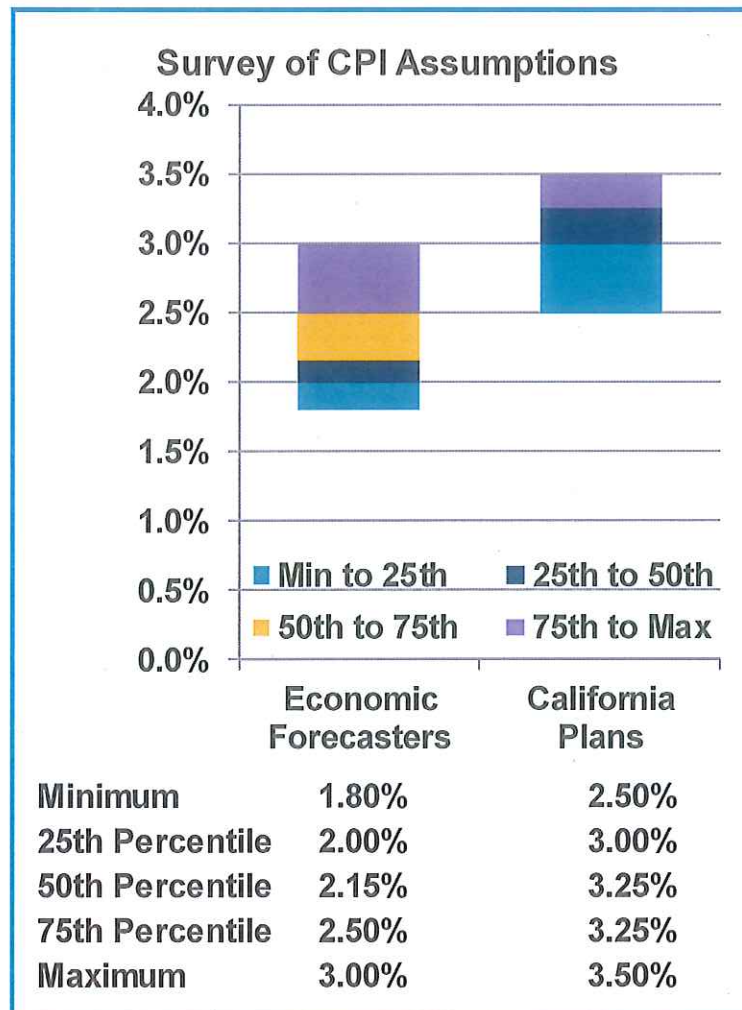


Appendix – Price Inflation



- Price inflation is a core building block of other assumptions, including wage inflation and the expected return on assets
- The expected rate of return on assets was developed using Meketa's 20-year capital market assumptions, including an inflation assumption of 2.8%
- With Tier 2, COLAs are now equal to inflation up to a maximum of 1.5%
- As long as the inflation assumption exceeds 1.5% by some margin, it will not have a direct impact on the valuation

Appendix – Price Inflation



- The Federal Reserve publishes a quarterly survey of professional economic forecasters
- The chart shows the distribution of the professionals forecasts for average inflation over the next 10 years compared to assumptions used by California public pension plans
- The most common assumption in California public pension plans is 3.25% (used by 18 of the 35 systems in the survey)
- 20-year breakeven inflation (the difference between yields on 20-year nominal Treasury securities and Treasury inflation protection securities) is 1.9%
- The current assumption is 2.5% which we believe continues to be reasonable

Appendix – Wage Inflation

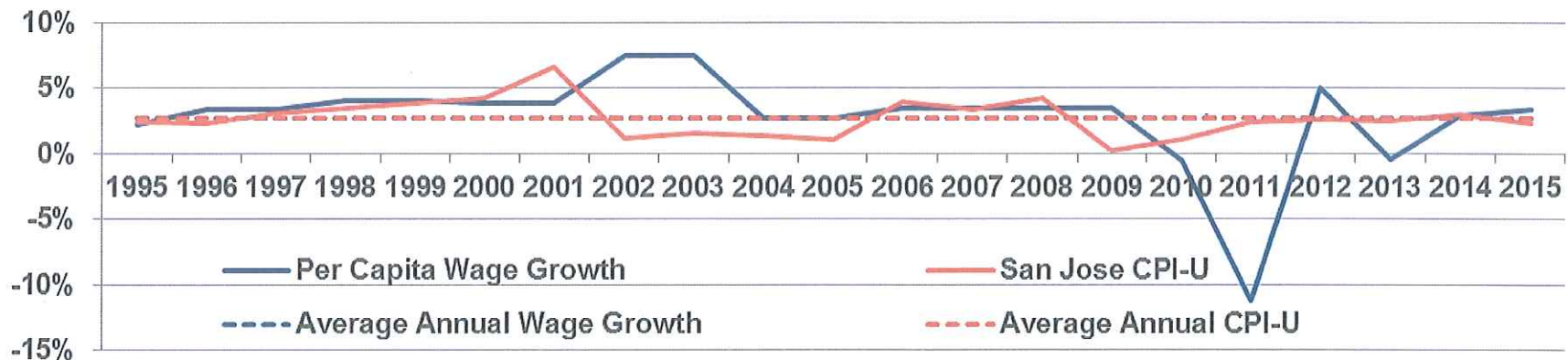


- Wage inflation can be thought of as the annual across-the-board increases in wages
- Individual salary increases in excess of wage inflation are studied as part of the merit salary scale
- Wage inflation generally exceeds price inflation over the long term by some margin reflecting the history of increased purchasing power
- Wage inflation is used in the actuarial valuation as:
 - The minimum individual salary increase, and
 - The rate of payroll growth for purposes of the amortization of the unfunded liability
- The current assumption is 2.85%

Appendix – Wage Inflation



San Jose Wage Growth



- In recent years, there have been significant across-the-board wage cuts resulting in a decline in real wages
- Over the 20-year period, average wage growth (2.73%) was comparable to San Jose inflation (2.71%)
- We understand that 3.0% across the board wage increases have been negotiated for the next three years
- The median wage inflation in our survey of California systems is 3.75% (used by 11 of the 35 systems)
- We believe the current long-term assumption of 2.85% continues to be reasonable



CHEIRON



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Cheiron (pronounced kī·ron), the immortal centaur from Greek mythology, broke away from the pack and was educated by the gods. Cheiron became a mentor to classical Greek heroes, then sacrificed his immortality and was awarded in eternity as the constellation Sagittarius.



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