



Cavanaugh Macdonald
CONSULTING, LLC
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Kentucky Retirement Systems Experience Study July 1, 2008 to June 30, 2013

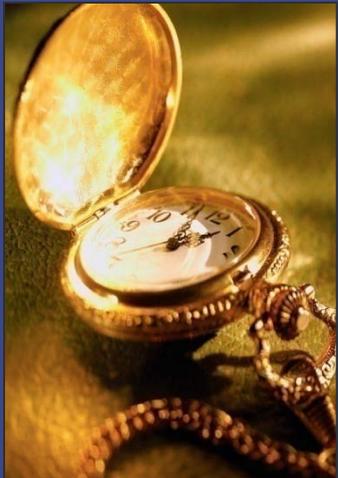




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Key Findings



- Recommended Demographic Assumption Changes
 - Adjust withdrawal, retirement and mortality decrements for all Systems to better match experience
 - Adjust disability decrements for KERS Non-Hazardous, KERS Hazardous, and CERS Non-Hazardous to better match experience
 - Adjust certain coverage assumptions for retiree healthcare benefits to better match experience



Key Findings



➤ Recommended Economic Assumption Changes

Item	Current	Proposed
Price Inflation	3.50%	3.25%
Investment Return	7.75%	7.50%
Wage Inflation	4.50%	4.00%



Demographic Assumptions

- Assumptions Reviewed
 - Rates of Withdrawal
 - Rates of Pre-Retirement Mortality
 - Rates of Disability Retirement
 - Rates of Retirement
 - Rates of Post-Retirement Mortality
 - Rates of Salary Increase

- Actuarial Standard of Practice (ASOP) No. 35, *“Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations”*, which provides guidance to actuaries in selecting demographic assumptions for measuring obligations under defined benefit plans.



Demographic Assumptions

- Study compares what actually happened during the study period (7/01/2008 through 6/30/2013) with what was expected to happen.
- Assumption changes recommended if actual experience differs significantly from expected.
- Judgment required to extrapolate future experience from past experience.



Demographic Assumptions



- Funds reviewed (pension and healthcare)
 - KERS Non-Hazardous
 - KERS Hazardous
 - CERS Non-Hazardous
 - CERS Hazardous
 - SPRS

- Results compare actual and expected decrements and present recommended changes, if any.

- Next slides use KERS Non-Hazardous as an example.



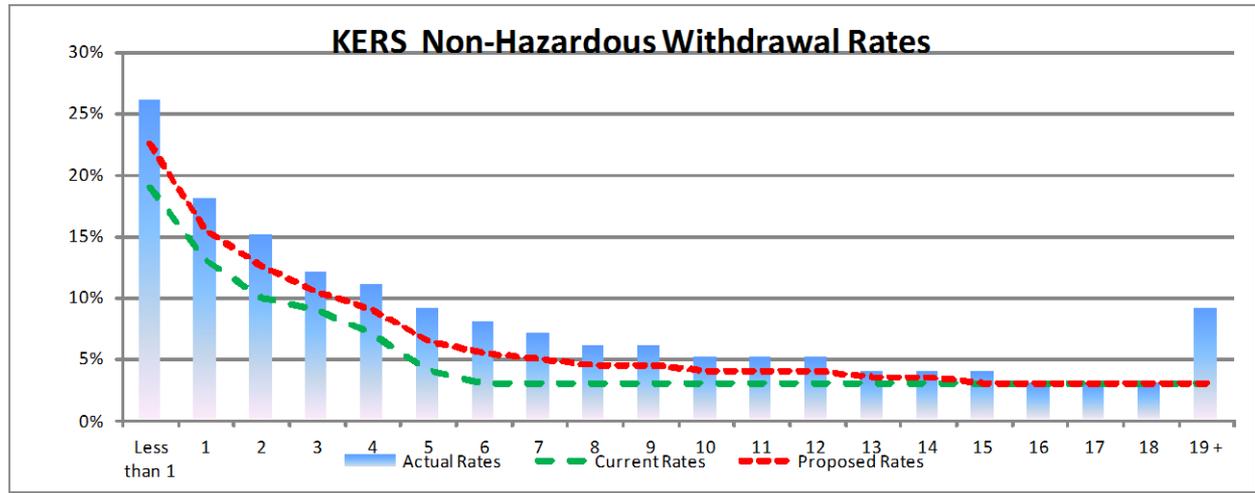
Demographic Assumptions



- Withdrawal –
 - Eliminated a specific Select Period as all rates were moved to service based.
 - Increased all effective rates through 15 years of service.



Demographic Assumptions



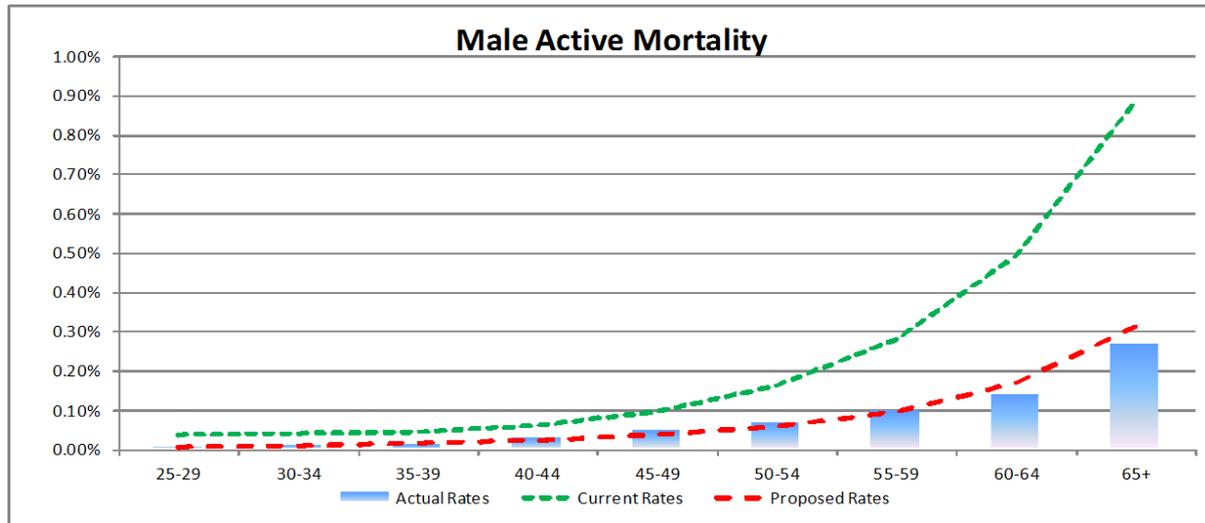


Demographic Assumptions



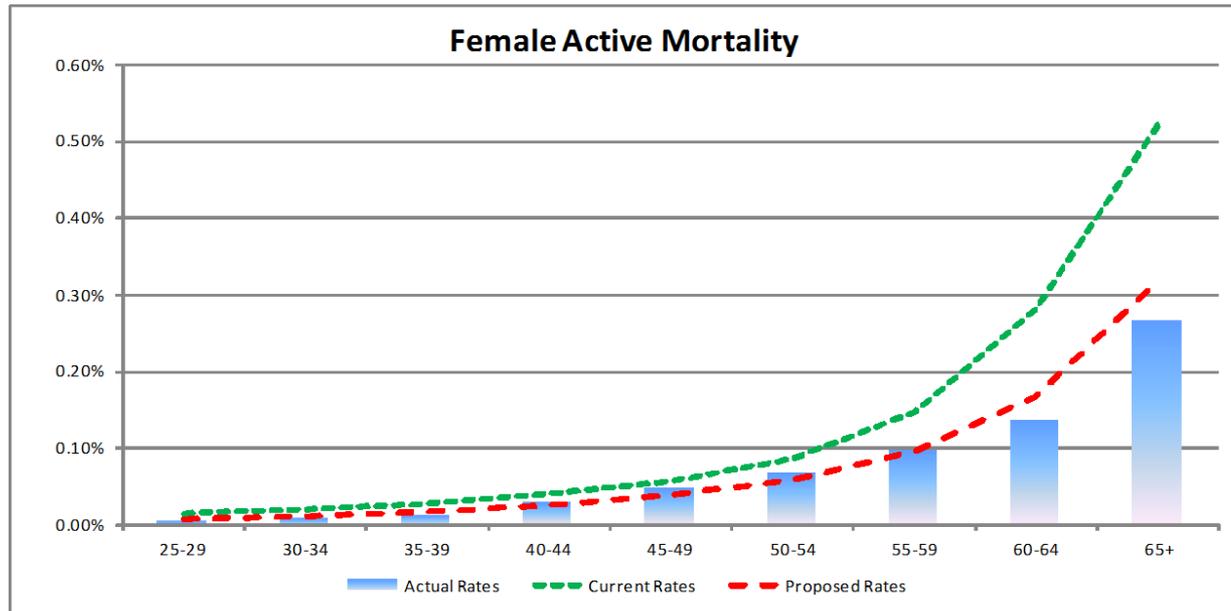
- Pre-Retirement Mortality
 - Compared Actual versus Expected in Aggregate
 - Much less actual deaths in active service than expected.
 - Recommend using half the post-retirement mortality assumption (RP-2000 Combined Mortality Table)

Demographic Assumptions





Demographic Assumptions



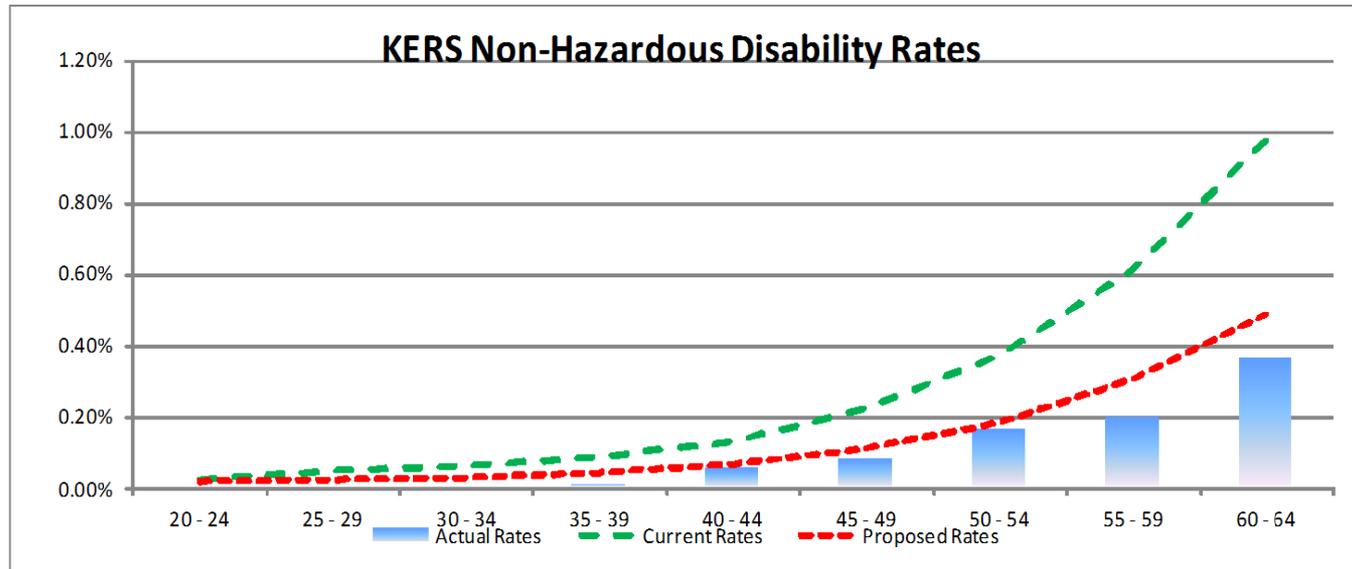


Demographic Assumptions

- Disability Retirement
 - Compared Actual versus Expected by Fund
 - For all funds except SPRS, there were far fewer actual disability retirements than expected.
 - Previous study showed a similar pattern.
 - Lowered disability rates for KERS Non-Hazardous, KERS Hazardous and CERS Non-Hazardous but not as much as current experience would suggest.
 - Exposures for CERS Hazardous and SPRS were not sufficient to generate a recommended change.



Demographic Assumptions





Demographic Assumptions

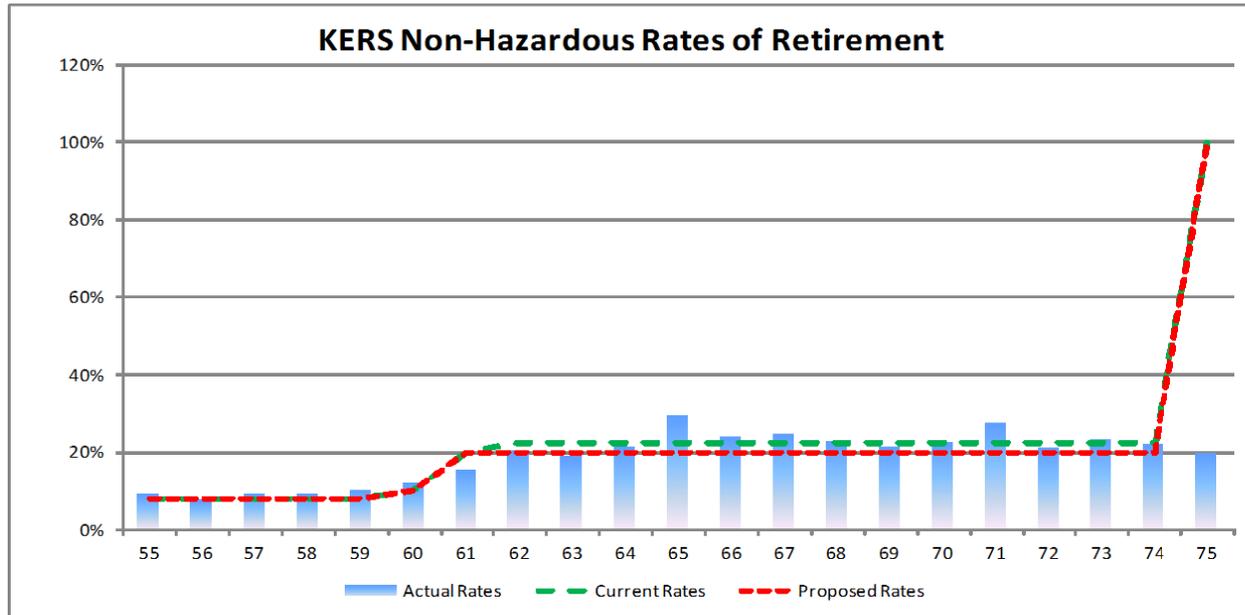


➤ Service Retirement

- In general, there were fewer actual retirements than expected for the non-hazardous groups and more than expected for the hazardous groups.
- We recommend adjustments in rates to more accurately reflect the experience at each retirement age.



Demographic Assumptions



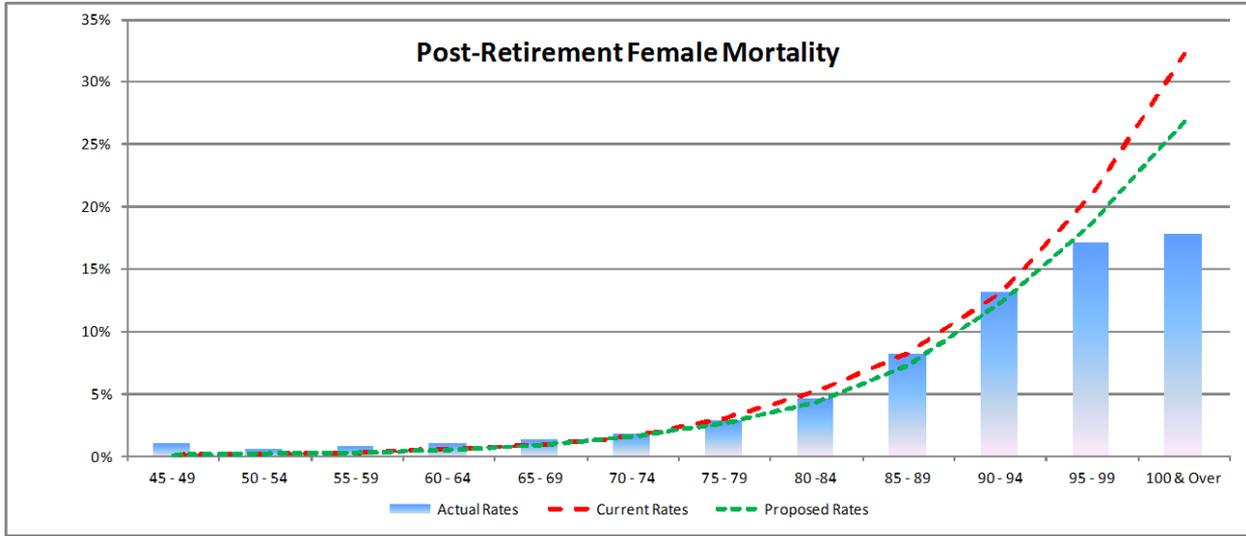
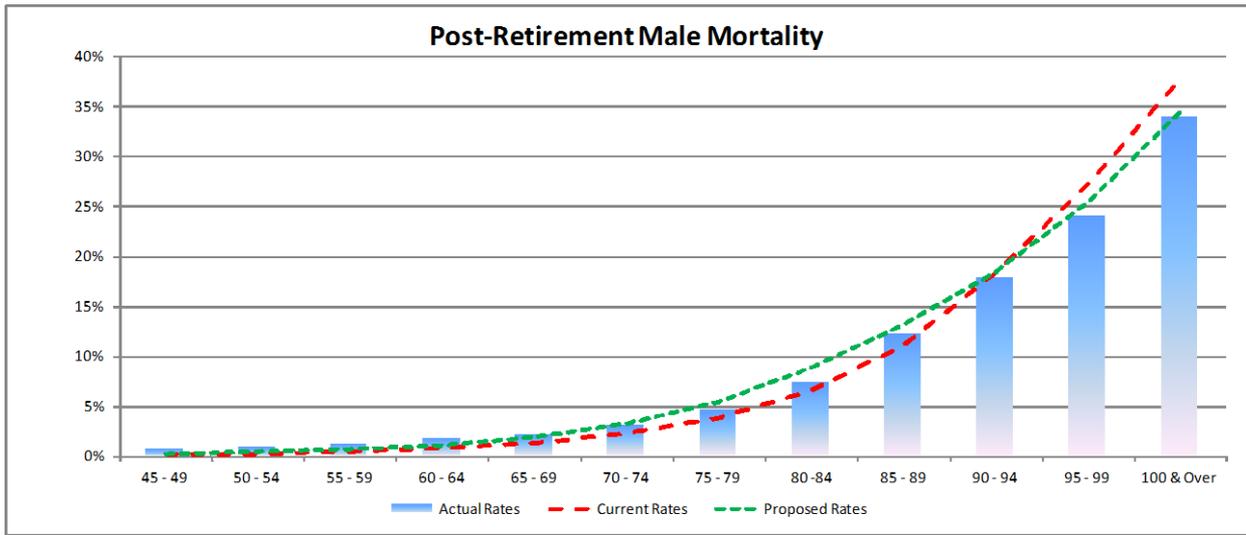


Demographic Assumptions

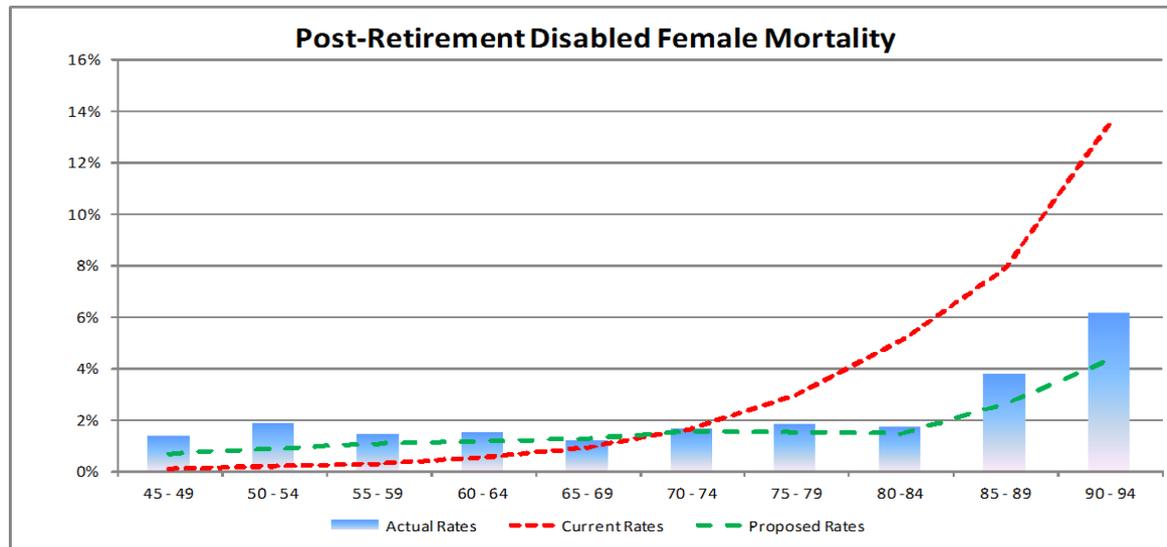
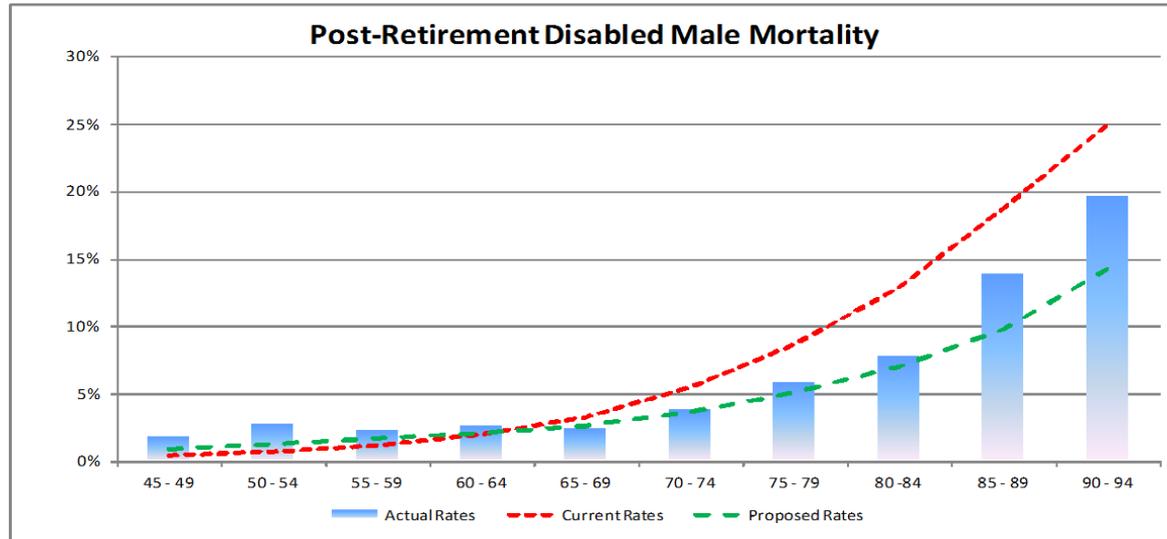
➤ Post-Retirement Mortality

- Compared Actual versus Expected in Aggregate
- Actual retiree deaths exceeded expected over the five year period.
- Note that the experience is measured against the 1983 GAM table which is applied to retired members and beneficiaries as of June 30, 2006. The mortality table for all other members is the 1994 GAM.
- Recommend change in healthy mortality to the RP-2000 Combined Mortality Table projected to 2013 using the BB projection scale, set back one year for females.
- Recommend change in disabled mortality to the RP-2000 Combined Disability Mortality Table projected to 2013 using the BB projection scale, set back four years for males.

Demographic Assumptions



Demographic Assumptions





Demographic Assumptions

➤ Salary Scale

- For all groups, the actual salary increases were less than expected for the investigation period.
- However, the experience was influenced by unusual economic conditions.
- As a result, no changes to the merit component of the salary scales are recommended at this time.
- The decrease in real wage growth assumption (covered later) was reflected in the final salary scales.



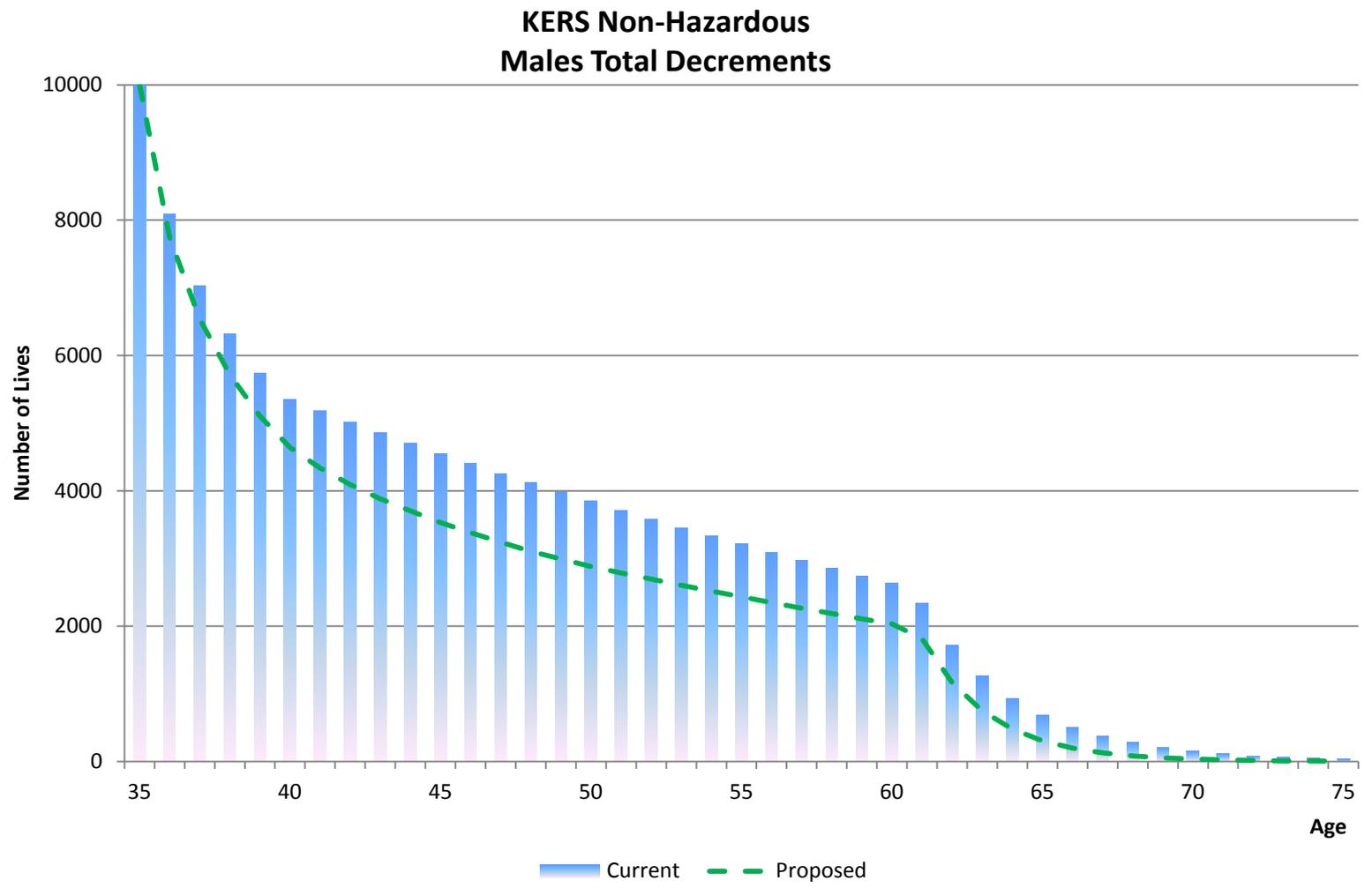
Demographic Assumptions



Years of Service	Salaries at End of Year (\$1,000)		
	KERS Non-Hazardous Members		
	Actual	Expected	Ratio Actual/Expected
Less Than 1	220,811	217,487	1.015
1	507,093	520,958	0.973
2	484,743	498,032	0.973
3	482,475	498,747	0.967
4	444,984	459,748	0.968
5	423,318	440,350	0.961
6	391,379	403,277	0.970
7	388,915	402,451	0.966
8	377,814	391,740	0.964
9	387,872	400,573	0.968
10 +	3,734,383	3,866,063	0.966
TOTAL	7,843,787	8,099,426	0.970

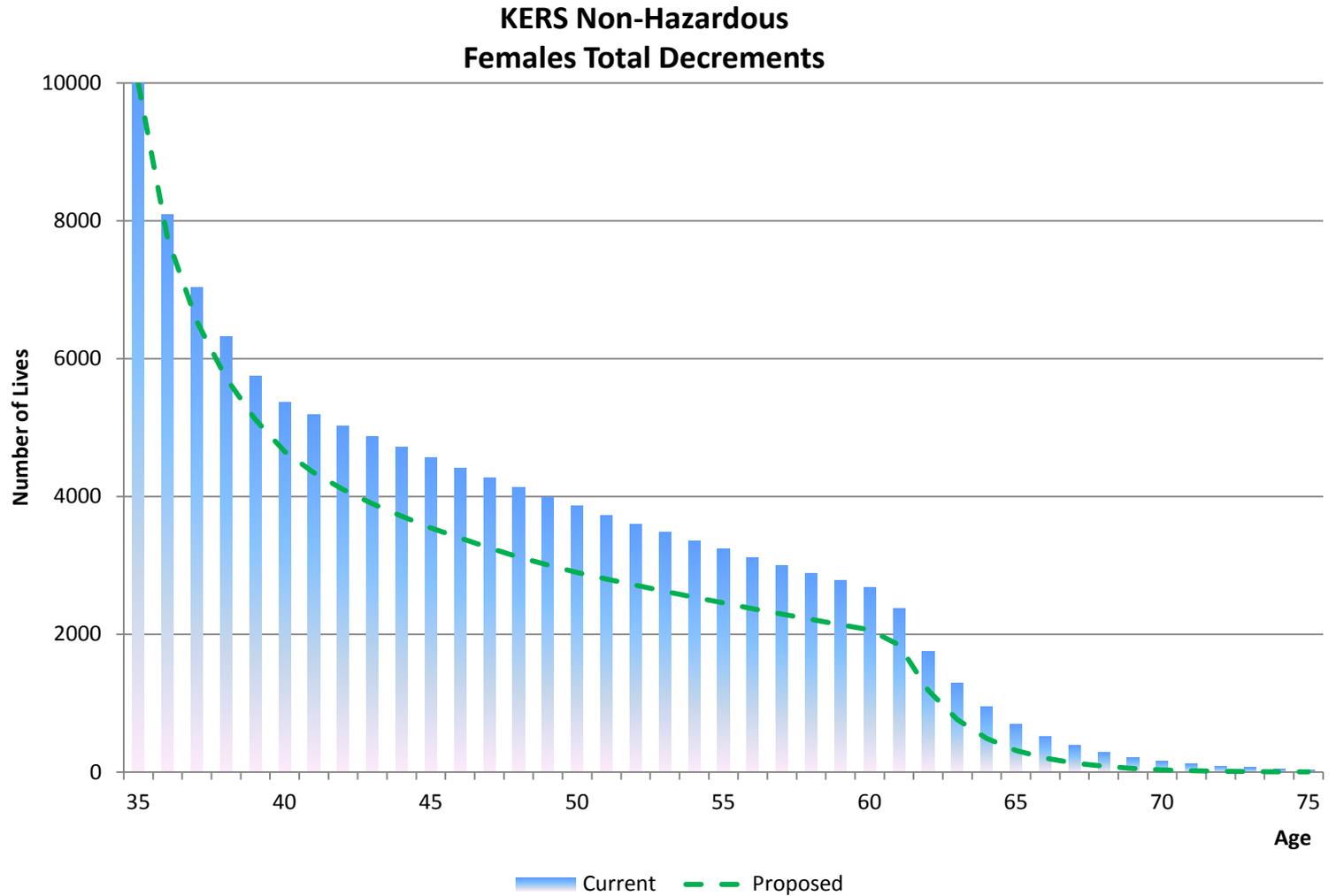


Demographic Assumptions



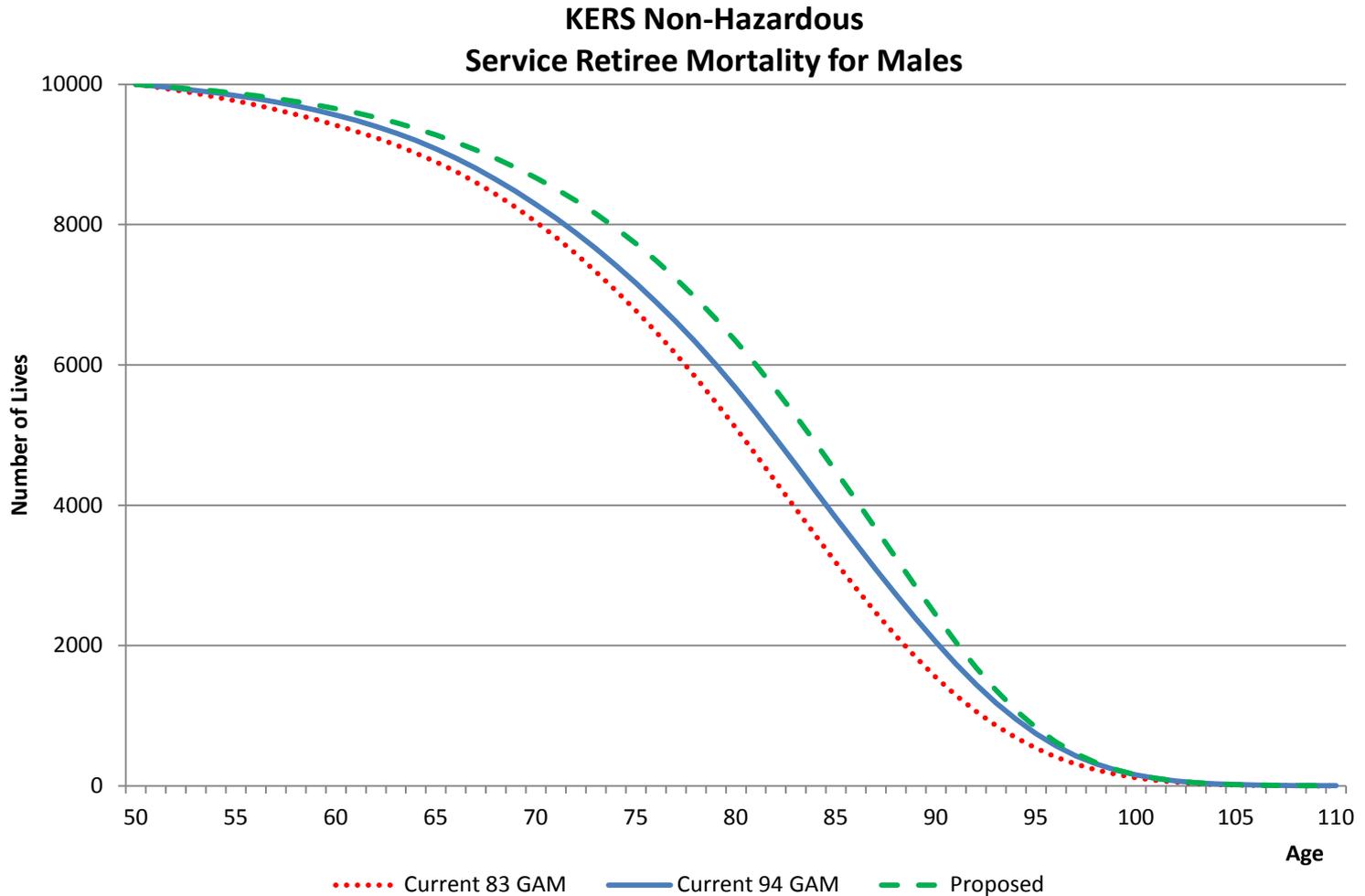


Demographic Assumptions



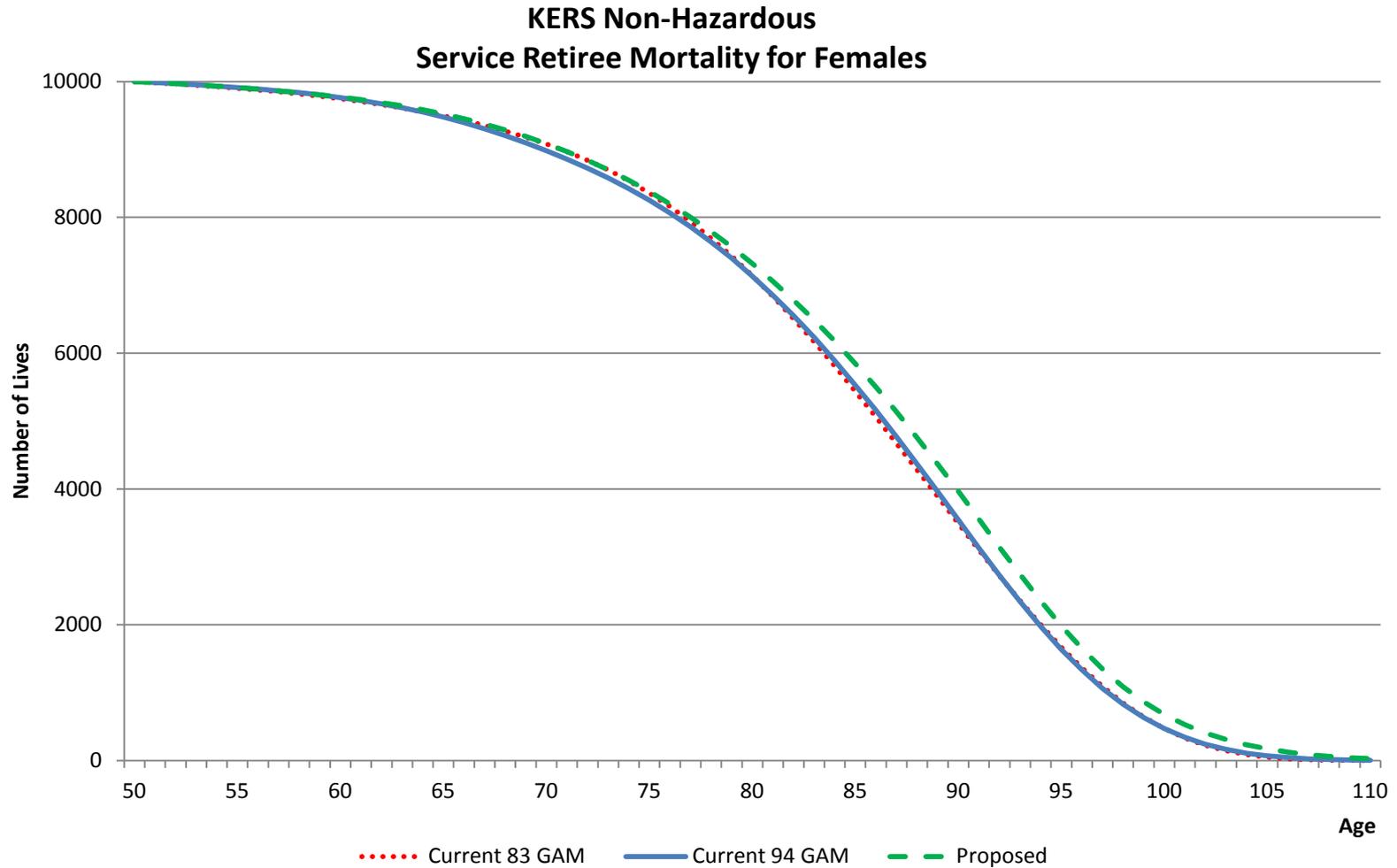


Demographic Assumptions





Demographic Assumptions





Retiree Healthcare Specific Assumptions



- The Actuarial Standards Board has issued Actuarial Standard of Practice (ASOP) No. 6, *“Measuring Retiree Group Benefit Obligations”*, which provides guidance to actuaries in selecting assumptions for measuring obligations of postretirement plans other than pensions.
- Types of assumptions:
 - Economic
 - Morbidity
 - Coverage
 - Choice of Coverage
 - Plan Participation
 - Spouse/Dependent Participation
 - Spouse/Dependent Age Differences



Retiree Healthcare Specific Assumptions



- Economic assumptions include those utilized for the pension funds plus health care trend rates.
- Currently review and set the trend rate annually.
- Recommend no change to this procedure.

- All other healthcare related assumptions were reviewed. The recommended changes are outlined in the following slides.



Retiree Healthcare Specific Assumptions



Tier 1: Service Retirement Members Participating Before July 1, 2003

KERS Non-Hazardous							
Percentage of Members Participating Before 7/1/2003 Electing Coverage							
Service at Retirement	6/30/2009	6/30/2010	6/30/2011	6/30/2012	6/30/2013	Current	Proposed
Under 10	35%	30%	52%	45%	30%	90%	50%
10 – 14	67%	63%	53%	58%	62%	90%	75%
15 – 19	81%	78%	81%	79%	85%	90%	90%
20+	95%	92%	96%	94%	96%	90%	100%

KERS Hazardous							
Percentage of Members Participating Before 7/1/2003 Electing Coverage							
Service at Retirement	6/30/2009	6/30/2010	6/30/2011	6/30/2012	6/30/2013	Current	Proposed
Under 10	24%	0%	47%	30%	13%	100%	50%
10 – 14	58%	69%	73%	46%	58%	100%	75%
15 – 19	71%	76%	68%	77%	73%	100%	90%
20+	97%	98%	97%	95%	97%	100%	100%



Retiree Healthcare Specific Assumptions



Tier 1: Service Retirement Members Participating Before July 1, 2003

CERS Non-Hazardous							
Percentage of Members Participating Before 7/1/2003 Electing Coverage							
Service at Retirement	6/30/2009	6/30/2010	6/30/2011	6/30/2012	6/30/2013	Current	Proposed
Under 10	28%	27%	52%	26%	22%	85%	50%
10 – 14	51%	54%	54%	57%	54%	85%	75%
15 – 19	79%	83%	76%	79%	81%	85%	90%
20+	92%	94%	95%	94%	94%	85%	100%

CERS Hazardous							
Percentage of Members Participating Before 7/1/2003 Electing Coverage							
Service at Retirement	6/30/2009	6/30/2010	6/30/2011	6/30/2012	6/30/2013	Current	Proposed
Under 10	20%	14%	67%	50%	0%	100%	50%
10 – 14	54%	50%	44%	65%	46%	100%	75%
15 – 19	73%	65%	77%	89%	82%	100%	90%
20+	94%	96%	97%	95%	97%	100%	100%

No changes recommended for SPRS from the current 100% participation rate



Retiree Healthcare Specific Assumptions



- No changes in participation rates for other service retirement tiers, disability or death-in-service recipients.
- Current assumption is 100% for all those groups. As experience emerges changes may be appropriate.



Retiree Healthcare Specific Assumption



Deferred Vested Member Health Care Participation Rates
Tier 1: Members Hired Before 7/1/2003

KERS Non-Hazardous							
Deferred Vested Benefit Recipients Electing Coverage							
Valuation	6/30/2009	6/30/2010	6/30/2011	6/30/2012	6/30/2013	Current	Proposed
Percentage	31%	27%	28%	45%	41%	90%	50%

KERS Hazardous							
Deferred Vested Benefit Recipients Electing Coverage							
Valuation	6/30/2009	6/30/2010	6/30/2011	6/30/2012	6/30/2013	Current	Proposed
Percentage	50%	43%	36%	42%	25%	100%	50%



Retiree Healthcare Specific Assumption



Deferred Vested Member Health Care Participation Rates
Tier 1: Members Hired Before 7/1/2003

CERS Non-Hazardous							
Deferred Vested Benefit Recipients Electing Coverage							
Valuation	6/30/2009	6/30/2010	6/30/2011	6/30/2012	6/30/2013	Current	Proposed
Percentage	22%	27%	31%	38%	25%	85%	50%

CERS Hazardous							
Deferred Vested Benefit Recipients Electing Coverage							
Valuation	6/30/2009	6/30/2010	6/30/2011	6/30/2012	6/30/2013	Current	Proposed
Percentage	15%	14%	33%	33%	35%	100%	50%

Again no changes recommended for SPRS or other tiers from the current 100% participation rate



Retiree Healthcare Specific Assumption



KRS Hazardous Divisions Spouse and Dependent Health Care Participation Rates

KERS Hazardous							
Percentage of Covered Retirees Electing Spouse Coverage							
Valuation	6/30/2009	6/30/2010	6/30/2011	6/30/2012	6/30/2013	Current	Proposed
Percentage	42%	42%	44%	44%	44%	100%	50%

CERS Hazardous							
Percentage of Covered Retirees Electing Spouse Coverage							
Valuation	6/30/2009	6/30/2010	6/30/2011	6/30/2012	6/30/2013	Current	Proposed
Percentage	66%	67%	67%	68%	67%	100%	75%

SPRS							
Percentage of Covered Retirees Electing Spouse Coverage							
Valuation	6/30/2009	6/30/2010	6/30/2011	6/30/2012	6/30/2013	Current	Proposed
Percentage	65%	71%	72%	73%	72%	100%	75%



Economic Assumptions

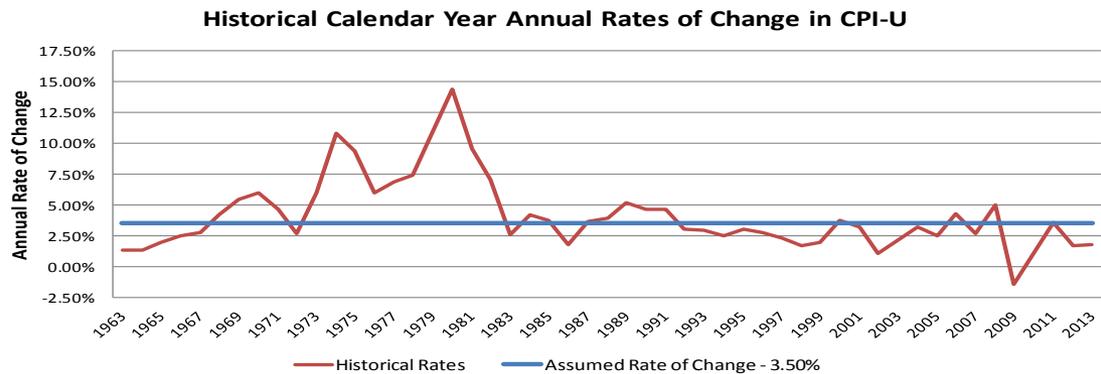
- Assumptions reviewed
 - Price inflation
 - Investment return
 - Wage inflation
- Actuarial Standard of Practice (ASOP) No. 27, *“Selection of Economic Assumptions for Measuring Pension Obligations”* provides guidance to actuaries in selecting economic assumptions for measuring obligations under defined benefit plans.
- Recommendations

Item	Current	Proposed
Price Inflation	3.50%	3.25%
Real Rate of Return	<u>4.25%</u>	<u>4.25%</u>
Investment Return	7.75%	7.50%
Price Inflation	3.50%	3.25%
Real Wage Growth	<u>1.00%</u>	<u>0.75%</u>
Wage Inflation	4.50%	4.00%

Economic Assumptions

Price Inflation

- Current assumption: 3.50%
- Historical data: Annual CPI (U) Increases



- Recommendation:

Price Inflation Assumption	
Current	3.50%
Reasonable Range	2.00% - 4.00%
Recommended	3.25%



Economic Assumptions Investment Return



➤ Current Assumption

- Price inflation 3.50%
- Real rate of return 4.25%
- Total return (net of investment and administrative expenses) 7.75%

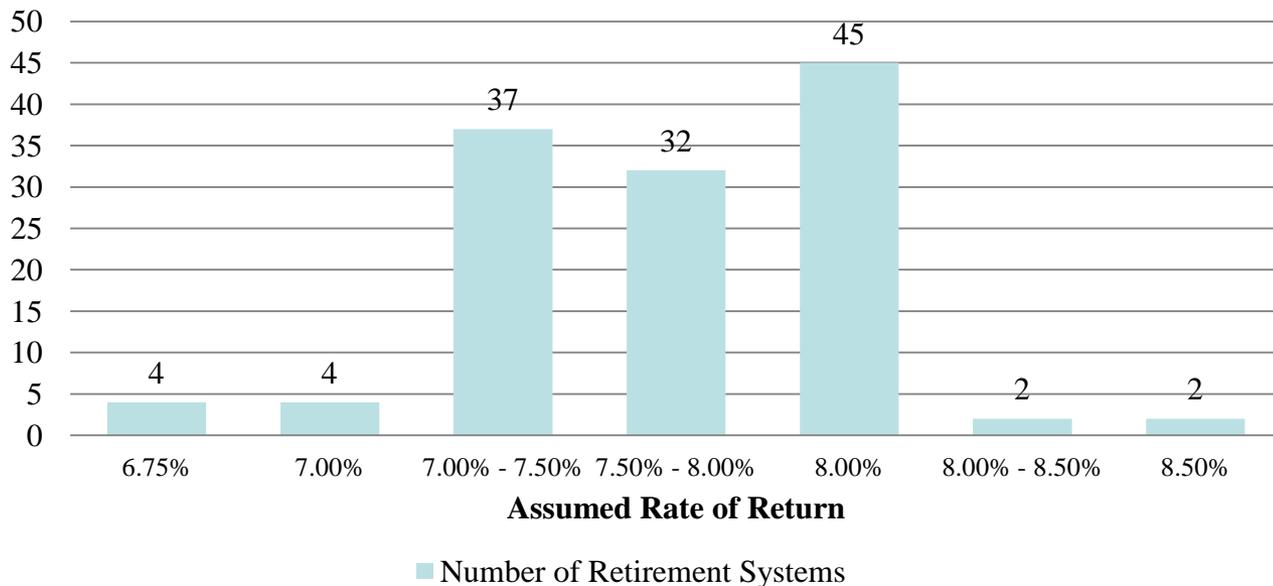
Nominal Total Rate of Return – Pension Funds		
Year Ending 6/30	Actuarial Value	Market Value
2009	1.74%	(17.72)%
2010	1.37%	16.37%
2011	3.60%	19.13%
2012	1.11%	0.01%
2013	4.29%	11.10%
Average	2.41%	4.85%



Economic Assumptions Investment Return



NASRA Issue Brief: Public Pension Plan Investment Return Assumption



The average assumed rate of return among Public Retirement Systems is 7.72% according to the April 2014 NASRA Issue Brief: “Public Pension Plan Investment Return Assumptions”



Economic Assumptions Investment Return



- Stochastic projection expected range of real rates of return (CERS)

Time Span In Years	Real Returns by Percentile				
	5 th	25 th	50 th	75 th	95 th
1	-14.43%	-4.11%	3.79%	12.34%	25.88%
5	-4.79%	0.18%	3.79%	7.53%	13.15%
10	-2.36%	1.22%	3.79%	6.42%	10.32%
20	-0.59%	1.97%	3.79%	5.64%	8.37%
30	0.20%	2.30%	3.79%	5.30%	7.51%
50	0.99%	2.63%	3.79%	4.96%	6.66%

- Based on KRS' current capital market assumptions and policy target asset allocation.



Economic Assumptions Investment Return



- Recommendation
 - ASOP No. 27 approach
 - Projection results – 50 years - CERS

Item	25 th Percentile	50 th Percentile	75 th Percentile
Real Rate of Return	2.63%	3.79%	4.96%
Inflation	3.25%	3.25%	3.25%
Expenses	<u>(0.00)%</u>	<u>(0.00)%</u>	<u>(0.00)%</u>
Net Investment Return	5.88%	7.04%	8.21%



Economic Assumptions Investment Return



- Normally would recommend 50th percentile results.
- However, there are mitigating issues:
 - Longer time horizon (10 years vs. System's lifetime)
 - Historical returns have been higher
 - Capital market assumptions do not include added return due to active management and other asset deployment strategies
 - Capital market assumptions are reflective of recent good experience. That, combined with the time horizon, causes them to be conservative compared to potential returns for longer periods.



Economic Assumptions Investment Return



- Therefore recommendation is greater than the 50th percentile
 - KERS Non-Hazardous – 64th percentile
 - KERS Hazardous, CERS Non-Hazardous and KERS Hazardous – 61st percentile
 - SPRS – 61st percentile

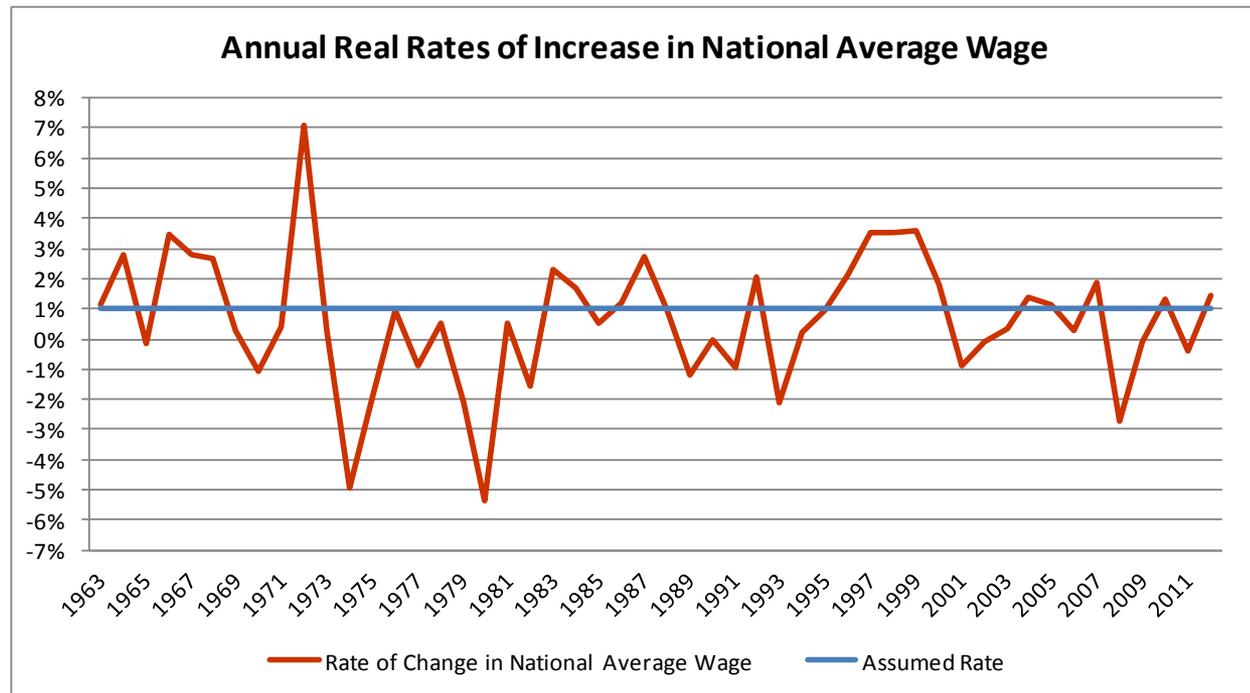
Investment Return Assumption	
Current	7.75%
Reasonable Range (CERS)	5.88% - 8.21%
Recommended	7.50%

- Further recommendation is to review the economic assumptions every biennium

Economic Assumptions

Wage Inflation

- Current assumption: 4.50%, which is 1.00% above price inflation
- Social Security Administration data





Economic Assumptions

Wage Inflation



➤ Historical Experience

Period	Wage Inflation	Price Inflation	Real Wage Growth
2002-2012	2.92%	2.46%	0.44%
1992-2012	3.35	2.49	0.83
1982-2012	3.79	2.91	0.85
1972-2012	4.67	4.36	0.30
1962-2012	4.78	4.14	0.62



Economic Assumptions

Wage Inflation



- Social Security 75 year projection of national wage growth assumption is 1.1% greater than price inflation.
- Recommendation is to be more consistent with historical results, particularly in periods of relatively high inflation.

Wage Inflation Assumption		
Current	4.50%	
	Reasonable Range	
Real Wage Growth	0.50%	1.50%
Inflation	<u>3.25%</u>	<u>3.25%</u>
Total	3.75%	4.75%
Recommended	4.00%	



Impact of Recommendations

Financial Impact on 06/30/2013 KERS Non-Hazardous Valuation

System	Before Change	After Change
KERS Non-Hazardous Pension:		
UAL	\$8,750,479,307	\$9,324,310,277
Funding Ratio	23.15%	22.04%
Employer Rate	30.84%	33.09%
KERS Non-Hazardous Insurance:		
UAL	\$1,631,169,807	\$1,801,450,791
Funding Ratio	23.37%	21.64%
Employer Rate	7.93%	8.27%
Total Employer Rate	38.77%	41.36%



Impact of Recommendations

Financial Impact on 06/30/2013 KERS Hazardous Valuation

System	Before Change	After Change
KERS Hazardous Pension:		
UAL	\$278,323,786	\$318,776,485
Funding Ratio	64.50%	61.33%
Employer Rate	16.37%	19.27%
KERS Hazardous Insurance:		
UAL	\$14,743,272	\$(6,845,174)
Funding Ratio	96.18%	101.88%
Employer Rate	9.97%	7.63%
Total Employer Rate	26.34%	26.90%



Impact of Recommendations

Financial Impact on 06/30/2013 CERS Non-Hazardous Valuation

System	Before Change	After Change
CERS Non-Hazardous Pension:		
UAL	\$3,741,781,631	\$4,163,362,131
Funding Ratio	60.10%	57.52%
Employer Rate	12.75%	13.69%
CERS Non-Hazardous Insurance:		
UAL	\$815,649,903	\$946,198,707
Funding Ratio	66.62%	63.25%
Employer Rate	5.35%	5.11%
Total Employer Rate	18.10%	18.80%



Impact of Recommendations

Financial Impact on 06/30/2013 CERS Hazardous Valuation

System	Before Change	After Change
CERS Hazardous Pension:		
UAL	\$1,322,514,183	\$1,432,756,145
Funding Ratio	57.67%	55.70%
Employer Rate	20.73%	19.63%
CERS Hazardous Insurance:		
UAL	\$544,558,426	\$519,882,134
Funding Ratio	62.11%	63.20%
Employer Rate	14.97%	12.40%
Total Employer Rate	35.70%	32.03%



Impact of Recommendations

Financial Impact on 06/30/2013 SPRS Valuation

System	Before Change	After Change
SPRS Pension:		
UAL	\$409,780,326	\$444,015,689
Funding Ratio	37.11%	35.26%
Employer Rate	53.90%	59.91%
SPRS Insurance:		
UAL	\$86,005,683	\$95,606,709
Funding Ratio	61.32%	58.78%
Employer Rate	21.86%	23.29%
Total Employer Rate		
	75.76%	83.20%