May 2005

Analysis of Actuarial Assumptions and Experience:
July 1, 2001 to June 30, 2004

Oklahoma Public Employees Retirement System

MERCER
Human Resource Consulting

Contents

Certification

We have prepared an experience study of the Oklahoma Public Employees Retirement System ("OPERS") for the three-year period July 1, 2001, to June 30, 2004. The results of the experience analysis are set forth in this report, which reflects the provisions of the System as amended and effective on July 1, 2004.

The study is based on employee and financial data which were provided by OPERS and the independent auditor, respectively, and which are summarized in the July 1, 2004, valuation report. All data, assets, assumptions, and System provisions used in this report are the same as in the valuation report, unless specifically noted otherwise.

We are available to answer any questions on the material contained in the report, or to provide explanations or further details as may be appropriate.

The below-signed credentialed actuaries meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report.

Brent A. Hradek   5/10/2005

Brent A. Hradek, FSA, EA   **Date**

Stephen T. McElhaney   5/10/2005

Stephen T. McElhaney, FSA, EA   **Date**

Mercer Human Resource Consulting
4400 Bank One Center
1717 Main Street
Dallas, TX 75201
214 220 3500

Section I: Report Highlights

A. Introduction

The ultimate costs of any pension plan will be determined by the benefits eventually paid by the plan and the net investment return earned by the trust. The purpose of an actuarial valuation is to estimate the projected amount and timing of plan benefits and to develop a reasonable pattern of contributions which, together with estimated investment income, will be sufficient to provide these benefits.

In order to make these estimates, the actuary makes various assumptions with respect to anticipated experience of the plan. Since demographic and economic factors change, experience should be reviewed periodically to verify that the assumptions remain appropriate or to form the basis for recommended changes in assumptions.

This report provides an analysis of experience during the period from July 1, 2001, to June 30, 2004. It is based on information provided by the Oklahoma Public Employees Retirement System on members in the System during the period. Comparisons have been made with the prior assumption study performed in May 2002 where appropriate. Experience was measured with regard to the mortality rates, retirement rates, disability rates, withdrawal rates, economic assumptions, and salary increases during this period.

The analysis of the assumptions listed above will help ensure that the calculation of System liability is as accurate as possible, and therefore, useful to the Board. The amortization period determines how quickly any unfunded liability is scheduled to be funded. We have added a section on amortization periods to illustrate how the period used by Oklahoma Public Employees Retirement System compares with other public retirement systems.

The data has been analyzed using graphs to illustrate the variation in assumptions versus actual experience. In addition, for the assumptions about termination, retirement, and death, we have shown comparisons of "actual number" to "expected number" to evaluate the amount of deviation in the results.

The last section of this report summarizes the effect on the valuation results of the System if the recommended assumption changes are adopted.

Section I: Report Highlights

B. Summary of Recommendations

We have recommended modifications to the following assumptions in order to adjust them to better reflect the Retirement System's experience.

- Mortality – We recommend changing mortality rates for all ages for all member classes.
- Retirement – We recommend changing the retirement rates at selected ages for all non-elected members and elected officials. In addition, we recommend increasing rates for selected service levels for all Department of Corrections officers.
- Disability – We recommend increasing the disability rates at selected ages.
- Withdrawal – We recommend increasing the withdrawal rates for members with five or more years of service.
- COLA increases – We recommend increasing the COLA assumption from 2.00% to 2.25% per year.

We recommend no other changes to the assumptions at this time.

See Section IX for a summary of the current and proposed assumptions and Section X for a summary of the effect of the changes in assumptions upon System costs.

Section II: Mortality Rates

A. Actives

Retirement benefits are paid to the members who do not terminate or die prior to retirement. After retirement, the period of time over which pensions are payable is based on the actual lifetimes of the retired members. It is important in estimating the present value of future benefit payments to be able to estimate the survival rates of members, pensioners, and beneficiaries through the use of an appropriate mortality table.

Mortality rates also affect the cost of death benefits in the actuarial valuation. In the Oklahoma Public Employees Retirement System, the death benefit is payable to the spouse of a member eligible for normal, early, or deferred vested benefits. The benefit is what would have been payable if the member had retired and elected the joint and 100% survivor option. In addition, the System provides lump sum death benefit payments and refund of contribution provisions.

The current pre-retirement mortality assumption is the 1983 Group Annuity Mortality Table for males and females.

Experience Analysis Results

The mortality experience for active members in the System has been studied separately for males and females due to the difference in life expectancy between the sexes.

Currently, the 1983 Group Annuity Mortality Table for males and females is used for the OPERS valuations. This table was based on mortality data collected in 1966. It has been adjusted to reflect general population improvements between 1966 and 1983.

Across most ages, active male and female deaths are lower than the assumed rate. In total we expected 238 active male deaths and experienced only 167. Likewise, we expected 109 active female deaths and experienced only 104.

Recommendations

The actual mortality rates experienced by OPERS is consistently lower than expected across most ages, especially for male members, under the current assumption. Mercer recommends a change to the RP-2000 mortality table for males and females projected to 2010 using Scale AA. This may result in lower expected deaths during the upcoming year than OPERS has been experiencing in recent years. However, this table will reflect expected mortality improvements in future years.

Section II: Mortality Rates
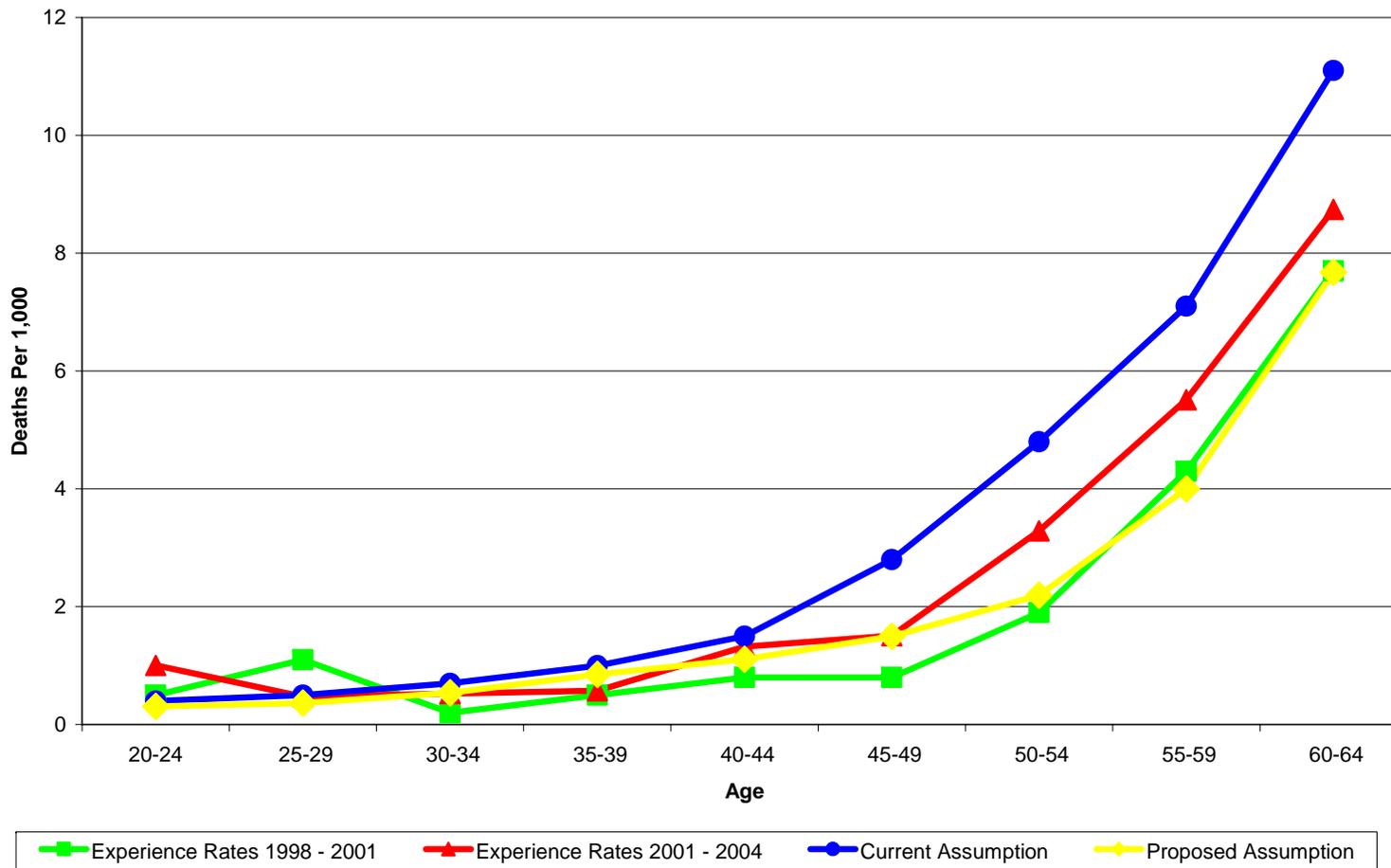
A. Actives *(continued)*

Pre-retirement Mortality Rates - Males

Section II: Mortality Rates

A. Actives *(continued)*

Pre-retirement Mortality Rates - Females

Section II: Mortality Rates

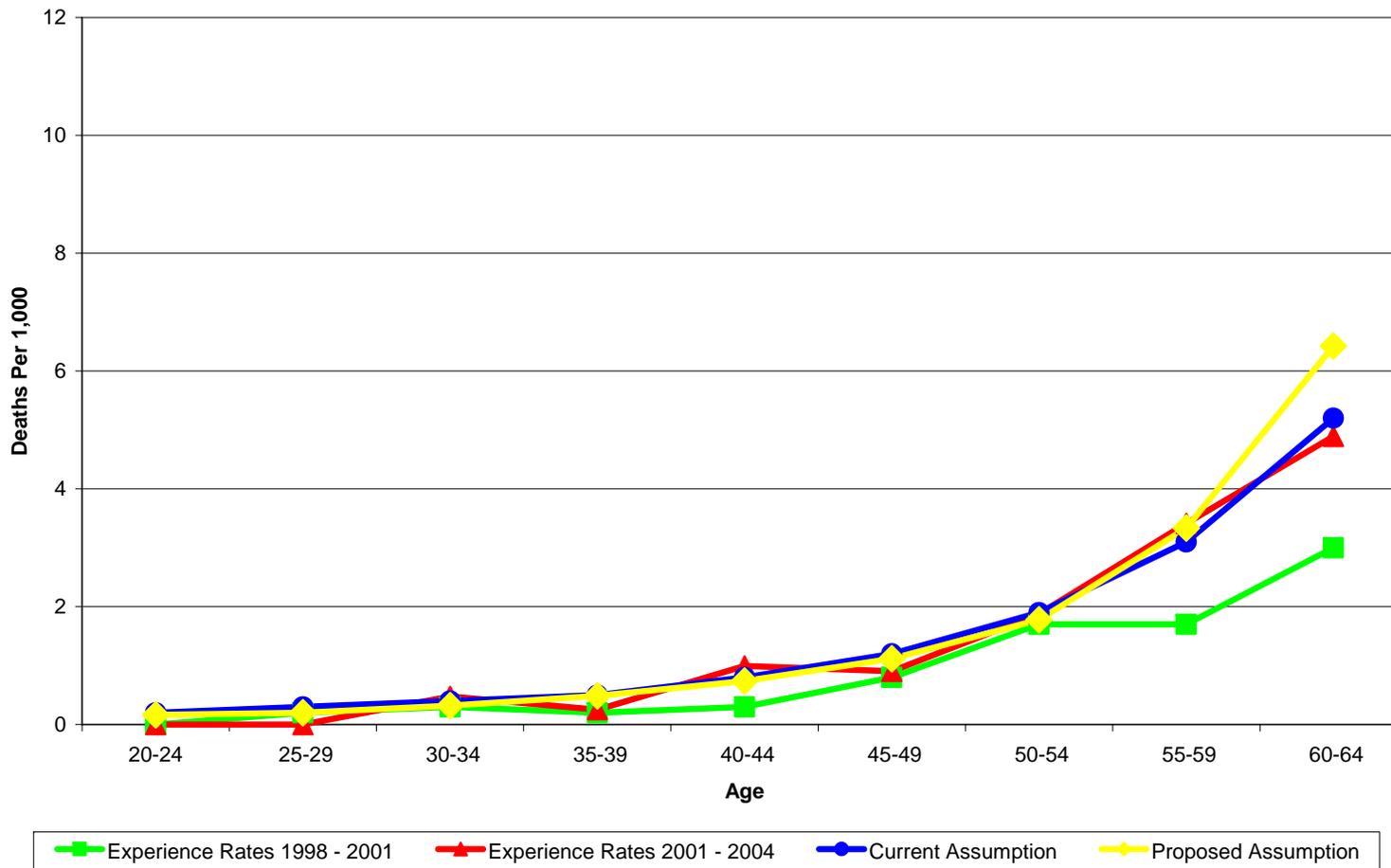## A. Actives *(continued)*

Pre-retirement Mortality Rates

Males

Age Range	Experience Rates 1998-2001	Experience Rates 2001-2004	Current Assumptions[1]	Proposed Assumptions[1]
20-24	0.0005	0.0010	0.0004	0.0003
25-29	0.0011	0.0005	0.0005	0.0004
30-34	0.0002	0.0005	0.0007	0.0005
35-39	0.0005	0.0006	0.0010	0.0009
40-44	0.0008	0.0013	0.0015	0.0011
45-49	0.0008	0.0015	0.0028	0.0015
50-54	0.0019	0.0033	0.0048	0.0022
55-59	0.0043	0.0055	0.0071	0.0040
60-64	0.0077	0.0087	0.0111	0.0077

Females

Age Range	Experience Rates 1998-2001	Experience Rates 2001-2004	Current Assumptions[1]	Proposed Assumptions[1]
20-24	0.0000	0.0000	0.0002	0.0002
25-29	0.0002	0.0000	0.0003	0.0002
30-34	0.0003	0.0005	0.0004	0.0003
35-39	0.0002	0.0003	0.0005	0.0005
40-44	0.0003	0.0010	0.0008	0.0007
45-49	0.0008	0.0009	0.0012	0.0011
50-54	0.0017	0.0019	0.0019	0.0018
55-59	0.0017	0.0034	0.0031	0.0033
60-64	0.0030	0.0049	0.0052	0.0064

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[1] *Assumption rates are based on the average of the age range.*

Section II: Mortality Rates

A. Actives *(continued)*

Comparison of Actual/Expected Number of Deaths for Actives

Males

Age Range	Actual Deaths 2001-2004	Current Assumption		Proposed Assumption	
		Expected Deaths 2001-2004	Actual/Expected Percentage	Expected Deaths 2001-2004	Actual/Expected Percentage
20-24	2	1	200%	1	200%
25-29	2	2	100%	2	100%
30-34	3	4	75%	3	100%
35-39	4	7	57%	6	67%
40-44	11	13	85%	9	122%
45-49	14	26	54%	14	100%
50-54	31	45	69%	21	148%
55-59	43	56	77%	31	139%
60-64	37	48	77%	32	116%
65 & over	20	36	56%	25	80%
	167	238	70%	144	116%

Females

Age Range	Actual Deaths 2001-2004	Current Assumption		Proposed Assumption	
		Expected Deaths 2001-2004	Actual/Expected Percentage	Expected Deaths 2001-2004	Actual/Expected Percentage
20-24	0	0	N/A	0	N/A
25-29	0	1	0%	1	0%
30-34	3	2	150%	2	150%
35-39	2	4	50%	4	50%
40-44	11	9	122%	8	138%
45-49	11	15	73%	14	79%
50-54	21	22	95%	20	105%
55-59	27	25	108%	26	104%
60-64	19	20	95%	25	76%
65 & over	10	11	91%	15	67%
	104	109	95%	115	90%

Section II: Mortality Rates

B. Retirees and Beneficiaries

Post-retirement mortality was evaluated separately for males and females. Beneficiaries were not evaluated separately due to the small number in the study.

The current assumption for post-retirement mortality is the 1983 Group Annuity Mortality Table for males and females.

Experience Analysis Results

The mortality experience for retired members and beneficiaries in pay status has been studied separately for males and females due to the difference in life expectancy between the sexes.

Currently, the 1983 Group Annuity Mortality Table for males and females is used for the OPERS valuations. This table was based on mortality data collected in 1966. It has been adjusted to reflect general population improvements between 1966 and 1983. Recent System experience has shown significantly lower than assumed mortality rates for females and somewhat lower than assumed mortality rates for males.`

There were more deaths at each age and for both genders than were expected based on the current assumptions.
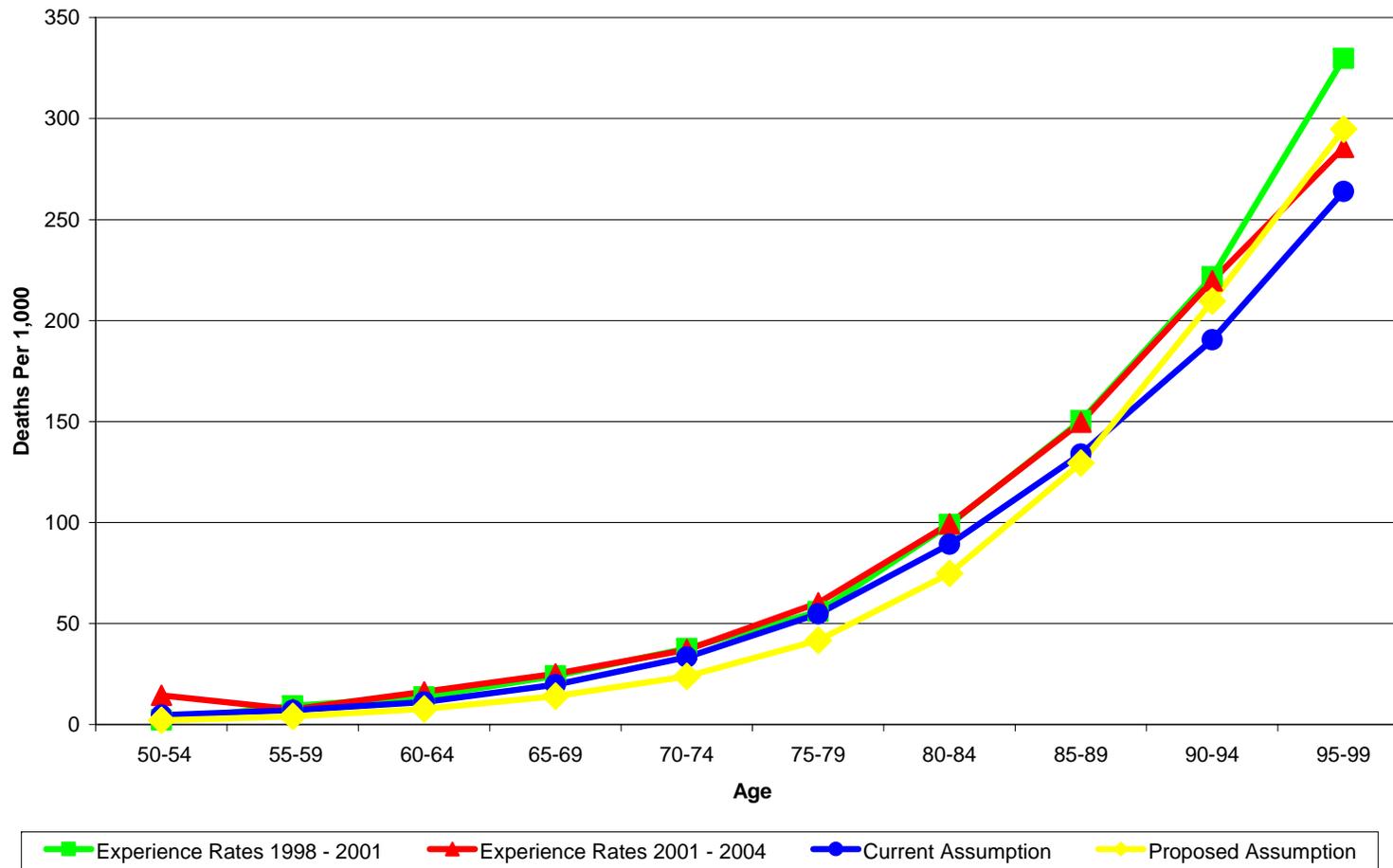
Recommendations

We recommend that OPERS adopt the RP-2000 Mortality Table projected to 2010 using Scale AA. This may result in lower expected deaths during the upcoming year than OPERS has been experiencing in recent years, especially for males. However, this table will reflect expected mortality improvements in future years.

This new table is in line with recent experience for retired females as well as active males and females. We believe it is appropriate to use this table for retired males.

Section II: Mortality Rates
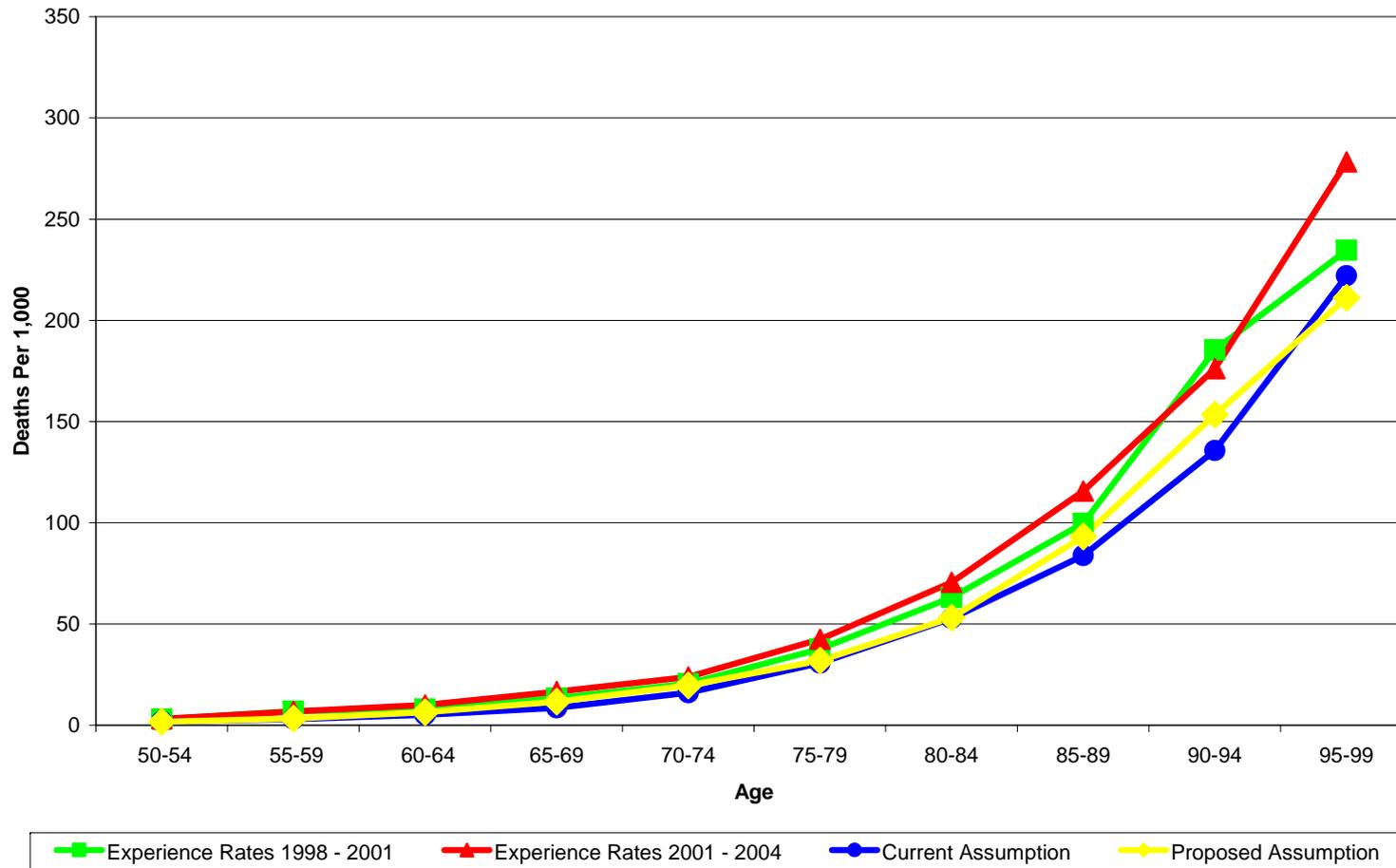
B. Retirees and Beneficiaries *(continued)*

Post-retirement Mortality Rates - Males

Section II: Mortality Rates

B. Retirees and Beneficiaries *(continued)*

Post-retirement Mortality Rates - Females

Legend:
- Experience Rates 1998 - 2001
- Experience Rates 2001 - 2004
- Current Assumption
- Proposed Assumption

Section II: Mortality Rates

B. Retirees and Beneficiaries *(continued)*

Post-retirement Mortality Rates

Males

Age Range	Experience Rates 1998-2001	Experience Rates 2001-2004	Current Assumptions[2]	Proposed Assumptions[2]
50-54	0.0023	0.0144	0.0048	0.0022
55-59	0.0092	0.0076	0.0071	0.0040
60-64	0.0137	0.0163	0.0111	0.0077
65-69	0.0241	0.0251	0.0198	0.0141
70-74	0.0376	0.0370	0.0334	0.0238
75-79	0.0559	0.0603	0.0548	0.0417
80-84	0.0990	0.0995	0.0893	0.0748
85-89	0.1504	0.1496	0.1339	0.1295
90-94	0.2217	0.2196	0.1905	0.2097
95-99	0.3297	0.2857	0.2640	0.2947

Females

Age Range	Experience Rates 1998-2001	Experience Rates 2001-2004	Current Assumptions[2]	Proposed Assumptions[2]
50-54	0.0031	0.0032	0.0019	0.0018
55-59	0.0070	0.0069	0.0031	0.0033
60-64	0.0080	0.0100	0.0052	0.0064
65-69	0.0135	0.0167	0.0087	0.0116
70-74	0.0205	0.0238	0.0162	0.0196
75-79	0.0377	0.0425	0.0307	0.0320
80-84	0.0632	0.0706	0.0527	0.0531
85-89	0.0998	0.1156	0.0839	0.0933
90-94	0.1854	0.1761	0.1356	0.1535
95-99	0.2346	0.2782	0.2220	0.2112

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[2] *Assumption rates are based on the average of the age range.*

Section II: Mortality Rates

B. Retirees and Beneficiaries *(continued)*

Comparison of Actual/Expected Number of Deaths for Retirees and Beneficiaries

Males

		Current Assumption		Proposed Assumption	
Age Range	Actual Deaths 2001-2004	Expected Deaths 2001-2004	Actual/Expected Percentage	Expected Deaths 2001-2004	Actual/Expected Percentage
50-54	9	3	300%	1	900%
55-59	16	15	107%	8	200%
60-64	70	49	143%	33	212%
65-69	153	122	125%	86	178%
70-74	197	179	110%	127	155%
75-79	242	222	109%	168	144%
80-84	245	221	111%	184	133%
85-89	168	151	111%	145	116%
90-94	83	72	115%	79	105%
95-99	18	17	106%	19	95%
	1,201	1,051	114%	850	141%

Females

		Current Assumption		Proposed Assumption	
Age Range	Actual Deaths 2001-2004	Expected Deaths 2001-2004	Actual/Expected Percentage	Expected Deaths 2001-2004	Actual/Expected Percentage
50-54	3	2	150%	2	150%
55-59	20	9	222%	10	200%
60-64	53	28	189%	34	156%
65-69	114	60	190%	80	143%
70-74	153	106	144%	126	121%
75-79	234	171	137%	176	133%
80-84	257	193	133%	193	133%
85-89	227	166	137%	183	124%
90-94	134	104	129%	117	115%
95-99	37	30	123%	28	132%
	1,232	869	142%	949	130%

Section II: Mortality Rates

C. Disabled Members

Experience Analysis Results

While the current data on this group of retirees is comprised of a small sample of individuals, the mortality rates were consistently above the assumption. In aggregate, we expected 48 male and 23 female deaths of disabled members compared to 69 male and 66 female actual deaths.

Recommendation

Currently, we use the 1983 GAM Mortality Table with a 10-year set forward. In the previous section of this report, we recommend adoption of the RP-2000 Mortality Table for active members and nondisabled members in pay status. We recommend adoption of that base table for disabled members with a change in the set-forward period from 10 years to 15 years. This change does not completely reflect the difference between actual and expected mortality during the past three years, especially with respect to female members, and this assumption should continue to be monitored.

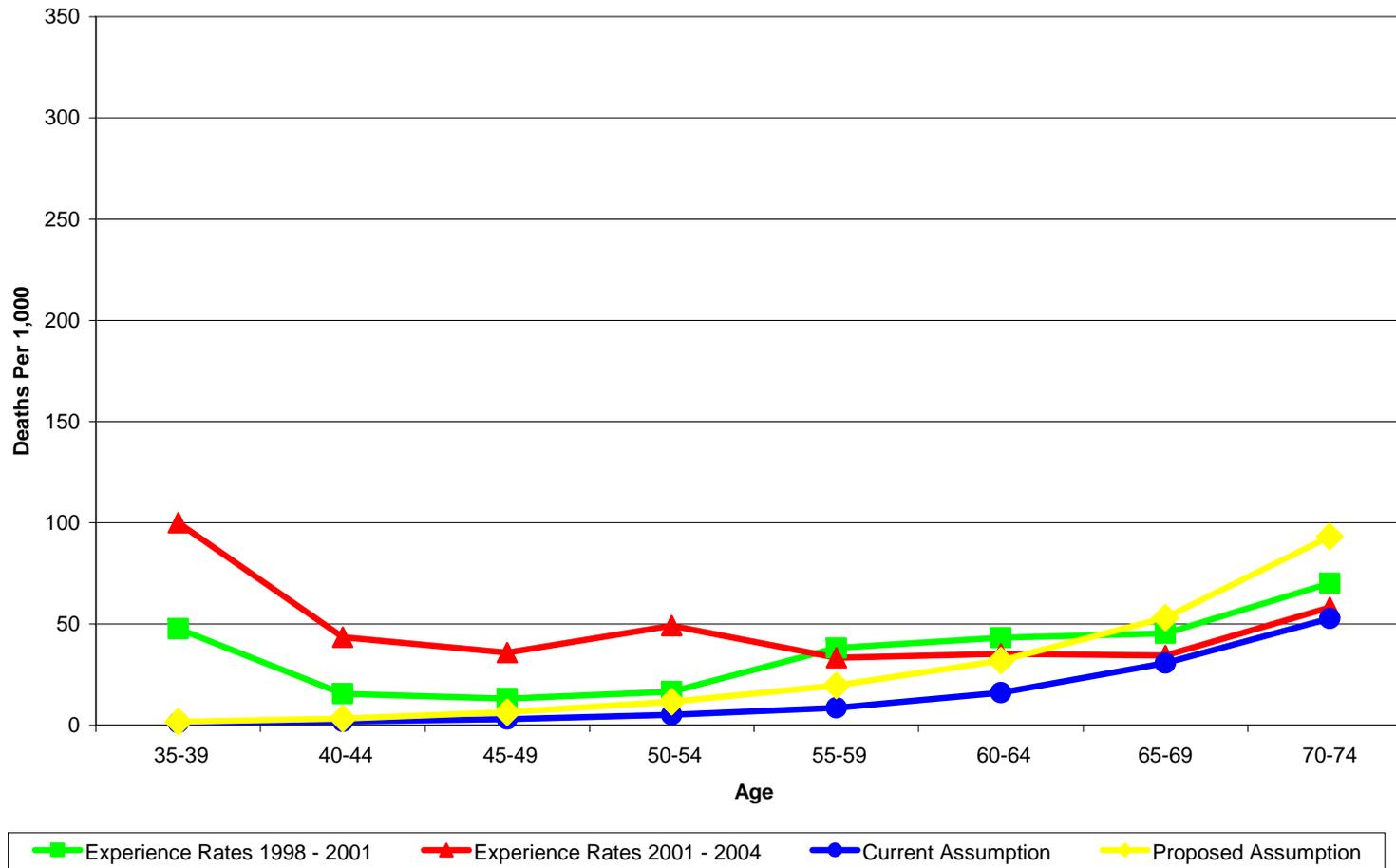# Section II: Mortality Rates

C. Disabled Members *(continued)*

Post-disability Mortality Rates - Males
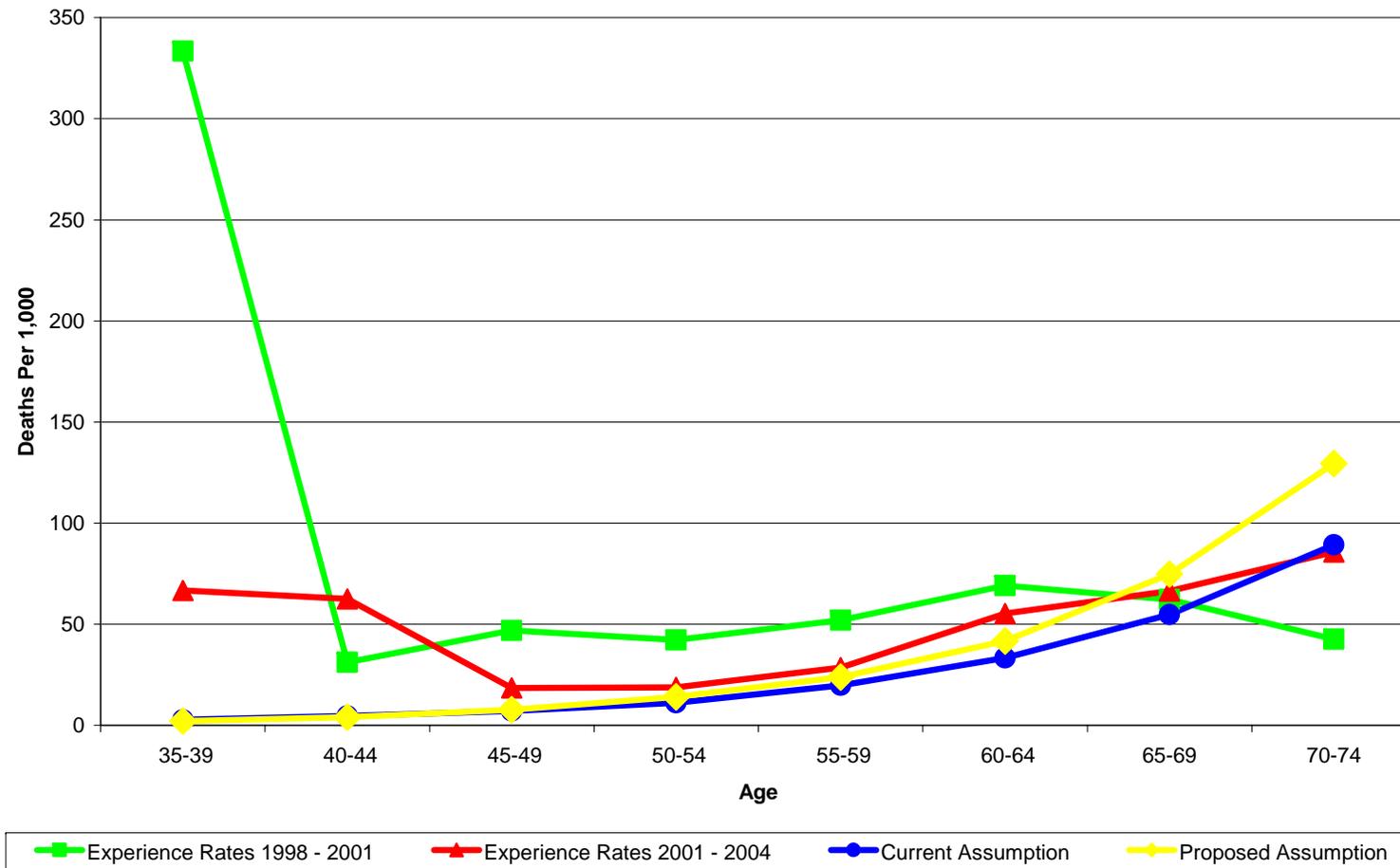
Section II: Mortality Rates

C. Disabled Members *(continued)*

Post-disability Mortality Rates - Females

Section II: Mortality Rates

C. Disabled Members *(continued)*

Post-disability Mortality Rates

Males

Age Range	Experience Rates 1998-2001	Experience Rates 2001-2004	Current Assumptions[3]	Proposed Assumptions
35-39	0.3333	0.0667	0.0028	0.0022
40-44	0.0313	0.0625	0.0048	0.0040
45-49	0.0469	0.0185	0.0071	0.0077
50-54	0.0423	0.0188	0.0111	0.0141
55-59	0.0520	0.0285	0.0198	0.0238
60-64	0.0691	0.0553	0.0334	0.0417
65-69	0.0622	0.0664	0.0548	0.0748
70-74	0.0426	0.0857	0.0893	0.1295

Females

Age Range	Experience Rates 1998-2001	Experience Rates 2001-2004	Current Assumptions	Proposed Assumptions
35-39	0.0476	0.1000	0.0012	0.0018
40-44	0.0156	0.0435	0.0019	0.0033
45-49	0.0132	0.0359	0.0031	0.0064
50-54	0.0167	0.0492	0.0052	0.0116
55-59	0.0382	0.0333	0.0087	0.0196
60-64	0.0432	0.0352	0.0162	0.0320
65-69	0.0455	0.0345	0.0307	0.0531
70-74	0.0702	0.0583	0.0527	0.0933

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[3] *Assumption rates are based on the average of the age range.*

Section II: Mortality Rates

C. Disabled Members *(continued)*

Comparison of Actual/Expected Number of Deaths for Disabled Members

Males

Age Range	Actual Deaths 2001-2004	Current Assumption		Proposed Assumption	
		Expected Deaths 2001-2004	Actual/Expected Percentage	Expected Deaths 2001-2004	Actual/Expected Percentage
35-39	1	0	N/A	0	N/A
40-44	2	0	N/A	0	N/A
45-49	2	1	200%	1	200%
50-54	6	4	150%	5	120%
55-59	11	8	138%	9	122%
60-64	22	13	169%	17	129%
65-69	16	13	123%	18	89%
70-74	9	9	100%	14	64%
	69	48	144%	64	108%

Females

Age Range	Actual Deaths 2001-2004	Current Assumption		Proposed Assumption	
		Expected Deaths 2001-2004	Actual/Expected Percentage	Expected Deaths 2001-2004	Actual/Expected Percentage
35-39	2	0	N/A	0	N/A
40-44	3	0	N/A	0	N/A
45-49	6	1	600%	1	600%
50-54	16	2	800%	4	400%
55-59	13	3	433%	8	163%
60-64	13	6	217%	12	108%
65-69	7	6	117%	11	64%
70-74	6	5	120%	10	60%
	66	23	287%	46	143%

Section II: Mortality Rates

D. Hazardous Duty Members

In 2004, OPERS added an in-line-of-duty death benefit to members employed by the Department of Corrections, who are killed or mortally wounded during the performance of duty. At that time, Mercer set up an in-line-of-duty mortality assumption that was approximately 10% of the total mortality rate for Department of Corrections officers. No in-line-of-duty deaths are assumed for Department of Corrections employees who are not officers.

Experience Analysis Results

Because of the low number of in-line-of-duty deaths experienced by members in the System, it is not appropriate to rely only on the experience of the System to set this assumption. Mercer has looked at the assumptions used by other systems around the country that have "hazardous duty" types of members. Most systems that we looked at assumed in-line-of-duty deaths as a percentage (between 5% and 20%) of total deaths. The 10% used by OPERS falls within this range.

It also appears that systems generally assume no probability of in-line-of-duty mortality for members in positions not classified as hazardous duty. This is consistent with the current assumption for OPERS.

Recommendation

Mercer recommends that no change be made to this assumption.

Section III: Retirement Rates

A. Non-elected Members

Retirement assumptions are used to predict the time when an employee retires from active service. The timing of a member's retirement determines both the amount of the annuity to be paid and the expected future lifetime of the member as a benefit recipient.

The Oklahoma Public Employees Retirement System provides for a normal retirement benefit on or after the earlier of the member's 62nd birthday and six years of service, or eligibility for the "Rule of 80" or "Rule of 90" criteria. For members hired prior to July 1, 1992, a normal retirement benefit is payable on the first day of the month following the date at which the sum of a member's age and years of credited service (minimum of six years) equals 80. For members hired on or after July 1, 1992, the normal retirement benefit is payable when the sum of a member's age and years of credited service (minimum of 6 years) equals 90.

A member is eligible for early retirement after attaining age 55 and completion of ten years of credited service. For early commencement, the benefit is reduced by 1/15 per year for the first five years before age 62 and 1/30 per year for the next two years.

Retirement rates specify the percentage of employees eligible to retire who choose to retire at each age. In general, retirement rates are appropriate whenever an early retirement benefit is payable, especially if the early retirement benefit is subsidized by the System. The reduction for the Oklahoma Public Employees Retirement System early retirement benefit is less than actuarial equivalence, which implies a subsidized benefit. This is especially true of the "Rule of 80" and "Rule of 90" unreduced benefits. This can have a substantial impact on the costs of the System, especially if experience indicates a significant number of early retirements.

Experience Analysis Results

In 1999, OPERS adopted separate retirement tables depending on whether a participant is eligible for unreduced retirement benefits or reduced retirement benefits. The table for unreduced retirement benefits currently begins at age 50 and assumes 100% of eligible members retire by age 70. The reduced table starts at age 55 since eligibility for reduced early retirement is at age 55 with ten years of service.

For members eligible for unreduced retirement, experience was in line with expectations at most ages although there was some deviation in both directions above age 60. For members not eligible for unreduced retirement, actual retirements were less than expected at most ages.
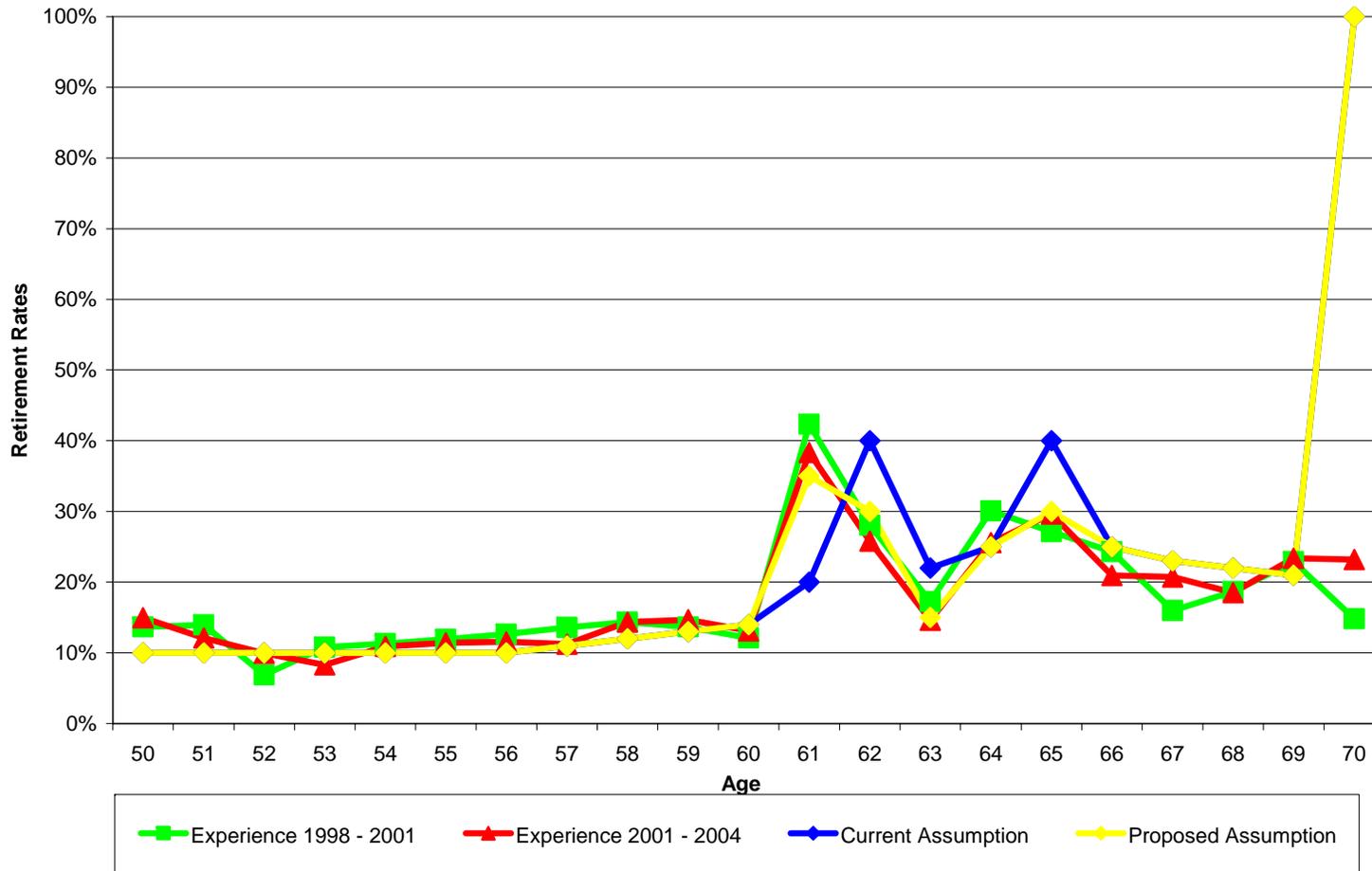
Recommendations

In general, the current assumptions were in line with actual experience during the last three years. For members eligible for unreduced retirement, Mercer recommends changing the rates for selected ages above age 60 as shown on the following pages of this report. In addition, we recommend extending the 10% assumption for age 50 to ages below age 50 when the member has attained rule of 80. Overall, the proposed rates have the effect of increasing the average expected retirement age. For members not eligible for unreduced retirement, Mercer recommends reducing the retirement rate assumption for most ages.

Section III: Retirement Rates
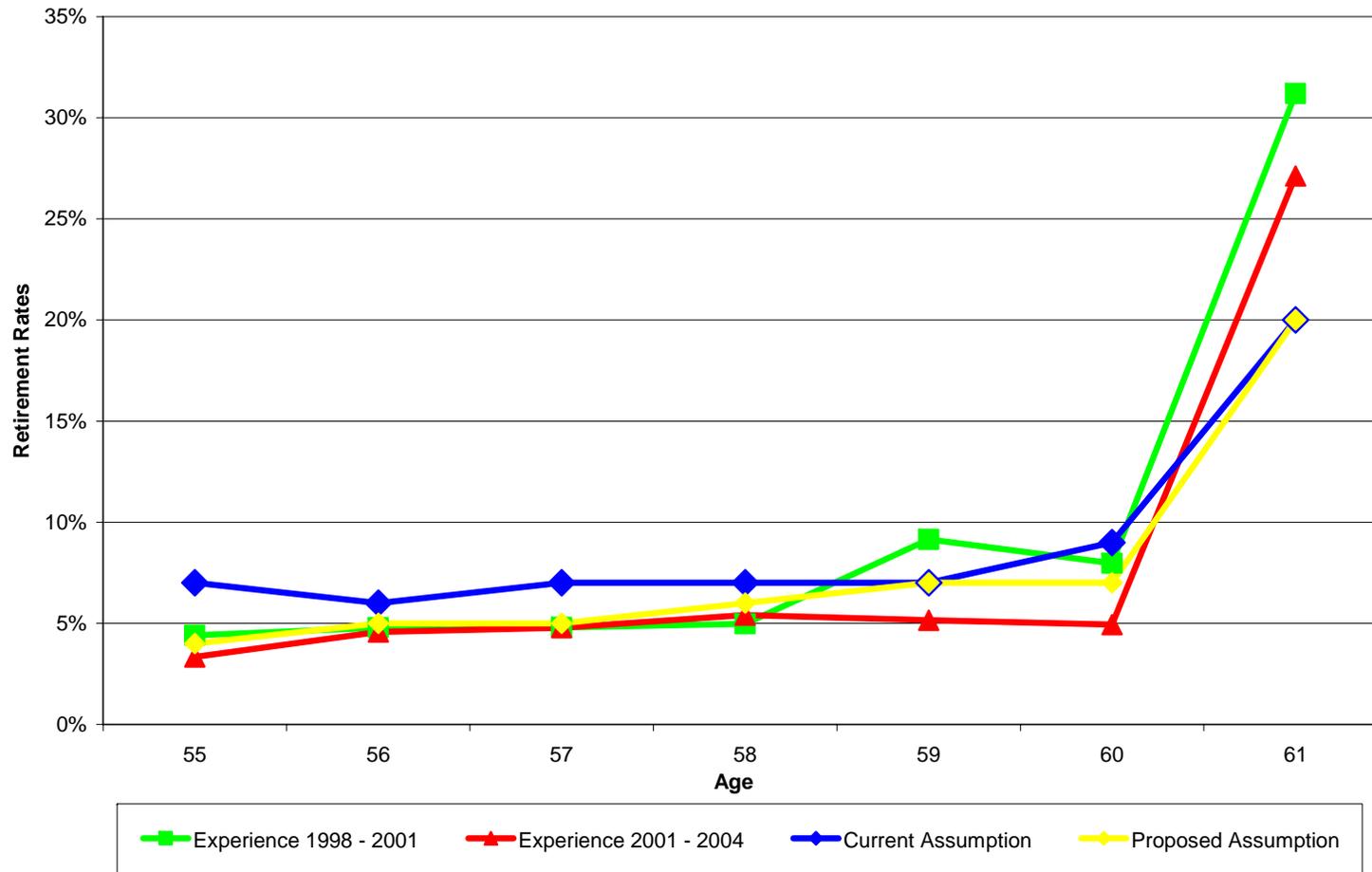
A. Non-elected Members *(continued)*

**Non-elected Member Retirement Rates
Members Eligible for Unreduced Retirement Benefits**

Section III: Retirement Rates

A. Non-elected Members *(continued)*

Non-elected Member Retirement Rates
Members Not Yet Eligible for Unreduced Retirement Benefits

Section III: Retirement Rates

A. Non-elected Members *(continued)*

Retirement Experience

Age	Experience Rates (2001-2004)		Current Assumption		Proposed Assumption	
	Eligible for Unreduced	Not Eligible for Unreduced	Eligible for Unreduced	Not Eligible for Unreduced	Eligible for Unreduced	Not Yet Eligible for Unreduced
Under 50	.0940		0.0000		0.1000	
50	.1497		0.1000		0.1000	
51	.1210		0.1000		0.1000	
52	.0994		0.1000		0.1000	
53	.0830		0.1000		0.1000	
54	.1091		0.1000		0.1000	
55	.1140	.0333	0.1000	0.0700	0.1000	0.0400
56	.1156	.0456	0.1000	0.0600	0.1000	0.0500
57	.1124	.0478	0.1100	0.0700	0.1100	0.0500
58	.1435	.0540	0.1200	0.0700	0.1200	0.0600
59	.1467	.0515	0.1300	0.0700	0.1300	0.0700
60	.1313	.0494	0.1400	0.0900	0.1400	0.0700
61	.3836	.2712	0.2000	0.2000	0.3500	0.2000
62	.2579		0.4000		0.3000	
63	.1462		0.2200		0.1500	
64	.2558		0.2500		0.2500	
65	.2966		0.4000		0.3000	
66	.2095		0.2500		0.2500	
67	.2072		0.2300		0.2300	
68	.1852		0.2200		0.2200	
69	.2339		0.2100		0.2100	
70	.2321		1.0000		1.0000	
71	.1957		1.0000		1.0000	
72	.2069		1.0000		1.0000	
73	.1268		1.0000		1.0000	
74	.3469		1.0000		1.0000	
75	.2593		1.0000		1.0000	

Section III: Retirement Rates

A. Non-elected Members *(continued)*

Comparison of Actual/Expected Number of Retirements-Participants Eligible for Unreduced Retirement

Age	Actual Retirees 2001-2004	Current Assumption		Proposed Assumption	
		Expected Retirees 2001-2004	Actual/Expected Percentage 2001-2004	Expected Retirees 2001-2004	Actual/Expected 2001-2004
Under 50	8	0	N/A	9	89%
50	28	19	147%	19	147%
51	42	35	120%	35	120%
52	46	46	100%	46	100%
53	48	58	83%	58	83%
54	66	61	108%	61	108%
55	70	61	115%	61	115%
56	69	60	115%	60	115%
57	67	66	102%	66	102%
58	92	77	119%	77	119%
59	93	82	113%	82	113%
60	88	94	94%	94	94%
61	262	137	191%	239	110%
62	284	440	65%	330	86%
63	119	179	66%	122	98%
64	166	162	102%	162	102%
65	148	200	74%	150	99%
66	79	94	84%	94	84%
67	63	70	90%	70	90%
68	45	53	85%	53	85%
69	40	36	111%	36	111%
70	26	112	23%	112	23%
71+	69	326	21%	326	21%
	2,018	2,468	82%	2,362	85%

Section III: Retirement Rates

A. Non-elected Members *(continued)*

Comparison of Actual/Expected Number of Retirements-Participants Not Yet Eligible for Unreduced Retirement

Age	Actual Retirees 2001-2004	Current Assumption		Proposed Assumption	
		Expected Retirees 2001-2004	Actual/Expected Percentage 2001-2004	Expected Retirees 2001-2004	Actual/Expected 2001-2004
55	53	111	48%	64	83%
56	66	87	76%	72	92%
57	58	85	68%	61	95%
58	61	79	77%	68	90%
59	49	67	73%	67	73%
60	38	69	55%	54	70%
61	173	128	135%	128	135%
	498	626	80%	514	97%

Section III: Retirement Rates

B. Elected Officials

The Oklahoma Public Employees Retirement System provides for a normal retirement benefit on or after the earlier of the member's 60th birthday and six years of service, or eligibility for the "Rule of 80" criteria.

A member is eligible for early retirement after attaining age 55 and completion of ten years of credited service. For early commencement, the benefit is reduced by 6% per year before age 60.

Experience Analysis Results

Experience for elected officials was not studied prior to 2001. The following pages provide experience during the past three years and compares this experience to experience for non-elected members (who have very similar retirement criteria). Currently, both of the groups use the same retirement assumptions, which are described in the previous section. The experience shows years when the retirement rates were higher for elected officials than for non-elected members and other years when the rates were lower.

Recommendations

Mercer recommends that the rates used for elected officials remains the same as for non-elected officials due to the small number of members eligible for retirement. In the future, differences between these groups will be monitored to see if any differences continue.
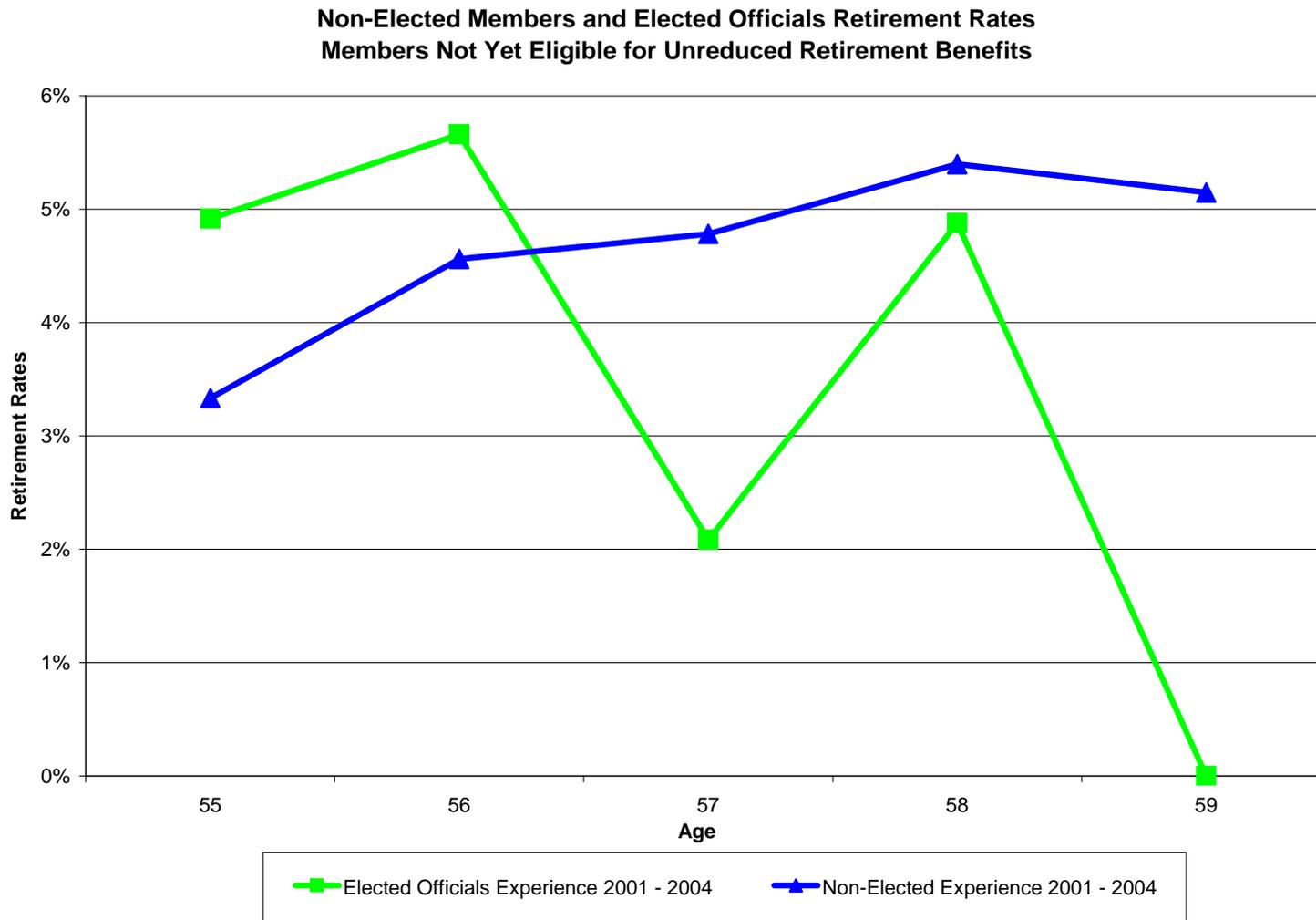
Section III: Retirement Rates

B. Elected Officials *(continued)*

**Non-Elected Members and Elected Officials Retirement Rates
Members Eligible for Unreduced Retirement Benefits**

Section III: Retirement Rates

B. Elected Officials *(continued)*

**Non-Elected Members and Elected Officials Retirement Rates
Members Not Yet Eligible for Unreduced Retirement Benefits**

Legend:
- Elected Officials Experience 2001 - 2004
- Non-Elected Experience 2001 - 2004
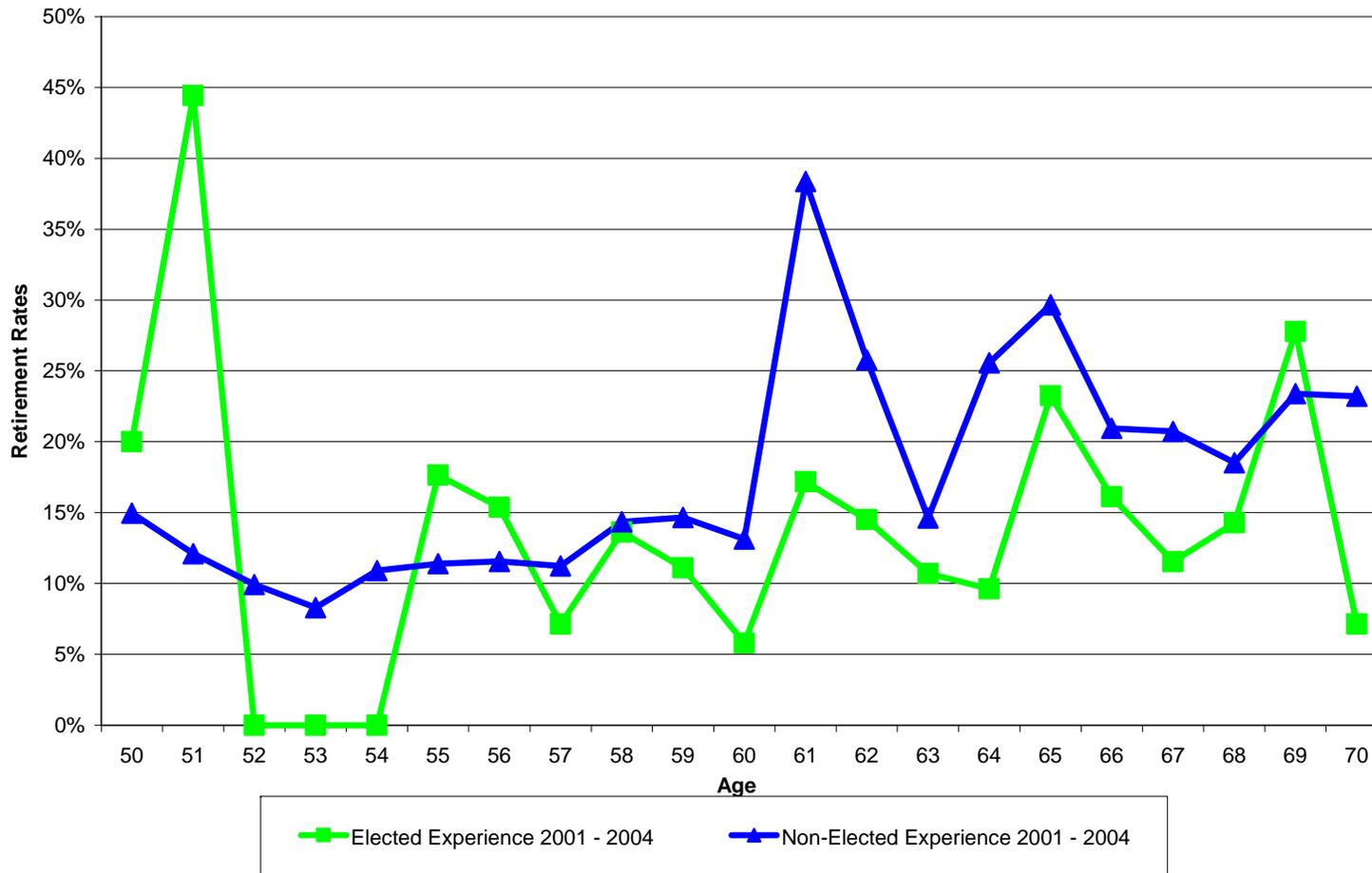
Section III: Retirement Rates

B. Elected Officials *(continued)*

Retirement Experience

Age	Experience Rates (2001-2004)	
	Eligible for Unreduced	**Not Eligible for Unreduced**
Under 50	0.2500	
50	0.2000	
51	0.4444	
52	0.0000	
53	0.0000	
54	0.0000	
55	0.1765	0.0492
56	0.1538	0.0566
57	0.0714	0.0208
58	0.1364	0.0488
59	0.1111	0.0000
60	0.0580	
61	0.1719	
62	0.1452	
63	0.1071	
64	0.0962	
65	0.2326	
66	0.1613	
67	0.1154	
68	0.1429	
69	0.2778	
70	0.0714	
71	0.0000	
72	0.1429	
73	0.5000	
74	0.0000	
75	0.5000	

Section III: Retirement Rates

C. Department of Corrections Officers

The Oklahoma Public Employees Retirement System provides normal retirement benefits at the earliest of 20 years of service, age 62, or when the sum of age and service equals 90 (or 80, for participants hired before July 1, 1992).

A member is eligible for early retirement after attaining age 55 and completion of ten years of credited service. For early commencement, the benefit is reduced by 1/15 per year for the first five years before age 62 and 1/30 per year for the next two years.

Retirement rates specify the percentage of employees eligible to retire who choose to retire at each age. In general, retirement rates are appropriate whenever an early retirement benefit is payable, especially if the early retirement benefit is subsidized by the System. The reduction for the Oklahoma Public Employees Retirement System early retirement benefit is less than actuarial equivalence, which implies a subsidized benefit. This is especially true of the "Rule of 80" and "Rule of 90" unreduced benefits. This can have a substantial impact on the costs of the System, especially if experience indicates a significant number of early retirements.

Experience Analysis Results

Experience for Department of Corrections officers was not studied prior to 2001. The following pages provide experience during the past three years. Overall, there were more retirements than expected. For members with exactly 20 years of experience, the assumption was in line with actual experience. For participants with over 20 years, there were consistently more retirements than assumed. For members with less than 20 years of service, there were certain ages with more than expected retirements and other ages with less than expected retirements.

Recommendations

We recommend increasing the retirement rate assumption for members with more than 20 years of service and less than 30 years of service from 15% to 18%. We do not recommend changing the assumption for members with less than 21 years of service or more than 29 years of service. In addition, we are recommending a change from 9% to 7% for people age 60 with less than 20 years of service, which is consistent with the recommended change for non-elected members.
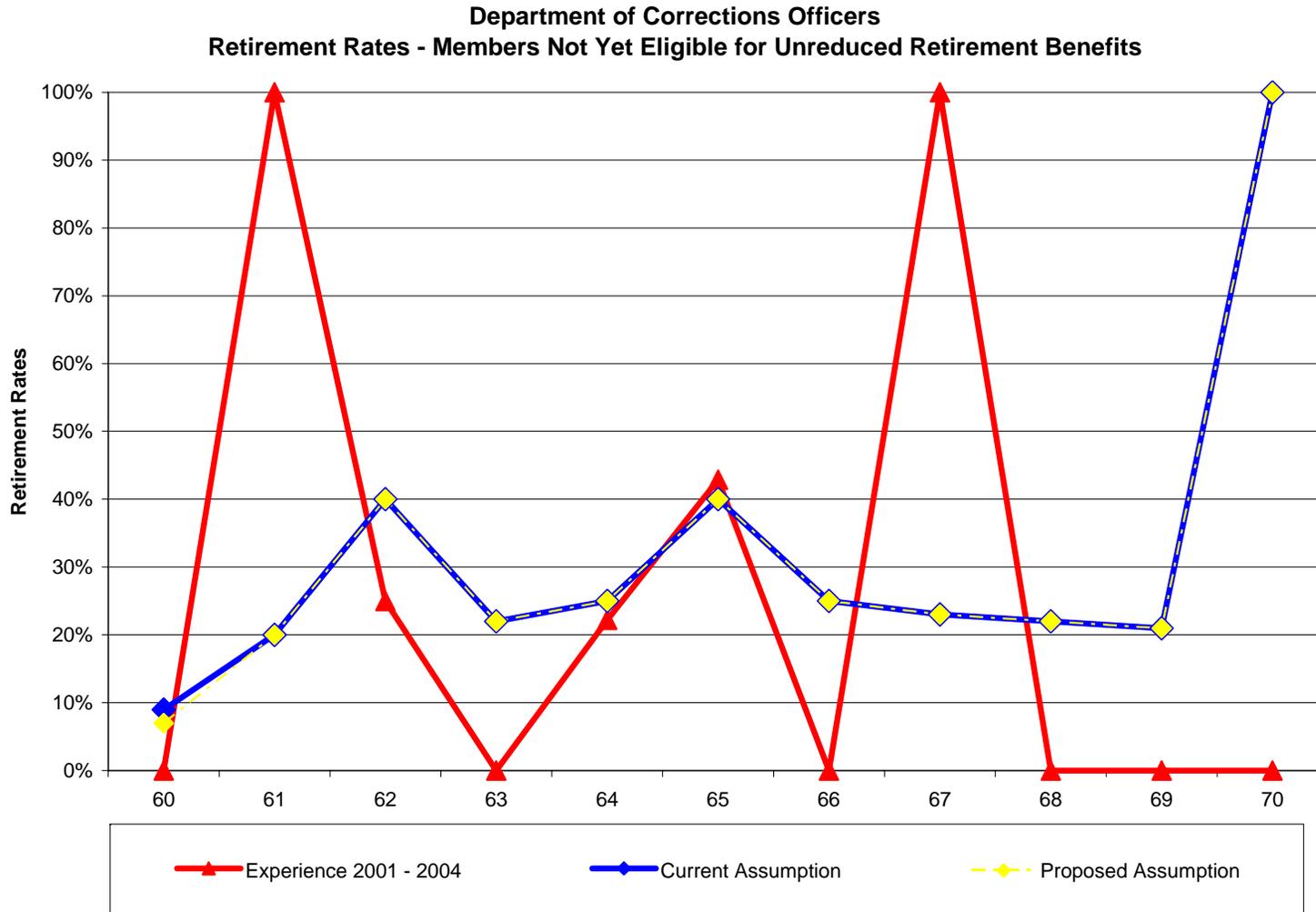
Section III: Retirement Rates

C. Department of Corrections Officers *(continued)*

**Department of Corrections Officers
Retirement Rates - Members Eligible for Unreduced Retirement Benefits**

Section III: Retirement Rates

C. Department of Corrections Officers *(continued)*

**Department of Corrections Officers
Retirement Rates - Members Not Yet Eligible for Unreduced Retirement Benefits**
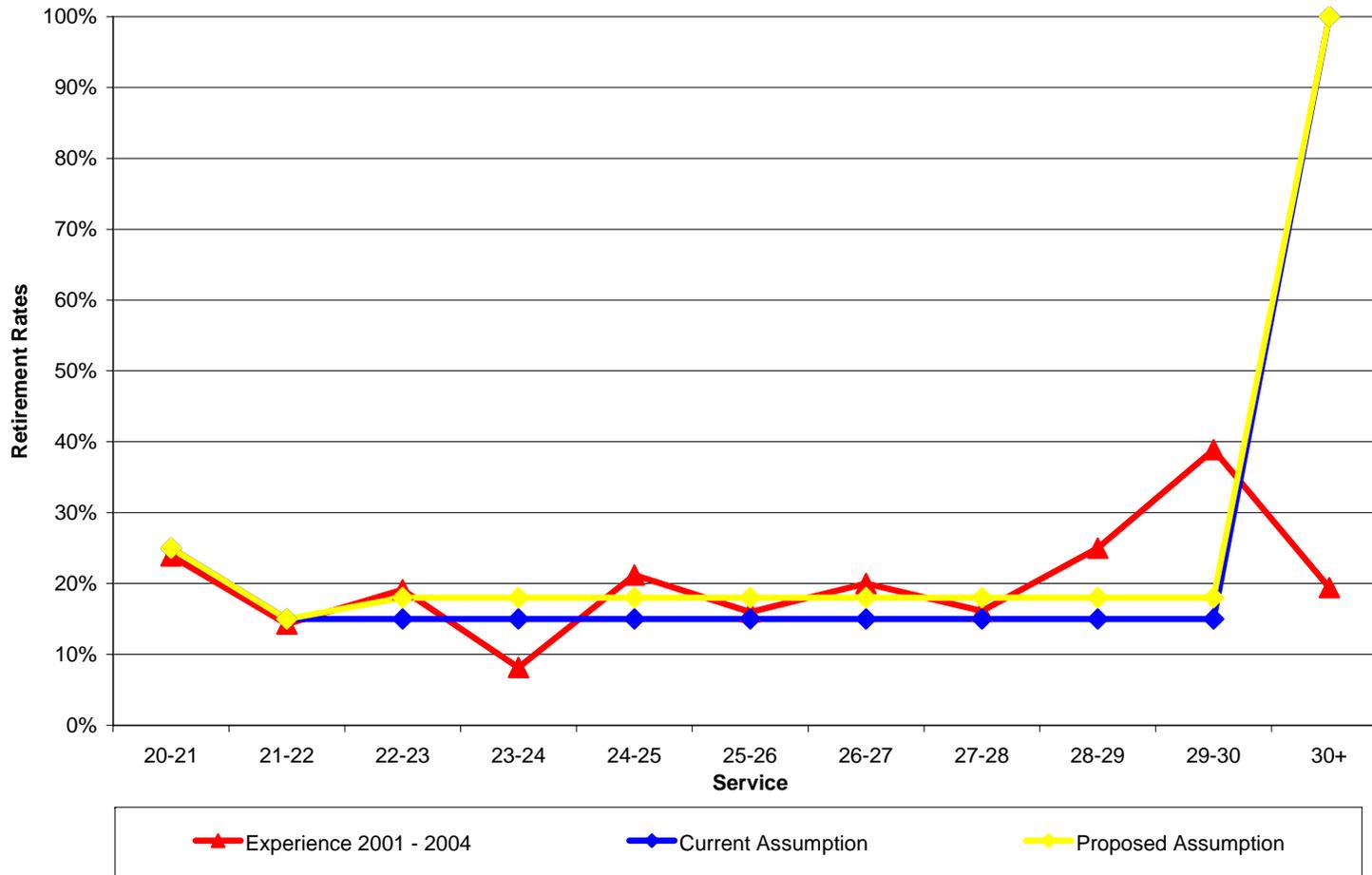
Section III: Retirement Rates

C. Department of Corrections Officers *(continued)*

Retirement Experience

Greater than 20 Years of Service

Service	Experience Rates (2001-2004)	Current Assumption	Proposed Assumption
20-21	0.2391	0.2500	0.2500
21-22	0.1429	0.1500	0.1800
22-23	0.1912	0.1500	0.1800
23-24	0.0816	0.1500	0.1800
24-25	0.2121	0.1500	0.1800
25-26	0.1600	0.1500	0.1800
26-27	0.2000	0.1500	0.1800
27-28	0.1613	0.1500	0.1800
28-29	0.2500	0.1500	0.1800
29-30	0.3889	0.1500	0.1800
30+	0.1944	1.0000	1.0000

Less than 20 Years Service

Age	Experience Rates (2001-2004)	Current Assumption	Proposed Assumption
60	0.0000	0.0900	0.0700
61	1.0000	0.2000	0.2000
62	0.2500	0.4000	0.4000
63	0.0000	0.2200	0.2200
64	0.2222	0.2500	0.2500
65	0.4286	0.4000	0.4000
66	0.0000	0.2500	0.2500
67	1.0000	0.2300	0.2300
68	0.0000	0.2200	0.2200
69	0.0000	0.2100	0.2100
70	0.0000	1.0000	1.0000

Section IV: Disability Rates

The Retirement System provides for disability benefits to members with eight years of service provided the member qualifies for federal Social Security disability benefits. The benefit is based on service and salary at date of disability with benefits payable immediately without reduction for early commencement.

Experience Analysis

There were fewer disabilities for both males and females than expected. Mercer recommends changes to the rates at selected ages. In general, these changes will increase the number of expected disabilities by approximately 22%.

Recommendations

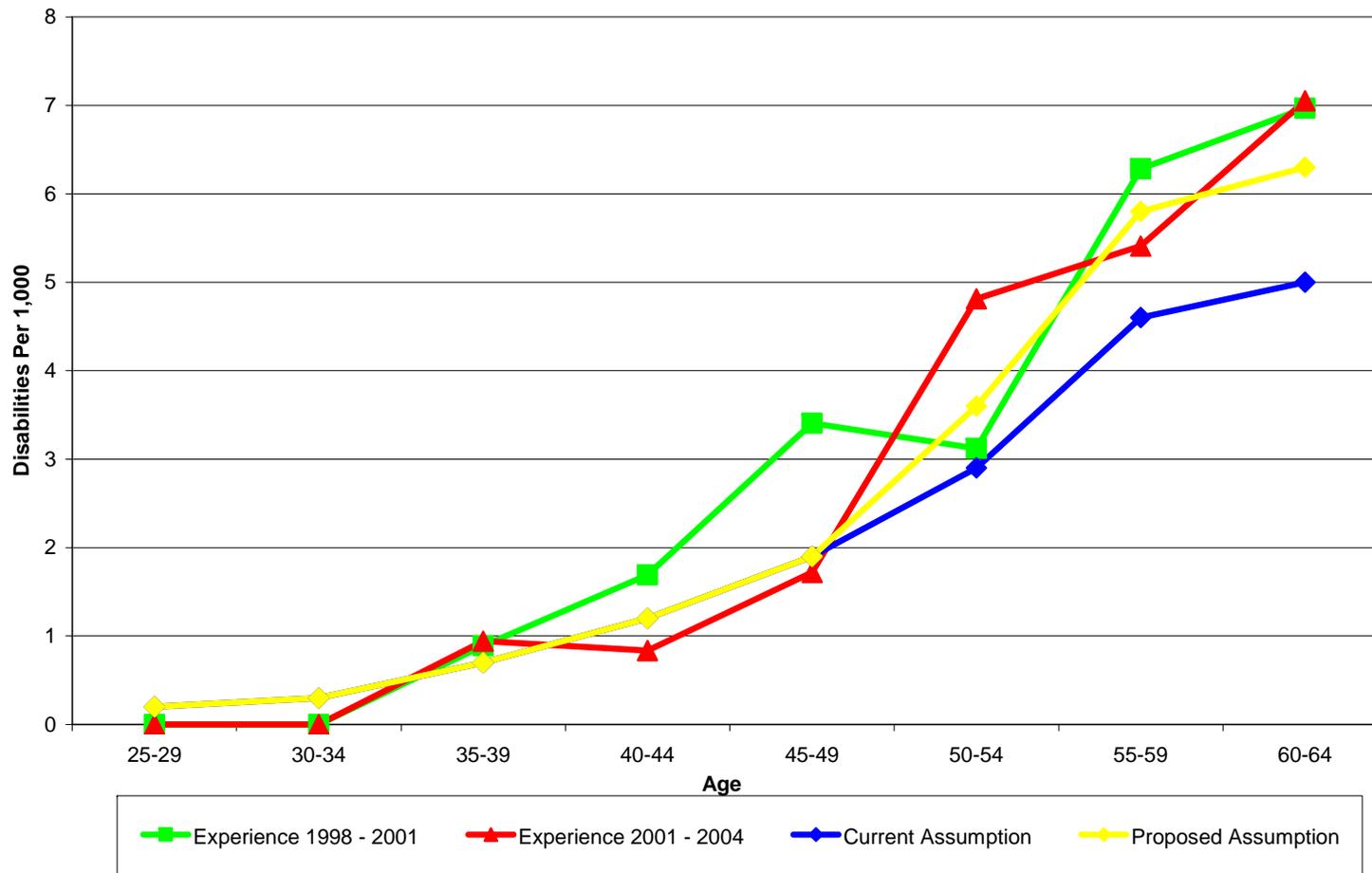We recommend increasing the rates at selected ages for both males and females.

Section IV: Disability Rates *(continued)*

Disability Rates - Males
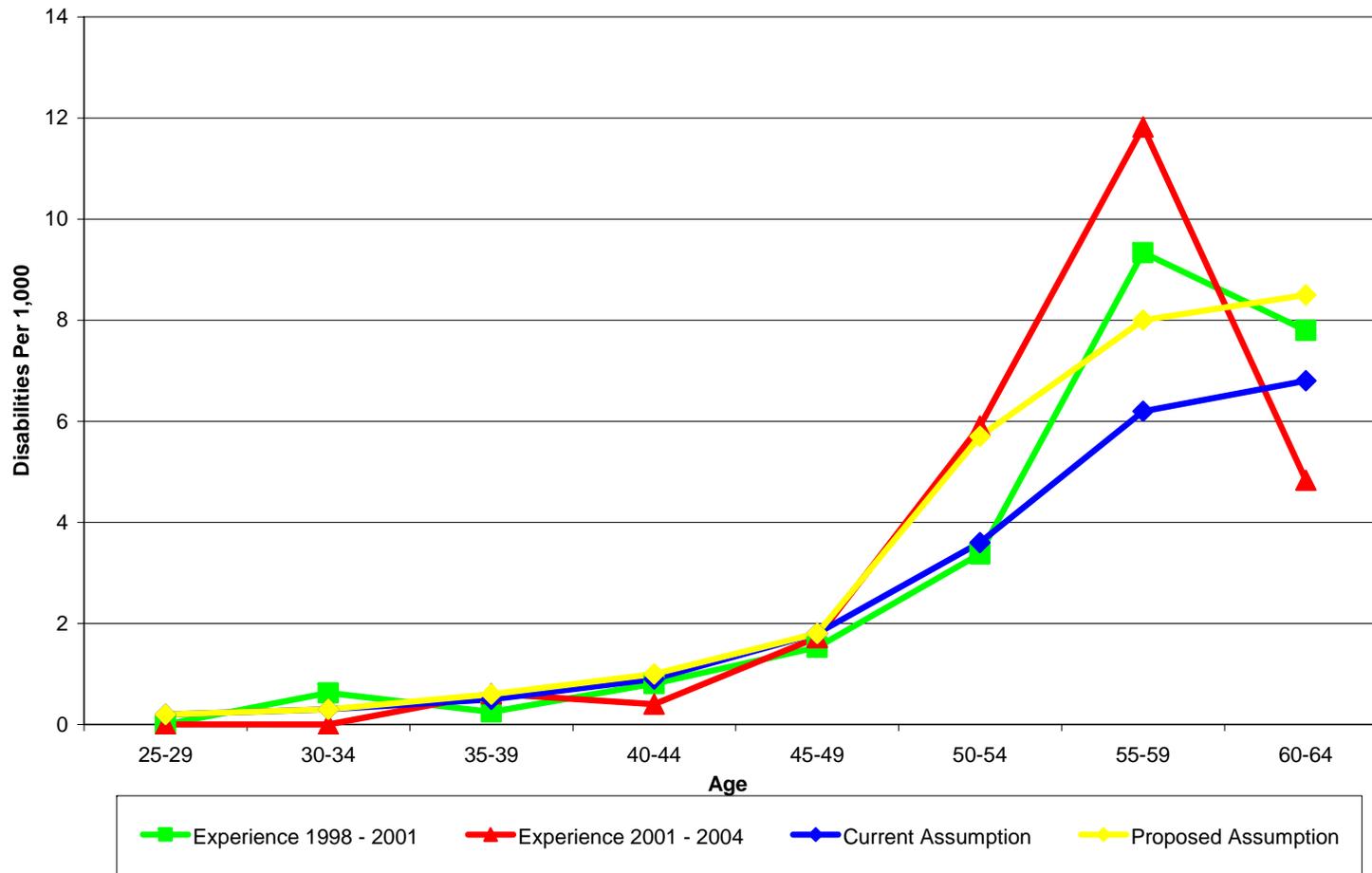
Section IV: Disability Rates *(continued)*

Disability Rates - Females

Section IV: Disability Rates *(continued)*

Males

Age	Actual Disabilities 2001-2004	Experience Rates	Current Assumption		Proposed Assumption	
			Expected Disabilities 2001-2004	Rates[4]	Expected Disabilities 2001-2004	Rates[3]
20-24	0	0.0000	0	0.0000	0	0.0000
25-29	0	0.0000	0	0.0002	0	0.0002
30-34	0	0.0000	0	0.0003	0	0.0003
35-39	2	0.0006	2	0.0005	2	0.0006
40-44	2	0.0004	5	0.0009	5	0.0010
45-49	10	0.0017	10	0.0018	10	0.0018
50-54	32	0.0059	20	0.0036	31	0.0057
55-59	44	0.0118	23	0.0062	29	0.0080
60-64	4	0.0048	6	0.0068	7	0.0085
	94		66		84	

Females

Age	Actual Disabilities 2001-2004	Experience Rates	Current Assumption		Proposed Assumption	
			Expected Disabilities 2001-2004	Rates[3]	Expected Disabilities 2001-2004	Rates[3]
20-24	0	0.0000	0	0.0001	0	0.0001
25-29	0	0.0000	0	0.0002	0	0.0002
30-34	0	0.0000	0	0.0003	0	0.0003
35-39	3	0.0009	2	0.0007	2	0.0007
40-44	5	0.0008	7	0.0012	7	0.0012
45-49	13	0.0017	14	0.0019	14	0.0019
50-54	30	0.0048	18	0.0029	23	0.0036
55-59	21	0.0054	18	0.0046	22	0.0058
60-64	6	0.0071	4	0.0050	5	0.0063
	78		63		73	

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[4] *Assumption rates are based on the average of the age range.*

Section V: Withdrawal Rates

The Retirement System provides for payment of the accrued benefit to a member who withdraws after eight years of credited service for any reason other than retirement, disability, or death. The benefit is payable at age 62, and early commencement is allowed if the member is 55 and has 10 years of credited service. The cost of providing these benefits is determined through the use of withdrawal rates which predict the occurrence of termination.

Factors affecting turnover rates are sex, age, and the number of years of employment completed. These factors can be addressed in the assumptions by making them sex distinct and by having select and ultimate factors to reflect turnover based on time of employment.

The current turnover rates are age-based with increased rates applying for employees with less than five years of service.

Experience Analysis Results

A review of the turnover experience on the following pages indicates that System experience is very close to the assumption for members with less than five years of service.

Turnover for members with five or more years of service is very close to the assumption from age 35 through 44. However, there were more withdrawals than expected at ages above and below that range.
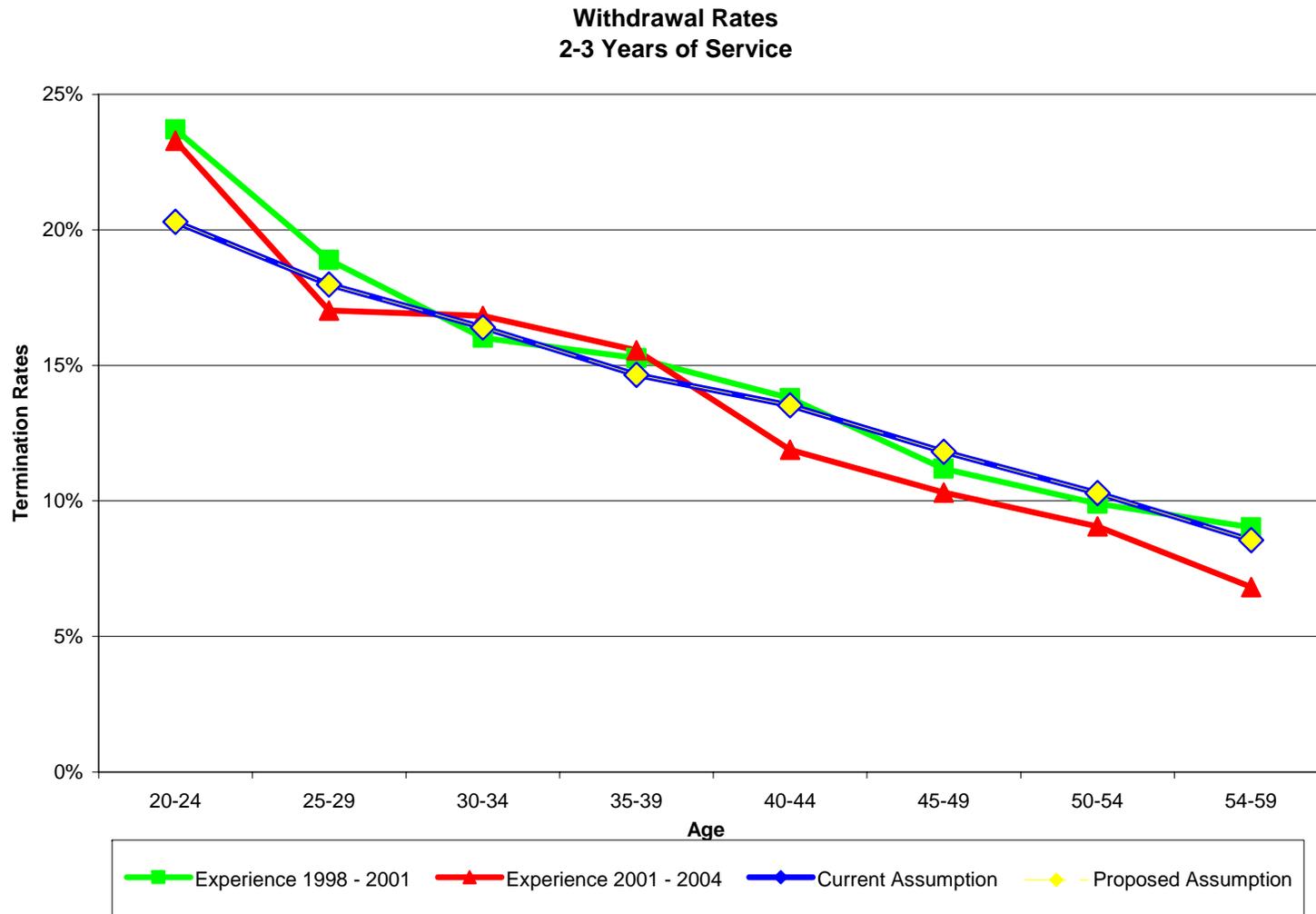
Recommendation

We recommend increasing the turnover rates for employees with over five years of service and under age 35 or over age 44. We recommend keeping the other rates unchanged.
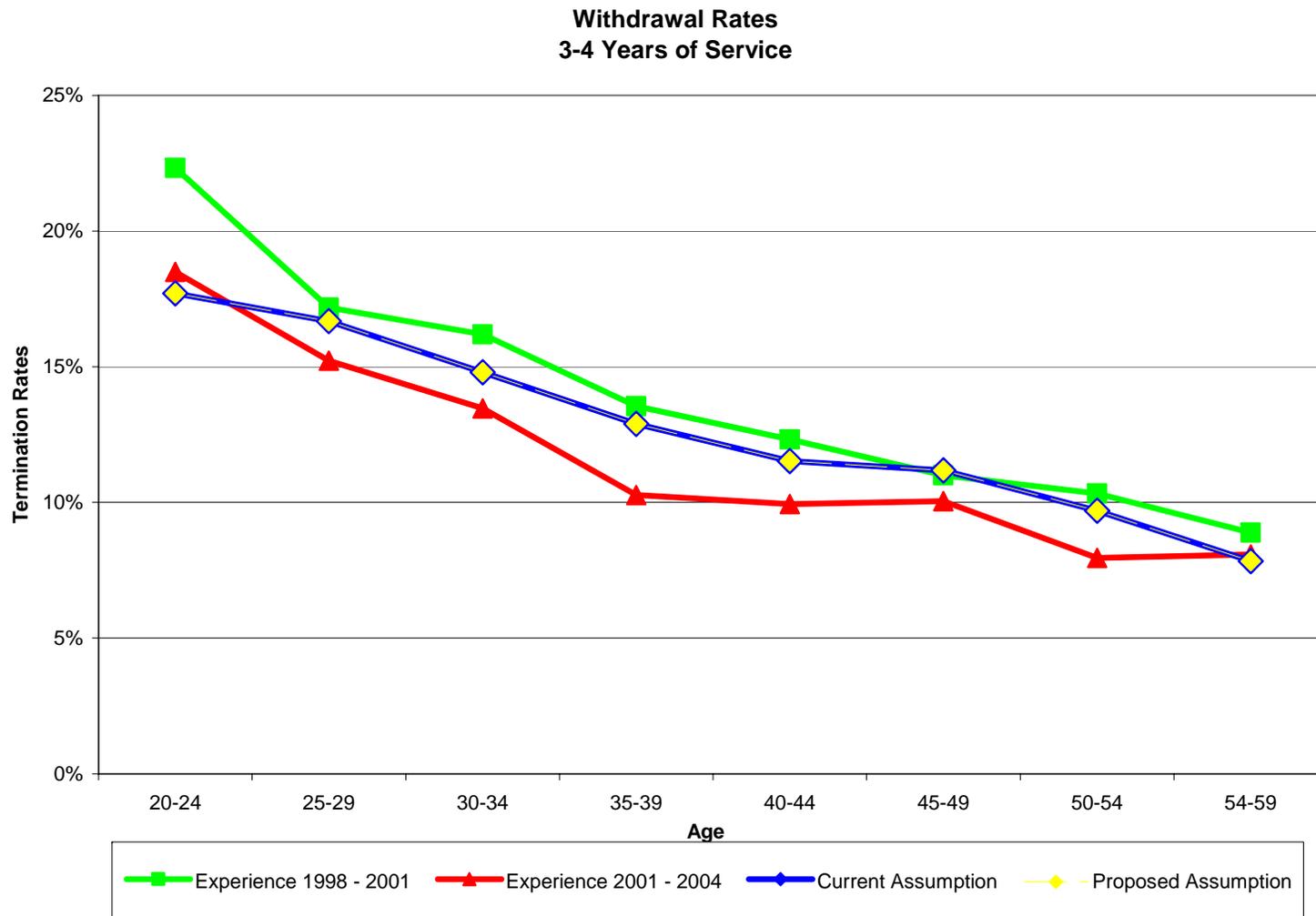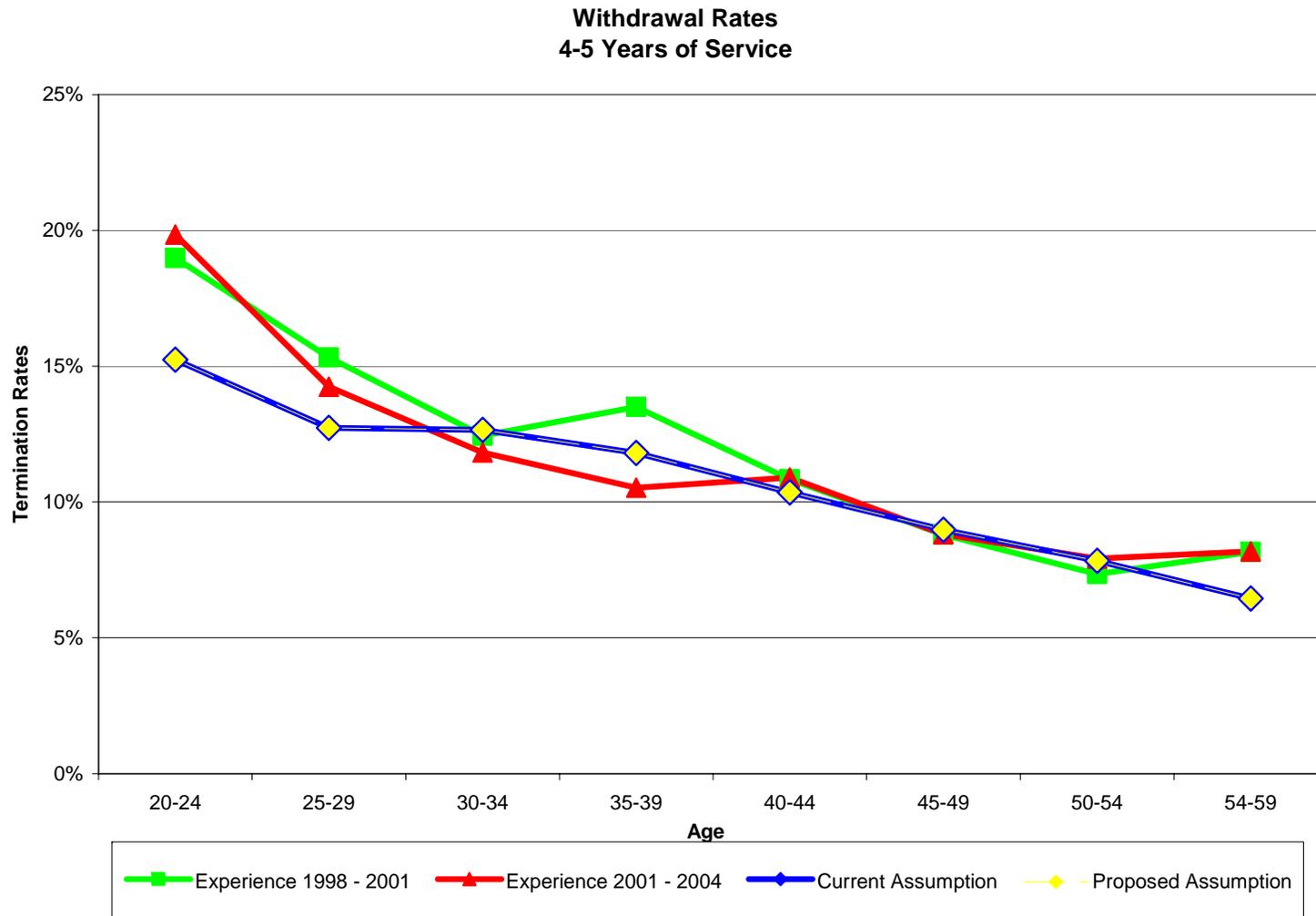
Section V: Withdrawal Rates *(continued)*
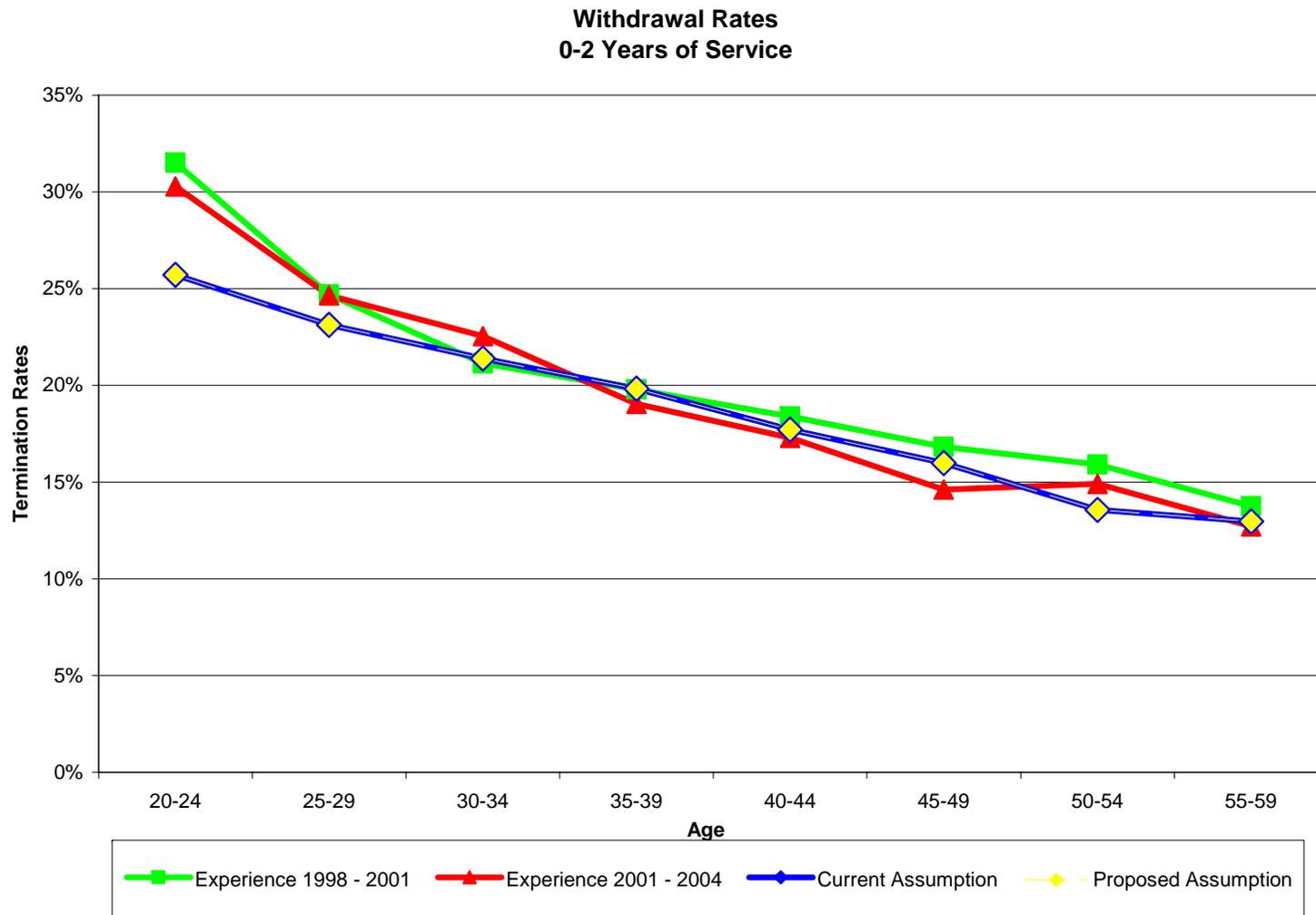
**Withdrawal Rates
0-2 Years of Service**
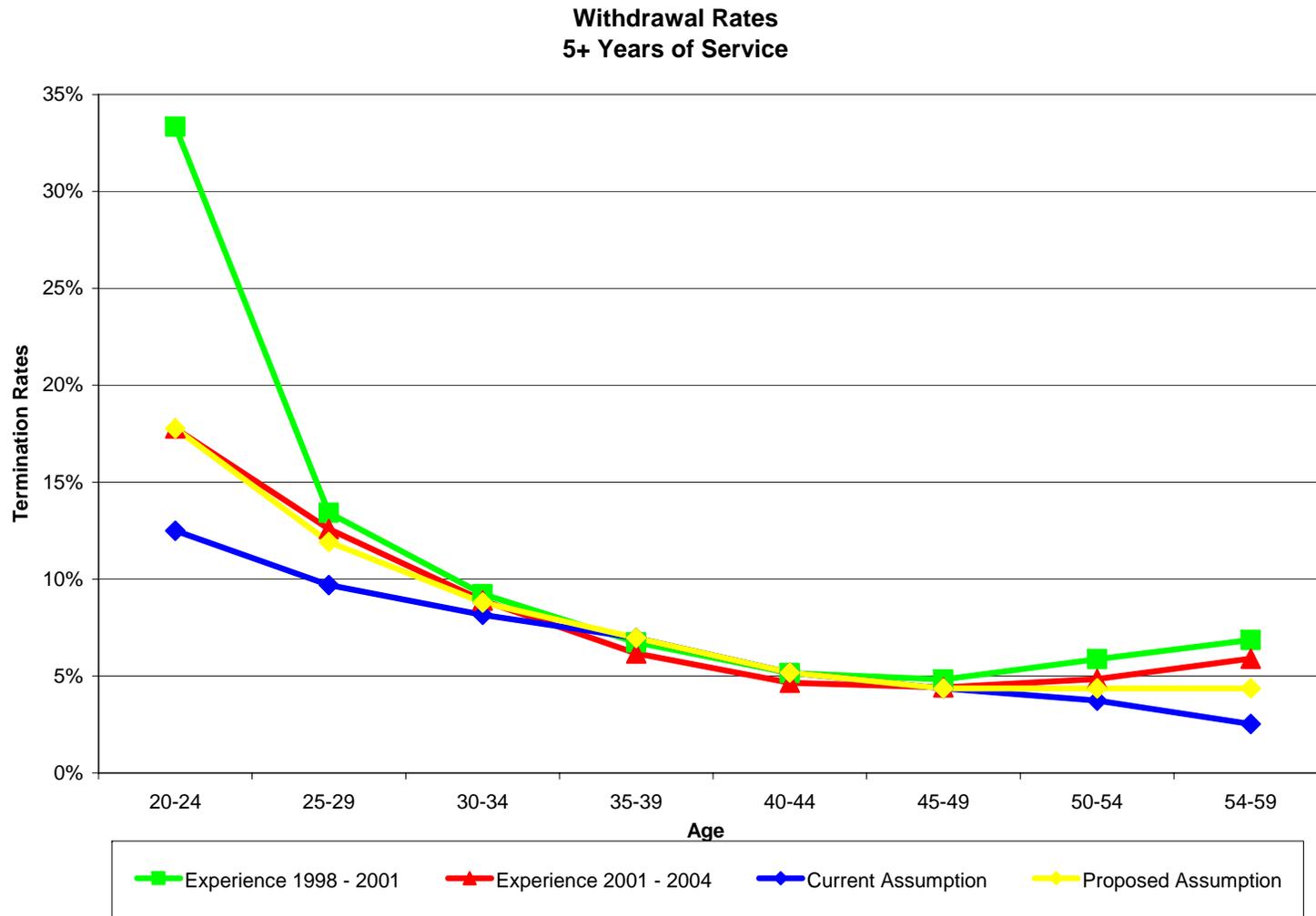
Section V: Withdrawal Rates *(continued)*

**Withdrawal Rates
2-3 Years of Service**

Section V: Withdrawal Rates *(continued)*

**Withdrawal Rates
3-4 Years of Service**

Section V: Withdrawal Rates *(continued)*

**Withdrawal Rates
4-5 Years of Service**

Section V: Withdrawal Rates *(continued)*

**Withdrawal Rates
5+ Years of Service**

Section V: Withdrawal Rates *(continued)*

Actual Experience (7/1/2001 – 6/30/2004)

Males

	Completed Years of Service				
Ages	**0-2 Years**	**2-3 Years**	**3-4 Years**	**4-5 Years**	**Over 5 Years**
20-24	0.3122	0.2305	0.1828	0.1594	0.2400
25-29	0.2636	0.1751	0.1557	0.1629	0.1266
30-34	0.2405	0.1674	0.1279	0.1164	0.0961
35-39	0.2040	0.1535	0.1085	0.1266	0.0663
40-44	0.1868	0.1271	0.0930	0.0976	0.0474
45-49	0.1536	0.1061	0.1038	0.0822	0.0460
50-54	0.1579	0.0989	0.0769	0.0779	0.0529
55-59	0.1398	0.0644	0.0660	0.0638	0.0636
60-64	0.1745	0.1304	0.0825	0.1135	0.1210

Females

	Completed Years of Service				
Ages	**0-2 Years**	**2-3 Years**	**3-4 Years**	**4-5 Years**	**Over 5 Years**
20-24	0.2934	0.2355	0.1880	0.2456	0.1000
25-29	0.2326	0.1665	0.1492	0.1194	0.1250
30-34	0.2132	0.1689	0.1404	0.1200	0.0815
35-39	0.1803	0.1571	0.0986	0.0879	0.0570
40-44	0.1639	0.1138	0.1032	0.1164	0.0459
45-49	0.1409	0.1012	0.0982	0.0927	0.0426
50-54	0.1417	0.0850	0.0814	0.0802	0.0446
55-59	0.1115	0.0723	0.0947	0.0997	0.0545
60-64	0.1137	0.1290	0.0800	0.0750	0.1169

Males and Females

	Completed Years of Service				
Ages	**0-2 Years**	**2-3 Years**	**3-4 Years**	**4-5 Years**	**Over 5 Years**
20-24	0.3027	0.2329	0.1850	0.1984	0.1778
25-29	0.2465	0.1703	0.1523	0.1424	0.1258
30-34	0.2254	0.1683	0.1346	0.1183	0.0889
35-39	0.1904	0.1556	0.1027	0.1053	0.0617
40-44	0.1729	0.1189	0.0994	0.1090	0.0466
45-49	0.1461	0.1031	0.1005	0.0881	0.0441
50-54	0.1490	0.0906	0.0796	0.0792	0.0485
55-59	0.1271	0.0682	0.0808	0.0818	0.0590
60-64	0.1493	0.1299	0.0816	0.1003	0.1191

Section V: Withdrawal Rates *(continued)*

Current and Proposed Rates

Ages	Current 0-2 Years	Current 2-3 Years	Current 3-4 Years	Current 4-5 Years	Current Over 5 Years	Proposed Over 5 Years
20	0.3030	0.2154	0.0000	0.0000	0.1324	0.2012
21	0.2725	0.2092	0.1329	0.0000	0.1278	0.1895
22	0.2571	0.2030	0.1773	0.1514	0.1233	0.1778
23	0.2433	0.1984	0.1752	0.1465	0.1179	0.1661
24	0.2401	0.1938	0.1731	0.1417	0.1126	0.1543
25	0.2355	0.1891	0.1709	0.1369	0.1072	0.1426
26	0.2341	0.1845	0.1688	0.1320	0.1019	0.1308
27	0.2312	0.1799	0.1667	0.1272	0.0969	0.1191
28	0.2278	0.1767	0.1630	0.1272	0.0939	0.1129
29	0.2244	0.1735	0.1592	0.1270	0.0910	0.1066
30	0.2210	0.1704	0.1554	0.1268	0.0881	0.1004
31	0.2175	0.1672	0.1516	0.1267	0.0849	0.0941
32	0.2139	0.1640	0.1479	0.1266	0.0816	0.0879
33	0.2101	0.1605	0.1441	0.1249	0.0792	0.0842
34	0.2078	0.1570	0.1403	0.1232	0.0766	0.0806
35	0.2044	0.1535	0.1365	0.1215	0.0742	0.0769
36	0.2011	0.1500	0.1327	0.1198	0.0717	0.0733
37	0.1983	0.1465	0.1289	0.1181	0.0696	0.0696
38	0.1856	0.1443	0.1261	0.1151	0.0660	0.0660
39	0.1831	0.1420	0.1234	0.1123	0.0623	0.0624
40	0.1809	0.1398	0.1207	0.1094	0.0587	0.0589
41	0.1799	0.1375	0.1180	0.1066	0.0551	0.0553
42	0.1771	0.1353	0.1152	0.1036	0.0517	0.0517
43	0.1737	0.1315	0.1146	0.1005	0.0503	0.0501
44	0.1702	0.1277	0.1138	0.0975	0.0486	0.0485
45	0.1667	0.1248	0.1131	0.0945	0.0468	0.0468
46	0.1630	0.1215	0.1124	0.0914	0.0451	0.0452
47	0.1599	0.1182	0.1117	0.0897	0.0435	0.0436
48	0.1465	0.1149	0.1087	0.0876	0.0422	0.0436
49	0.1430	0.1114	0.1058	0.0855	0.0410	0.0436
50	0.1400	0.1085	0.1029	0.0834	0.0398	0.0436
51	0.1373	0.1057	0.0999	0.0811	0.0385	0.0436
52	0.1356	0.1029	0.0970	0.0784	0.0372	0.0436
53	0.1341	0.1000	0.0937	0.0758	0.0349	0.0436
54	0.1326	0.0973	0.0903	0.0731	0.0325	0.0436
55	0.1314	0.0934	0.0869	0.0704	0.0302	0.0436
56	0.1302	0.0894	0.0827	0.0678	0.0278	0.0436
57	0.1296	0.0855	0.0784	0.0644	0.0251	0.0436
58	0.1280	0.0815	0.0742	0.0610	0.0232	0.0436
59	0.1275	0.0777	0.0699	0.0576	0.0212	0.0436

Section V: Withdrawal Rates *(continued)*

Comparison of Actual/Expected Number of Withdrawals

0-2 Years of Service

		Current and Proposed Assumption	
Age Range	Actual Withdrawals	Expected Withdrawals	Actual/Expected Withdrawals
20-24	848	720	118%
25-29	908	852	107%
30-34	679	644	105%
35-39	498	519	96%
40-44	444	455	98%
45-49	332	363	91%
50-54	277	252	110%
55-59	154	157	98%
	4,140	3,962	104%

2-3 Years of Service

		Current and Proposed Assumption	
Age Range	Actual Withdrawals	Expected Withdrawals	Actual/Expected Withdrawals
20-24	146	127	115%
25-29	277	293	95%
30-34	245	239	103%
35-39	190	179	106%
40-44	146	166	88%
45-49	123	141	87%
50-54	82	93	88%
55-59	47	59	80%
	1,256	1,297	97%

3-4 Years of Service

		Current and Proposed Assumption	
Age Range	Actual Withdrawals	Expected Withdrawals	Actual/Expected Withdrawals
20-24	59	57	104%
25-29	201	220	91%
30-34	175	192	91%
35-39	113	142	80%
40-44	114	132	86%
45-49	111	123	90%
50-54	69	84	82%
55-59	53	51	104%
	895	1,001	89%

Section V: Withdrawal Rates *(continued)*

Comparison of Actual/Expected Number of Withdrawals *(continued)*

4-5 Years of Service

Age Range	Actual Withdrawals	Current and Proposed Assumption	
		Expected Withdrawals	Actual/Expected Withdrawals
20-24	25	19	132%
25-29	142	127	112%
30-34	149	160	93%
35-39	109	122	89%
40-44	117	111	105%
45-49	87	89	98%
50-54	69	68	101%
55-59	54	43	126%
	752	739	102%

5+ Years of Service

Age Range	Actual Withdrawals	Current Assumption		Proposed Assumption	
		Expected Withdrawals	Actual/Expected Withdrawals	Expected Withdrawals	Actual/Expected Withdrawals
20-24	8	6	133%	8	100%
25-29	176	136	129%	167	105%
30-34	440	404	109%	435	101%
35-39	547	617	89%	617	89%
40-44	620	688	90%	688	90%
45-49	690	680	101%	682	101%
50-54	668	513	130%	601	111%
55-59	147	63	233%	109	135%
	3,296	3,107	106%	3,307	100%

Section VI: Economic Assumptions

The interest rate assumption is one of the most important assumptions to the annual valuation because of its significant impact on the projected contribution requirements of the Retirement System. For example, the impact of a 1/2% decrease in interest rates would result in an increase in System liabilities of approximately 5-10%.

Although it is important to evaluate the rate of return assumption based on historical performance, the interest rate assumption should be determined based on the actuary's "best estimate" of the anticipated long-term economic conditions. This should also take into consideration the information and projections provided by the System's investment consultant based upon the Board's investment policy.

When setting an investment return assumption, the following two components should be examined separately:

1) inflation
2) real rate of return on assets (net of inflation)

The current assumption in the OPERS valuation for the rate of return on investments is 7.5%, net of investment expenses. This consists of a 3.0% inflation assumption and a 4.5% assumption for the real rate of return on assets.

For purposes of the actuarial valuation, the asset value is currently smoothed by a method that recognizes 20% of any gain or loss on the expected value each year and the remaining 80% of the gain or loss over the subsequent four years. Therefore, the rate of return reflected in the actuarial value of assets does not have the same return as the market value. The smoothing method tends to dampen the fluctuations in the marketplace. The June 30, 2004, actuarial value of assets is $5.41 billion, compared to a market value of $5.13 billion for OPERS.

Section VI: Economic Assumptions *(continued)*

A. Inflation

Inflation is an underlying assumption that is closely tied to the member salary increases and returns required by investors. Before setting an investment return assumption, an underlying inflation assumption must be determined.

The 2001 Survey of State and Local Government Employee Retirement Systems provides information on the inflation assumptions used by large public pension funds. The survey shows that public plans use an average inflation rate of 3.97%.

Please also note that recently low inflation rates have resulted in a continually decreasing inflation assumption.

The following table shows the average inflation assumption used by all plans during past versions of the above study.

Study	Average Inflation Assumption
1993 Survey	4.98%
1995 Survey	4.81%
1997 Survey	4.41%
1999 Survey	4.36%
2001 Survey	3.97%

While the 2003 study is not yet available, another study conducted by the National Association of State Retirement Administrators shows a 0.25% decline in the median inflation assumption between 2002 and 2003 to 3.75%.

The CPI can be used as an estimate of past inflation to assist in estimating future inflation. Historical rates of inflation as measured by changes in the CPI are shown below as cumulative rates developed over varying periods of time for calendar years ending June 30, 2004.

Years	CPI
3	2.2%
6	2.5%
10	2.5%
15	2.8%
20	3.0%
25	3.9%
30	4.6%
50	4.0%
76	3.2%

As can be seen by the previous table, inflation during the last 15 to 20 years has been significantly lower than the inflation rates that occurred 25 to 30 years ago. However, for years prior to 1970, inflation was more in line with the inflation we have seen in recent years. The range of inflation of 2.5% to 3.0% would appear to be reasonable if the more recent information is given more weight than the older information.

Section VI: Economic Assumptions *(continued)*

A. Inflation *(continued)*

Investment professionals generally would consider that an inflation assumption between 2.5% and 3.0% is a reasonable assumption. Mercer Investment Consulting currently recommends using a 2.5% inflation assumption.

Recommendation

We recommend changing this assumption to 2.5%, which appears to be consistent with recent experience and long-term expectations.

Section VI: Economic Assumptions *(continued)*

B. COLA

Currently, we assume that two-thirds of purchasing power lost to inflation is ultimately "made up" through ad hoc benefit increases to retirees. Since that time, the legislature provided ad hoc benefit increases to retirees in 2002 that averaged 5.3% of their retirement benefits and in 2004 that averaged 4.1% of their retirement benefits. This is 144% of the total inflation (6.70%) during the last three years. Over the last six years, benefits have been increased by a total cumulative rate of 14.88%. This is 93% of the inflation (16.05%) during the period.

Recommendation

We recommend OPERS use an ad hoc COLA assumption equal to 90% of the current inflation assumption. Using an inflation assumption of 2.5%, as recommended in the previous section, would effectively result in an increase to the average COLA assumption from 2.00% to 2.25% per year.

Section VI: Economic Assumptions *(continued)*

C. Rate of Return

The expected real rate of return (net of inflation) will depend heavily on the System's asset mix (i.e., percentage of equities, fixed income, cash, etc.). Generally, the higher the System's concentration in equities, the higher the return it will be expected to earn. As of July 1, 2004, OPERS had the following asset mix. In addition, this table shows the proposed asset mix to be presented at the May 12, 2005, Board meeting.

	July 1, 2004 Mix	Target Mix	Proposed Mix
U. S. Equities	45.1%	44.0%	43.0%
Non-U. S. Equities	15.1%	14.0%	19.0%
Fixed Income	39.5%	42.0%	38.0%
Cash and Short Term Investments	0.3%	0.0%	0.0%

The following are long-term assumptions provided by Strategic Investment Solutions, Inc. (SIS) and Mercer Investment Consultants, Incorporated (MICI) for U. S. equities, non-U. S. equities, and fixed income investments.

	SIS	MICI
U. S. Equities	8.4%[5]	8.1%
Non-U. S. Equities	8.9%	8.2%
Fixed Income	4.7%	4.9%

A simple weighting of the above rates of return by the target asset mix results in an expected rate of return (prior to investment expense) of 6.92% for the SIS assumptions and 6.77% for the MICI assumptions. Deducting for investment expenses of 0.2% reduces these rates of return to 6.72% and 6.57% respectively.

Similarly weighting the above rates by the proposed asset mix results in an expected rate of return of 7.09% using the SIS assumptions (6.89% after subtracting the expense assumption) and 6.90% using the MICI assumptions (6.70% after subtracting the expense assumption).

Please note that the above tables do not account for the fact that liquidity needs require a small portion of OPERS' portfolio to be based on cash or cash equivalents. To this extent, the rates shown above slightly overstate the justifiable rate of return assumption.

We also ran the MICI assumed rates of return through a proprietary Mercer program that adjusts expected rates of return based on the risk characteristics of each investment class, the correlation between expected returns for different asset classes, and the underlying inflation rate. Using this program and the same 0.2% assumption for investment expenses produces a median 7.05% expected rate of return for the System using the current asset mix and a 7.21% using the proposed asset mix. If we adjust our median expected rate of return by the 0.19% difference in SIS and MICI assumptions noted above, the result becomes 7.40%, which is very close to the assumed rate of 7.5%.

Based on survey data from the 2001 Survey of State and Local Government Employee Retirement Systems, the chart on the next page shows that the average assumption used by all plans in the study is 7.91%. Furthermore, the distribution of rate of return assumptions used by all systems in the survey is as follows:

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[5] *Weighted average of large capitalization and small capitalization equity rates based on current target asset mix.*

Section VI: Economic Assumptions *(continued)*

C. Rate of Return *(continued)*

Interest Rate	Percentage of Plans Using Assumption
< 7.0%	3%
7.0 – 7.9%	23%
8.0 – 8.9%	65%
9.0%	9%

Please note that these plans also used a higher inflation rate, so the nominal rate of return assumption may be lower if they were using the 2.5% inflation assumptions as recommended in this report.

Most actuaries do not recommend basing the rate of return assumptions on recent investment results. On market value of assets, OPERS earned rates of return greater than 15% each year for fiscal years ending from 1995 through 1998 and earned a return greater than the 7.5% assumption eight of nine years from 1992 through 2000. These actuaries did not recommend dramatic rate of return assumption increases during this period. Similarly, the System's annual return since 2000 has been less than 2%. Most actuaries would similarly not recommend decreasing the rate of return assumption dramatically to reflect this experience. Please note that the average annual rate of return during the last 10 years has been 9.2%.

Recommendation

If OPERS adopts the proposed asset mix, we recommend continued use of the 7.5% rate of return assumption. A different rate might be used if another mix is adopted.

Section VI: Economic Assumptions *(continued)*

D. Actuarial Asset Method

The actuarial value of assets smoothes investment gains and losses over five years. This is done in an attempt to smooth market fluctuations so that contributions are more predictable and less variable. The current method and variations of it are widely used by actuaries. This method produces an actuarial value of assets that is not biased over the long term toward either overstatement or understatement compared to the market value of assets.

The actuarial value of assets smoothes investment experience. The following shows the results (in millions) for the past six fiscal years ending June 30, 2004:

	MVA	AVA	Difference	AVA as % of MVA
2004	$5,126	$5,412	$(286)	106%
2003	4,619	5,355	(736)	116%
2002	4,486	5,300	(814)	118%
2001	4,815	5,110	(295)	106%
2000	5,246	4,786	460	91%
1999	4,831	4,262	569	88%

We recommend retaining the current method for developing the actuarial value of assets.

Section VII: Salary Scale

Increases in salary for an individual employee reflect three principal components:

- inflation
- productivity increases, and
- merit, seniority and promotional increases.

Inflation is a component that is flat for all employees, but the merit and productivity increases are a function of age.

Similar to the investment return assumption, the salary scale assumption is directly impacted by inflation. In an earlier section of this report, we have recommended a 2.5% inflation assumption. From the investment return analysis, we will rely upon the underlying assumption of 2.5% as a long-term inflation assumption. The remaining portion of the salary scale is based on merit and productivity increases.

In the annual actuarial valuation for the Oklahoma Public Employees Retirement System, the current level of salary is projected into the future to determine the pension benefit expected to be paid to the participant. Since contributions into the System are pay-related, a change in the salary scale will impact both liabilities and contributions.

The current Retirement System salary increase assumption is graded by age from a high of 9.0% at age 20 to a low of 5.1% at the higher ages. This results in an average salary increase of 5.63%. This is based on your employee population on July 1, 2004.

Experience Analysis Results

Overall, salary increases were less than expected during the three years in the study period. During the first year of the study period, increases were higher than expected and consistent with the previous three year study period. However, increases during the past two years were significantly lower than expected. Each of these two years were affected by OPERS recent changes to the definition of pay with respect to Excess Benefits. The pay increases shown on the following pages are after adjustments were made for the pay definition change.

The 2001 Survey of State and Local Government Employee Retirement Systems shows an average salary scale assumption for all plans in the survey to be 5.56%. This is 159 basis points higher than the 3.97% average inflation assumption used by the plans. Adjusting to the 2.5% inflation assumption recommended in this report, this produces a 4.09% net salary scale which is less than the 5.63% average assumption used by OPERS.

Recommendations

We recommend no change at this time. Pay increases were below expectation during the last two years. However, the impact of the pay definition change was estimated during these years. Rather than make a change to the assumption based on these estimates, we will continue to monitor System experience during the next three years.

Section VII: Salary Scale *(continued)*

**Annual Salary Increase
by Age**
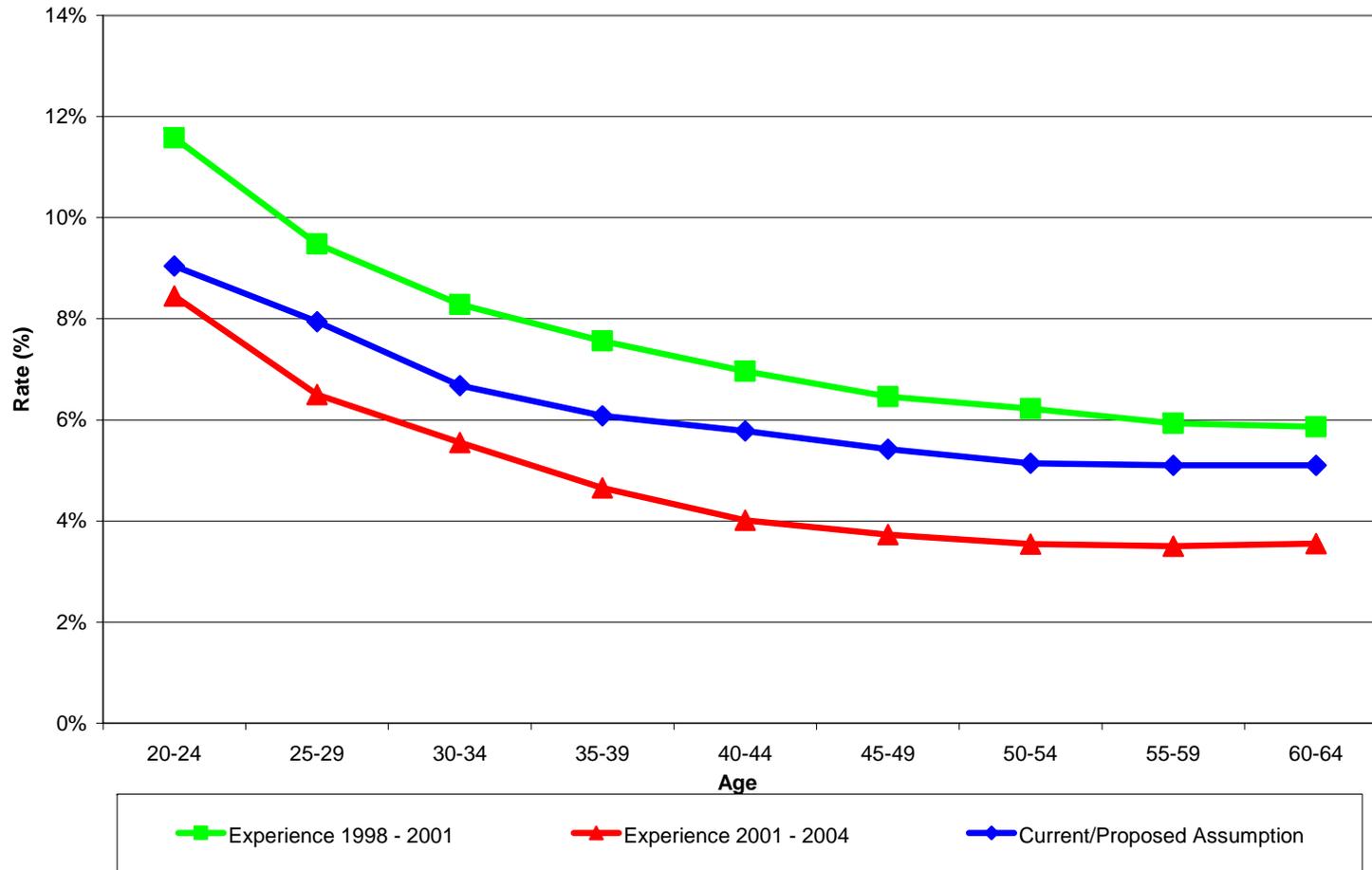
Section VII: Salary Scale *(continued)*

Salary Increase Experience

Age Range	Experience Rates 1998 – 2001	Experience Rates 2001-2004[6]	Current and Proposed Assumption[7]
20-24	11.58%	8.45%	9.04%
25-29	9.48%	6.50%	7.94%
30-34	8.28%	5.55%	6.68%
35-39	7.56%	4.65%	6.08%
40-44	6.96%	4.01%	5.78%
45-49	6.46%	3.73%	5.42%
50-54	6.22%	3.54%	5.14%
55-59	5.93%	3.50%	5.10%
60-64	5.86%	3.55%	5.10%

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[6] *This is the average rate of increase per year over the last three years after adjustment for one-time pay adjustments due to the change made by OPERS in the treatment of Excess Benefits.*

[7] *Assumption rates are based on the average rate of the age range.*

Section VIII: Amortization Period and Method

The amortization period determines how quickly the unfunded liability of the System will be funded. When determining the System's annual required contribution, it is assumed that the unfunded liability will be funded ratably until the System has no unfunded liability as of July 1, 2027. Therefore, the amortization period assumed for the 2004 valuation was 23 years.

Any change to this period will have a significant impact on the System's required contributions.

OPERS amortization period decreases by a year each year since the end of the amortization period is a fixed date. This means that future liability and investment gains will be recognized over a decreasing period of time. This will, in turn, result in recognizing higher portions of these gains and losses occurring each year in the following year's annual required contribution amount. This should not be a major concern over the near term, but will eventually need to be addressed.

In addition, Governmental Accounting Standards Board Statement No. 27 states that the amortization period of the System must be between 10 and 40 years. The current amortization period lies within this range.

The OPERS amortization amount is based upon a level dollar amortization. GASB Statement 27 permits amortizing the unfunded actuarial accrued liability with either a level dollar amount or as a level percentage of payroll. Using a level percentage of payroll decreases the current amortization amount and increases later amortization amounts. In the early years, under level percentage of payroll, the amortization amount does not cover interest on the unfunded actuarial accrued liability and therefore the unfunded actuarial accrued liability will increase for a period of time. We recommend that OPERS continue to use the level dollar amortization method although it should be noted that the level dollar amortization produces decreasing amortization payments as a percentage of pay.

Section IX: Summary of Recommendations

	<u>**Current Assumptions**</u>	<u>**Proposed Assumptions**</u>

Economic Assumptions

1. Investment Return

7.5%, net of investment expenses, per annum, compounded annually.

No change.

2. Earnings Progression

Sample rates below:

Attained Age	In- flation	Merit	% Increase
20	3.0	6.0	9.0
25	3.0	5.0	8.0
30	3.0	3.7	6.7
35	3.0	3.1	6.1
40	3.0	2.8	5.8
45	3.0	2.4	5.4
50	3.0	2.1	5.1
55	3.0	2.1	5.1
60	3.0	2.1	5.1
65	3.0	2.1	5.1

No change. Inflation has decreased 0.5%, and merit has increased 0.5%.

Section IX: Summary of Recommendations *(continued)*

<u>**Current Assumptions**</u>   <u>**Proposed Assumptions**</u>

Non-elected Members

Demographic Assumptions

1. Retirement Rates

Attained Age	Annual Rates of Retirement Per 100 Employees Eligible for "Rule of 80" or "Rule of 90"	Attained Age	Annual Rates of Retirement Per 100 Employees Not Eligible for "Rule of 80" or "Rule of 90"	Attained Age	Annual Rates of Retirement Per 100 Employees Eligible for "Rule of 80" or "Rule of 90"	Attained Age	Annual Rates of Retirement Per 100 Employees Not Eligible for "Rule of 80" or "Rule of 90"
Under 50	0			Under 50	10		
50	10			50	10		
51	10			51	10		
52	10			52	10		
53	10			53	10		
54	10			54	10		
55	10	55	7	55	10	55	4
56	10	56	6	56	10	56	5
57	11	57	7	57	11	57	5
58	12	58	7	58	12	58	6
59	13	59	7	59	13	59	7
60	14	60	9	60	14	60	7
61	20	61	20	61	35	61	20
62	40			62	30		
63	22			63	15		
64	25			64	25		
65	40			65	30		
66	25			66	25		
67	23			67	23		
68	22			68	22		
69	21			69	21		
70	100			70	100		

2. Mortality Rates

Active employees and nondisabled pensioners	1983 Group Annuity Mortality Table.	RP-2000 mortality table (combined active/retiree healthy) projected to 2010 using Scale AA for males and females.
Disabled pensioners	1983 Group Annuity Mortality set forward 10 years.	Above table set forward 15 years.

3. Disability Rates   Graduated rates.   Graduated rates.

Disabled Rates per 100 Members

Attained Age	Male	Female	Attained Age	Male	Female
20	0.01	0.01	20	0.00	0.01
30	0.02	0.03	30	0.02	0.03
40	0.08	0.10	40	0.08	0.10
50	0.26	0.25	50	0.41	0.31
60	0.68	0.50	60	0.85	0.63

Section IX: Summary of Recommendations *(continued)*

	<u>Current Assumptions</u>	<u>Proposed Assumptions</u>
4. Withdrawal Rates	Graded select and ultimate rates.	Revisions made to employees with at least five years of employment. (see withdrawal section of this report).
5. Marital Status		
Percentage married	Males: 85%; Females: 85%.	No change.
Age difference	Males are assumed to be four years older than spouses.	No change.

Other Assumptions

1. Assumed Age of Commencement for Deferred Benefits	Age 62	No change.
2. Actuarial Value of Assets	An expected actuarial value is determined equal to the prior year's Actuarial Value of Assets plus cash flow (excluding realized and unrealized gains and losses) for the year ended on the valuation date and assuming 7.5% interest return. Twenty percent (20%) of any (gain)/loss as measured by the difference between the expected actuarial value and the market value at the valuation date is added to the expected actuarial value plus prior unrecognized gains or losses. The (gain)/loss is amortized over five years. The result is constrained to a value of 80% to 120% of the market value at the valuation date.	No change.
3. Provision for Administrative Expenses	As budgeted by the Oklahoma Public Employees Retirement System.	No change.

Section IX: Summary of Recommendations *(continued)*

	<u>Current Assumptions</u>	<u>Proposed Assumptions</u>

Department of Corrections Members

Unless specified below, the assumptions for Department of Corrections members are the same as those for other non-elected members.

1. Retirement Rates

		Annual Rates per 100		Annual Rates per 100
	<u>Attained Age</u>	<u>Employees</u>	<u>Attained Age</u>	<u>Employees</u>
Service less than 20	60	9	60	7
	61	20	61	20
	62	40	62	40
	63	22	63	22
	64	25	64	25
	65	40	65	40
	66	25	66	25
	67	23	67	23
	68	22	68	22
	69	21	69	21
	70	100	70	100

		Annual Rates per 100		Annual Rates per 100
	<u>Service</u>	<u>Employees</u>		<u>Employees</u>
Service greater than 20 years	20 – 21	25		25
	21 – 30	15		18
	30+	100		100

2. Line of duty death — 10% of mortality rates for active employees — No Change.

Elected Officials

All assumptions are the same as for non-elected members who are not Department of Corrections members.

Section X: Summary of Costs

Costs – (Millions) – based on July 1, 2004, valuation results

	Actuarial Accrued Liability	Unfunded Accrued Liability	Employer Contribution	
			$	% of Pay
July 1, 2004 Actuarial Valuation	$ 7,114.8	$ 1,702.6	$ 266.0	19.22%
Demographic Changes:				
Mortality Rates	67.9	67.9	8.6	0.62
Retirement Rates	(4.9)	(4.9)	(1.0)	(0.08)
Disability Rates	0.4	0.4	(0.4)	(0.03)
Withdrawal Rates	(8.7)	(8.7)	(3.8)	(0.27)
Inflation/COLA Assumption	149.7	149.7	16.4	1.19
Total Effect of Changes	204.4	204.4	19.8	1.43
Total After Demographic Changes	**$ 7,319.2**	**$ 1,907.0**	**$ 285.8**	**20.65%**

MERCER

Human Resource Consulting

Mercer Human Resource Consulting, Inc.
4400 Bank One Center
1717Main Street
Dallas, Texas 75201
214 220 3500