LOCAL EXPERIENCE STUDY ANALYSIS

MARCH, 2002

Commonwealth of Massachusetts | Public Employee Retirement Administration Commission

Five Middlesex Avenue, Third Floor, Somerville, MA 02145
ph 617 666 4446 | *fax* 617 628 4002 | *tty* 617 591 8917 | *web* www.mass.gov/perac

Published by PERAC Communications, 2002.
Printed on recycled paper.

TABLE OF CONTENTS

PAGE

EXPERIENCE STUDY – LOCAL RETIREMENT SYSTEMS

Introduction

The Public Employee Retirement Administration Commission (PERAC) has completed an experience study of the local retirement systems. The nature of an experience study is to track how members leave a system (retirement, death, disability, or withdrawal). This study reflects our ongoing analysis of the actuarial assumptions used in determining pension liabilities throughout the Commonwealth. In 2000, we published experience studies of both the State Retirement System and the State Teachers' Retirement System.

Our methodology in performing the experience study analysis was quite different from that used for the State and State Teachers' Retirement Systems. For the State and State Teachers' Retirement Systems we used the data for both active and retired members as of January 1, 1995, 1996, 1998, 1999 and 2000. These two systems represent the largest systems of the 106 Commonwealth retirement systems subject to Chapter 32. With the five separate data sets, we analyzed approximately 1.3 million separate "lives". In the event that we had been able to analyze 5 years of data from each of the 104 systems, we would not have as many "lives" for review.

Performing an experience study requires not only accurate data but also more detailed data than a regular actuarial valuation. We used a sampling of a number of local systems for our analysis. Systems chosen for sampling were determined on several criteria including the number of members, geographic location in the Commonwealth and quality of data available to PERAC. Our goal was a representative sampling of cities and towns throughout the Commonwealth. We concentrated on data from January 1, 1998 through January 1, 2001, as we believe the most recent data offer the best opportunity to estimate anticipated experience. Since the data cells are generally relatively small from one system to the next, data from the systems was combined to achieve meaningful results in determining actual experience. In addition, we contracted with several private actuaries to provide experience analysis for additional local systems. The local systems and periods of analysis that we used are outlined in the next section.

The annual funding schedule appropriation (the total plan cost) reflects two sources of plan costs and liabilities. The first is the amortization of the unfunded liability. The actuarial accrued liability less plan assets equals the unfunded liability. Although local systems use a variety of funding schedules, the minimum schedule requires that the unfunded liability is amortized by FY2028 on no more than a 4.5% increasing basis. In addition to the amortization of the unfunded liability, the annual appropriation also reflects the normal cost (or current cost), which represents the value of benefits accruing during the coming year. The measure of the impact on the total plan cost of any change in assumptions is the impact of that change on these two components.

Although the normal cost and accrued liability directly determine the appropriation under the funding schedule, these items are components that make up a portion of the present value of future benefits (PVFB). The PVFB may be the most accurate measure of the "true" total cost of a plan since it represents the present value of total projected benefits for all active, inactive and retired members. Any change in the actuarial assumptions will change the PVFB and, accordingly, the normal cost and accrued liability (and thereby the amortization of the unfunded liability).

Introduction (continued)

Our revised assumptions generally increase turnover rates, decrease disability rates and decrease the salary increase assumption. These changes decrease total plan cost. For example, higher turnover means that members are more likely to leave service before they become vested, thereby reducing retirement benefits to be paid. We are also proposing assumptions that generally decrease mortality rates and therefore serve to increase total plan cost.

Based on our results, the revised assumptions would generally produce a total cost (normal cost and amortization of the unfunded liability) that is less than that produced under the current assumptions. The revised assumptions will first be implemented in our January 1, 2002 actuarial valuations. Those valuations will also reflect investment return experience during 2001 and any gains or losses on plan liabilities. We will continue to monitor the experience with respect to the valuation assumptions each year and recommend changes to any of the assumptions as necessary.

Respectfully submitted,
Public Employee Retirement Administration Commission

James R. Lamenzo
Member of the American Academy of Actuaries
Associate of the Society of Actuaries
Enrolled Actuary Number 99-4709

Joseph E. Connarton
Executive Director

Dated: March 1, 2002

Data Sets

We have listed the data sets used in our study below. Each data set reflects an analysis of data at both the beginning and ending of the period specified:

January 1, 1998 – December 31, 1998

Arlington *	Gardner *	Springfield *
Watertown *	Woburn *	

January 1, 1999 – December 31, 1999

Adams	Arlington *	Athol
Beverly	Easthampton	Gardner *
Hampden County *	Lynn	Malden
Melrose	Milford	North Adams
Northampton	Northbridge	Norwood *
Saugus	Springfield *	Swampscott
Watertown *	Westfield	Winchester
Woburn *		

January 1, 2000 – December 31, 2000

Arlington *	Beverly	Chelsea
Clinton	Easthampton	Everett
Falmouth	Greenfield	Gardner *
Hampden County *	Lynn	Malden
Marblehead	Marlborough	Melrose
Milford	Newton *	North Adams
Norwood *	Saugus	Springfield *
Watertown *	Westfield	Winchester
Woburn *		

* Denotes data sets analyzed by private actuaries.

Executive Summary

General

As part of this experience study, PERAC has developed actuarial assumptions that will be used beginning January 1, 2002. PERAC currently has a standard set of actuarial assumptions used in performing valuations of most systems. These were generally used in valuations PERAC performed as of January 1, 2001. References to cost comparisons throughout this report reflect results under the revised assumption set compared to the current assumption set.

The principal results of our study can be summarized as follows:

- **Experience indicates that changes should be made to the following:**
  - Rates of retirement for active members - decrease in number of expected retirements resulting in a small increase in total plan cost.
  - Rates of disability for active members - decrease in number of expected disabilities resulting in a decrease in total plan cost.
  - Rates of withdrawal for active members - increase in number of expected withdrawals resulting in a decrease in total plan cost.
  - Rates of salary increases for active members - decrease in overall rate resulting in a decrease in total plan cost.
  - Rates of mortality for retired members - decrease in number of expected deaths resulting in an increase in total plan cost.
  - Rates of mortality for disabled members - decrease in number of expected deaths resulting in an increase in total plan cost.
- **Nature and effect of changes:**
  - Assumption changes are based on both actual past and anticipated future experience.
  - Overall, these changes decrease total plan cost.

Executive Summary (continued)

- **Retirement**
  - For Group 1, adopt gender distinct rates. There is a significant overall rate decrease at age 55 and significant overall increases at ages 61 and 64-66. There were moderate changes at other ages less than 65. Rates were added (less than 100%) at ages 67-69.
  - For Group 2, adopt Group 1 rates described above.
  - For Group 4, add rates at ages 45-49 with generally gradually increasing rates thereafter. Significant decrease in rates at ages 50 and 55. Significant increase in rates at ages 56, 59 and 61-64.
  - Overall, revised assumptions slightly increase total plan cost.
- **Disability**
  - For Groups 1 and 2, adopt table with significant decrease in rates at all ages.
  - For Group 4, adopt table with moderate change in rates from ages 20 to 50 with more significant decrease in rates thereafter.
  - Revised assumptions decrease total plan cost.
- **Withdrawal**
  - For all Groups, propose service based table (current tables are age based).
  - New tables reflect higher rates for Groups 1 and 2.
  - For Group 4, modest rates added for service up to 10 years (current table assumes no turnover).
  - Revised assumptions decrease total plan cost.

Executive Summary (continued)

- **Salary Increases for Continuing Active Members**
  - Current PERAC standard assumption is 5.5% at all ages for each Group.
  - Adopt service-based tables for each Group, with ultimate assumption of 4.75% for Group 1, 5.0% for Group 2, and 5.25% for Group 4.
  - Revised salary increase assumption generally greater than current 5.5% rate for service less than 5 years and less than the current 5.5% assumption thereafter.
  - Revised assumptions decrease total plan cost.
- **Post-Retirement Mortality**
  - Adopt RP-2000 table (without projection).
  - Adopt tables by gender.
  - Adopt tables for members who retired under disability provisions.
  - Generally, revised rates assume longer life expectancy.
  - Revised assumptions increase total plan cost.

Methodology

General methodology for all assumptions

- Study of PERAC data comprises the years January 1, 1999 through December 31, 2000. Results provided by private actuaries comprise the years January 1, 1998 through December 31, 2000.

- Data used in this study was provided by various boards. If a full valuation were completed for a given data set, the data reflects the final valuation data. If no valuation was performed, the data reflects the raw data.

- For each period in the experience study period (1/98 to 1/99, 1/99 to 1/00, or 1/00 to 1/01), we determined the member experience relating to:

  Active Members
  - Retirement
  - Disability
  - Withdrawal (Turnover)
  - Salary increases

  Retired Members
  - Post-retirement mortality for both healthy and disabled annuitants

- Actual experience was determined at each age (and/or at each year of service) for each assumption. For example, for retirement, we determined the actual number of members retiring at each age compared to the total number of members at that age.

- Analysis reflects a review by job group:
  - Group 1- general employees
  - Group 2- certain employees with hazardous positions
  - Group 4- public safety officers

- Graphed experience results and used various smoothing techniques to select assumptions.

Methodology (continued)

In addition to the general methodology that was used for each assumption outlined on the previous page, the following specific analysis was conducted:

- **Retirement**
  - Assumed a member retired if the member was eligible to retire at the beginning of a period and is not in the active file at the end of the period.
  - Analyzed results by gender.
  - Analyzed results separately for members retiring before or after age 55.
  - Analyzed results separately for members with less than 20 years and more than 20 years of service.
  - Analyzed results separately for members at the 80% maximum benefit limitation.
  - Analyzed results separately for cities and towns.

- **Disability**
  - Results modified to reflect that some members retire from an inactive status as opposed to an active status.
  - Compared results to historical disability counts from PERAC disability unit.
  - Analyzed results by the percentage of disabilities that are job related (accidental) compared to non-job-related (ordinary).
  - Analyzed results separately for cities and towns.

- **Withdrawal**
  - Assumed a member withdrew if the member was not eligible to retire at the beginning of the period and is not in the active file at the end of the period.
  - Analyzed results by service and age/service combined in addition to age.
  - Analyzed results in 5 year age brackets in selecting assumptions.
  - Analyzed results of increased rates (greater than the initial revised rates) in the first 5 years of service.

Methodology (continued)

- **Salary Increases for Continuing Active Members**

  - Determined ratios of salaries at the end of the year to salaries at the beginning of the year for continuing members.
  - Analyzed results by age and service separately.
  - Analyzed results comparing plan liabilities under a decreasing salary scale rate versus a flat 5.5% salary scale rate.
  - Results determined in aggregate only.

Post-Retirement Mortality

- Analyzed results by gender.
- Adjusted results for each Group to reflect retiree deaths with continuing payments to beneficiaries.
- Compared actual experience for each Group to several standard mortality tables (83GAM, 94GAM, UP94 and RP-2000 both with and without scale adjustments).
- Performed testing for disabled retired members separately by gender.

Findings

The expected rates reflect the standard PERAC assumption set in place prior to this study.

- **Retirement**
  - In aggregate, Group 1 female rates generally greater than male rates prior to age 60 and less than male rates thereafter.
  - For Group 1, actual retirements significantly less than expected at ages 55 and 62; generally greater than expected at other ages.
  - For Group 1, the rates for members over the 80% maximum are somewhat greater than for those under 80%.
  - For Group 1 members over age 65, the 80% maximum does not appear to be a deciding factor in retirement.
  - For both Groups 1 and 4, there were limited exposures for members with less than 20 years of service, and therefore, there was no discernable pattern of retirement.
  - Group 4 actual retirements greater than expected at ages 56-59 and 61-64, and significantly less than expected at ages 55, 60 and 65.
  - For Group 4, the rates for members over the 80% maximum were greater than those under the 80% maximum for some ages. There were a small number of exposures and results were inconclusive.
  - Comparison of city and town results deemed inconclusive.
- **Disability**
  - Actual number of disability retirements much less than expected for Groups 1 & 2.
  - Actual number of disability retirements about as expected (in total) for Group 4.
  - Ratio of accidental disability to ordinary disability retirements about as expected.
  - City results appear somewhat greater than town for both Groups 1 and 4 but there are only a small number of actual disabilities.
- **Withdrawal**
  - Actual number of withdrawals significantly greater than expected for all Groups.
  - Most of Group 4 withdrawals assumed to be transfers to other systems.

Findings (continued)

- **Salary Increases for Continuing Active Members**
  - For all job groups, service based results yield more consistent results than age based results.
  - For Group 1, salary increases generally high in the first two years of employment. Rates decrease to approximately 4% after 3 years, then generally phase down gradually.
  - For Group 4, salary increases generally high for the first three years of employment. Rates then decrease to approximately 4% after 4 years with both increases and decreases out to 18 years before settling at 2.5% or less.
  - Some new entrant salary data was not adjusted for the year of employment and skews the results (higher than actual) in the first two years.

- **Post-Retirement Mortality**
  - Male mortality somewhat less than expected in all years.
  - Female mortality significantly greater than expected in all years.
  - Disabled male mortality significantly less than expected.
  - Disabled female mortality about the same as expected, although this is based on an extremely small number of exposures.

Summary of Assumptions

The selection of the actuarial assumptions reflects a work in progress. We expect the assumptions shown here will be used in January 1, 2002 actuarial valuations. However, we will continue to monitor the assumptions for reasonableness.

In this section, we show sample rates for each assumption, and where appropriate, an illustration showing a comparison of the assumptions. The complete tables for Group specific assumptions are shown in the Appendix. In all illustrations that follow, the current rates are represented by dashes and the revised rates by a solid line.

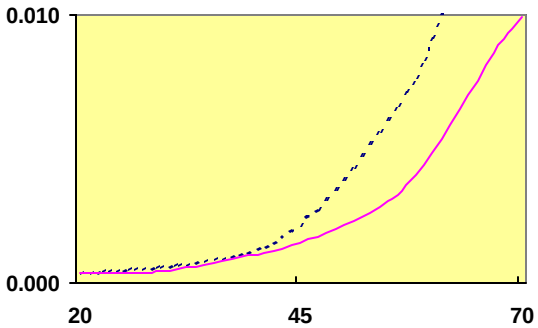
Assumptions Common to All Job Groups

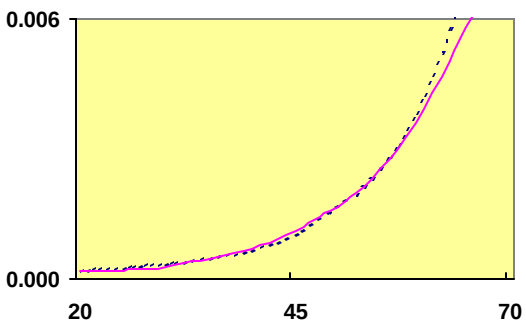
1. Rate of Investment Return: This assumption is determined by each Board and was not reviewed as part of this study. The standard PERAC assumption is 8.0% annually.

2. Pre-Retirement Mortality: Current rates of mortality are in accordance with the 1983 Group Annuity Mortality (GAM83) table. The revised rates reflect the RP-2000 Employees table. The RP-2000 table was adopted by a number of systems as a part of the January 1, 2001 actuarial valuation.

The following tables and graphs compare current and revised mortality rates for active males and females respectively. The revised male table indicates lower mortality rates and reflects longer life expectancy than the current table. The revised female table reflects a slightly longer life expectancy than the current table. The revised rates would increase total plan cost.

	Male		Female	
Age	Current	Revised	Current	Revised
20	.000377	.000345	.000189	.000191
30	.000607	.000444	.000342	.000264
40	.001238	.001079	.000665	.000706
50	.003909	.002138	.001647	.001676
60	.009158	.004878	.004241	.003931



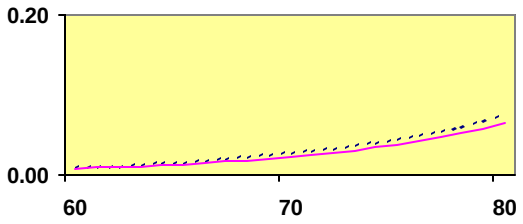


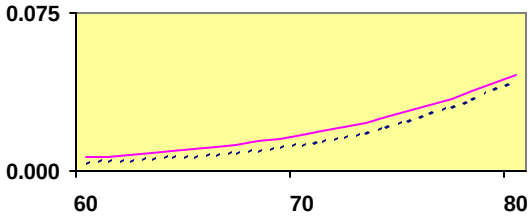
Summary of Assumptions (continued)

3. Post-Retirement Mortality: Current rates of mortality are in accordance with the 1983 Group Annuity Mortality (GAM83) table. The revised rates reflect the RP-2000 Healthy Annuitant table. For disabled members, current rates are in accordance with GAM83 with rates set forward 10 years. The revised rates reflect the RP-2000 table set forward 2 years.

The following tables and graphs compare current and revised mortality rates for non-disabled retired males and females respectively. The revised male table reflects a slightly longer life expectancy than the current tables. The revised female table reflects a slightly shorter life expectancy than the current tables. The revised rates would increase total plan cost.

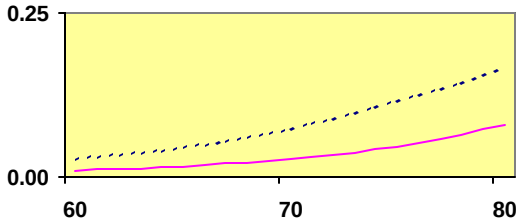
Non Disabled	Male		Female	
Age	Current	Revised	Current	Revised
60	.009158	.008196	.004241	.006200
70	.027530	.022206	.012385	.016742
80	.074070	.064368	.042945	.045879
90	.166307	.183408	.111750	.131682

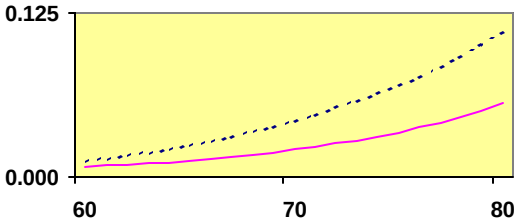




The following tables and graphs compare the current and revised mortality rates for disabled retired males and females respectively. The revised male and female tables reflect a slightly longer life expectancy than the current tables. The revised rates would increase total plan cost.

Disabled	Male		Female	
Age	Current	Revised	Current	Revised
60	.027530	.009915	.012385	.007689
70	.074070	.027281	.042945	.020665
80	.166307	.080486	.111750	.056294
90	.319185	.216605	.295187	.157618



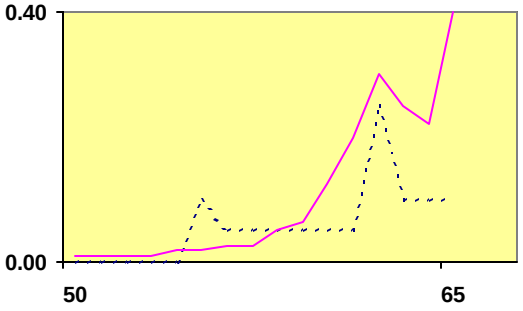


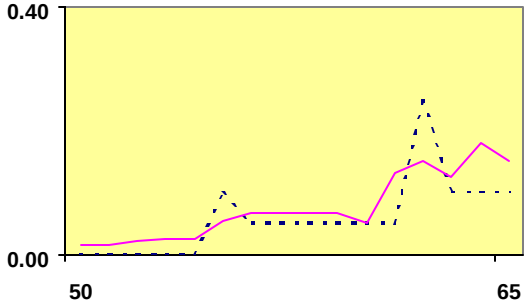
Summary of Assumptions (continued)

Groups 1 & 2 – Specific Assumptions:

1. Rates of Retirement: The following table and graphs compare current and revised retirement rates for males and females respectively. The revised assumptions are gender specific. The revised rates have a small impact on total plan cost.

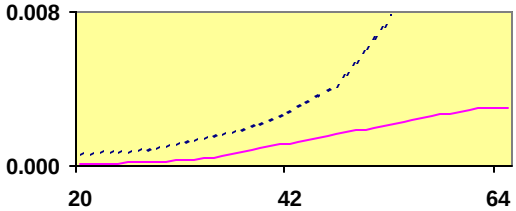
Age	Current	Revised	
		Male	Female
50	.00	.010	.015
55	.10	.020	.055
60	.05	.120	.050
65	.10	.400	.150
67	1.00	.250	.200
70	1.00	1.000	1.000





2. Rates of Disability: The following table and graph show that the revised disability rates are less than the current rates. The revised rates decrease total plan cost.

Age	Current	Revised
20	.0006	.00010
30	.0011	.00030
40	.0024	.00101
50	.0061	.00192
60	.0123	.00280



Summary of Assumptions (continued)

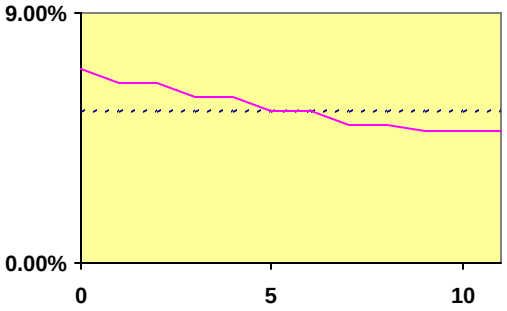
Groups 1 & 2– Specific Assumptions (continued):

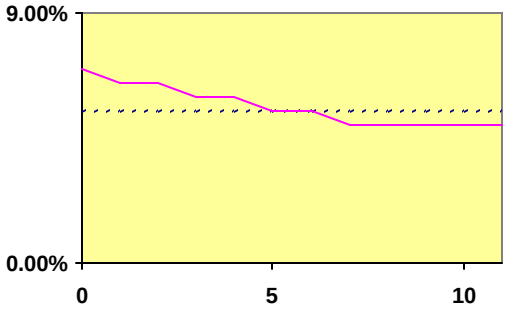
3. Rates of Withdrawal: Current rates are strictly age based. Revised rates are strictly service based. The revised rates decrease total plan cost.

Age	Current (age based)		Service	Revised (service based)
20	.0794		0	.150
30	.0722		5	.076
40	.0515		10	.054
50	.0256		15	.033
60	.0009		20	.020

4. Rate of Salary Increase: The following table and graph compare current and revised salary increase rates. The revised rates are less than the current rate after 6 years of service. The revised rates decrease total plan cost.

Service	Current	Revised	
		Group 1	Group 2
0	5.50%	7.00%	7.00%
1	5.50%	6.50%	6.50%
2	5.50%	6.50%	6.50%
3	5.50%	6.00%	6.00%
4	5.50%	6.00%	6.00%
5	5.50%	5.50%	5.50%
6	5.50%	5.50%	5.50%
7	5.50%	5.00%	5.00%
8	5.50%	5.00%	5.00%
9+	5.50%	4.75%	5.00%



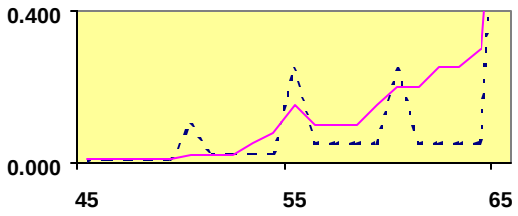


Summary of Assumptions (continued)

Group 4 – Specific Assumptions:

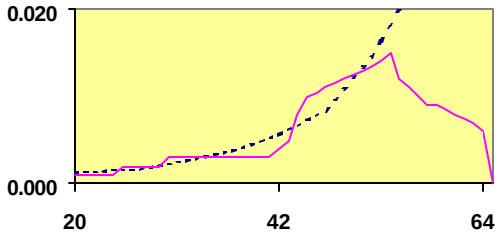
1. Rates of Retirement: The following table and graph compare current and revised retirement rates. The revised rates are less than the current rates at ages 50, 55 and 60 and greater than or equal to the current rates at other ages. The revised rates slightly increase total plan cost.

Age	Current	Revised
45 – 49	.00	.010
50	.10	.020
55	.25	.150
60	.25	.200
62	.05	.250
65+	1.0000	1.000



2. Rates of Disability: The following table and graph show that the revised disability rates are generally less than the current rates. The revised rates decrease total plan cost.

Age	Current	Revised
20	.0012	.0010
30	.0022	.0030
40	.0048	.0030
50	.0122	.0125
60	.0246	.0085



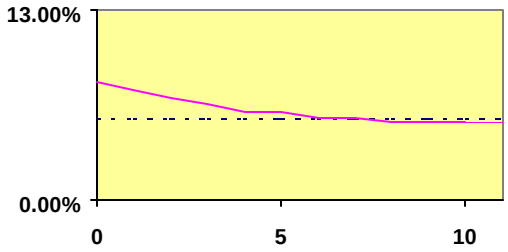
Summary of Assumptions (continued)

Group 4 - Specific Assumptions (continued):

3. Rates of Withdrawal: Current rates assume no withdrawal. The revised rate is .015 for service up to and including 10 years of service. No withdrawal is assumed thereafter.

4. Rate of Salary Increase: The following table and graph compare current and revised salary increase rates. The revised rates are less than the current rate after 5 years of service. The revised rates decrease total plan cost.

Service	Current	Revised
0	5.50%	8.00%
1	5.50%	7.50%
2	5.50%	7.00%
3	5.50%	6.50%
4	5.50%	6.00%
5	5.50%	6.00%
6	5.50%	5.50%
7	5.50%	5.50%
8+	5.50%	5.25%



Effect of Revised Assumptions

For illustration, the effect of the revised salary scale and demographic assumption changes based on January 1, 2001 valuation results is shown below. For this illustration, we combined all the data sets analyzed by PERAC for the period January 1, 2000- December 31, 2000 (17 data sets).

To estimate the total cost impact, we amortized the increase in actuarial accrued liability on a level dollar basis until 2028. The net cost impact equals the change in normal cost plus the amortization of the increase in actuarial liability. For this illustration, all costs reflect the FY 2002 appropriation as of January 1, 2001 without adjustment for the date payments would be made during the fiscal year.

1. Number of Members:	
Active	11,902
Retired	6,392
Total	18,294
2. Total Annual Regular Compensation	$327,270,946
3. Average Annual Regular Compensation	$27,497

	(Dollars in thousands)		
	Current Assumptions	Revised Assumptions	Increase/Decrease
4. Normal Cost			
a. Total Normal Cost	$54,211	$47,730	($6,481)
b. Employee Contributions	$24,831	$24,449	($382)
c. Net Normal Cost	$29,380	$23,281	($6,099)
5. Actuarial Accrued Liability			
a. Active Members	$760,040	$776,797	$16,757
b. Retirees	$252,250	$261,757	$9,507
c. Total	$1,012,290	$1,038,554	$26,264
6. Amortization of Increase in Actuarial Accrued Liability			
Level dollar amortization until 2028			$2,224
7. Net Cost Impact (4 c + 6)			($3,875)

Terms and Definitions

ACTUAL/EXPECTED (or A/E) RATIO The ratio of the actual number of occurrences of a particular decrement compared to the expected number of occurrences of that decrement, based upon the current set of assumptions and the applicable exposures.

ACTUARIAL ACCRUED LIABILITY That portion of the Actuarial Present Value of pension plan benefits which is not provided by future Normal Costs or employee contributions. It is the portion of the Actuarial Present Value attributable to service rendered as of the Valuation Date.

ACTUARIAL ASSUMPTIONS Assumptions, based upon past experience or standard tables, used to predict the occurrence of future events affecting the amount and duration of pension benefits, such as: mortality, withdrawal, disablement and retirement; changes in compensation; rates of investment earnings and asset appreciation or depreciation; and any other relevant items.

ACTUARIAL GAIN OR LOSS (or EXPERIENCE GAIN or LOSS) A measure of the difference between actual experience and that expected based upon the set of Actuarial Assumptions, during the period between two Actuarial Valuation dates.

Note: The effect on the Accrued Liability and/or the Normal Cost resulting from changes in the Actuarial Assumptions, the Actuarial Cost Method or pension plan provisions would be described as such, not as an Actuarial Gain (Loss).

DECREMENTS The means by which a member changes status. For active members, the decrements are retirement, disability retirement, withdrawal and death. For retired members, the only decrement is death.

EXPOSURE The number of lives exposed to a given risk of decrement for a particular age (and/or service and gender). It represents the number of members who could have potentially retired, become disabled, withdrawn or died at that particular age.

NORMAL COST Total Normal Cost is that portion of the Actuarial Present Value of pension plan benefits which is to be paid in a single fiscal year. The Employee Normal Cost is the amount of the expected employee contributions for the fiscal year. The Employer Normal Cost is the difference between the Total Normal Cost and the Employee Normal Cost.

RP-2000 Mortality tables recently published by the Society of Actuaries based on a study of uninsured pension plan mortality. The tables reflect data submitted from 100 large pension plans for the years 1990-1994, and the resulting table is projected to the year 2000.

UNFUNDED ACCRUED LIABILITY The excess of the Actuarial Accrued Liability over the Assets.

Appendix

Retirement Assumptions - Revised Rates

	Groups 1 & 2		Group 4
	Male	Female	
45	0.000	0.000	0.010
46	0.000	0.000	0.010
47	0.000	0.000	0.010
48	0.000	0.000	0.010
49	0.000	0.000	0.010
50	0.010	0.015	0.020
51	0.010	0.015	0.020
52	0.010	0.020	0.020
53	0.010	0.025	0.050
54	0.020	0.025	0.075
55	0.020	0.055	0.150
56	0.025	0.065	0.100
57	0.025	0.065	0.100
58	0.050	0.065	0.100
59	0.065	0.065	0.150
60	0.120	0.050	0.200
61	0.200	0.130	0.200
62	0.300	0.150	0.250
63	0.250	0.125	0.250
64	0.220	0.180	0.300
65	0.400	0.150	1.000
66	0.250	0.200	1.000
67	0.250	0.200	1.000
68	0.300	0.250	1.000
69	0.300	0.200	1.000
70	1.000	1.000	1.000

Appendix (continued)

Disability Assumptions - Revised Rates

Age	Groups 1 & 2	Group 4
< 20	0.00010	0.0010
20	0.00010	0.0010
21	0.00010	0.0010
22	0.00010	0.0010
23	0.00010	0.0010
24	0.00010	0.0010
25	0.00020	0.0020
26	0.00020	0.0020
27	0.00020	0.0020
28	0.00020	0.0020
29	0.00020	0.0020
30	0.00030	0.0030
31	0.00030	0.0030
32	0.00030	0.0030
33	0.00040	0.0030
34	0.00040	0.0030
35	0.00055	0.0030
36	0.00064	0.0030
37	0.00074	0.0030
38	0.00083	0.0030
39	0.00092	0.0030
40	0.00101	0.0030
41	0.00110	0.0030
42	0.00119	0.0040
43	0.00128	0.0050
44	0.00137	0.0080
45	0.00147	0.0100
46	0.00156	0.0105
47	0.00165	0.0110
48	0.00174	0.0115
49	0.00183	0.0120
50	0.00192	0.0125
51	0.00201	0.0130
52	0.00210	0.0135
53	0.00220	0.0140
54	0.00229	0.0150
55	0.00238	0.0120
56	0.00247	0.0110
57	0.00256	0.0100
58	0.00265	0.0090
59	0.00274	0.0090
60	0.00280	0.0085
61	0.00290	0.0080
62	0.00300	0.0075
63	0.00300	0.0070
64	0.00300	0.0060
65-69	0.00300	0.0000
70	0.00000	0.0000

Appendix (continued)

Turnover Assumptions - Revised Rates

Service	Groups 1 & 2	Group 4
0	0.150	0.015
1	0.120	0.015
2	0.100	0.015
3	0.090	0.015
4	0.080	0.015
5	0.076	0.015
6	0.075	0.015
7	0.067	0.015
8	0.063	0.015
9	0.059	0.015
10	0.054	0.015
11	0.050	0.000
12	0.046	0.000
13	0.041	0.000
14	0.037	0.000
15	0.033	0.000
16	0.020	0.000
17	0.020	0.000
18	0.020	0.000
19	0.020	0.000
20	0.020	0.000
21	0.010	0.000
22	0.010	0.000
23	0.010	0.000
24	0.010	0.000
25	0.010	0.000
26	0.010	0.000
27	0.010	0.000
28	0.010	0.000
29	0.010	0.000
30+	0.000	0.000

Salary Increase Assumption - Revised Rates

Years of Service	Group 1	Group 2	Group 4
0	7.00%	7.00%	8.00%
1	6.50%	6.50%	7.50%
2	6.50%	6.50%	7.00%
3	6.00%	6.00%	6.50%
4	6.00%	6.00%	6.00%
5	5.50%	5.50%	6.00%
6	5.50%	5.50%	5.50%
7	5.00%	5.00%	5.50%
8	5.00%	5.00%	5.25%
9	4.75%	5.00%	5.25%
10+	4.75%	5.00%	5.25%

PERAC
Five Middlesex Ave.
Third Floor
Somerville, MA 02145
ph 617 666 4446
fax 617 628 4002
tty 617 591 8917
web www.mass.gov/perac