



Actuarial Valuation Report GASB 75

Commonwealth of Massachusetts

Postemployment Benefits Other Than Pensions

For the Fiscal Year Ending June 30, 2019

Measurement Date June 30, 2018

Introduction

This report documents the results of the actuarial valuation for the Measurement Period ending June 30, 2018 of the Commonwealth of Massachusetts Other Post-Employment Benefits Plan. The plan is a single-employer plan and does not issue a separate financial statement. As a result, all reporting requirements are included in the Commonwealth's financial statements. These results are based on a measurement date of June 30, 2018. The information provided in this report is intended strictly for documenting information relating to the Commonwealth's plan disclosure and reporting requirements.

Determinations for purposes other than the financial accounting requirements may be significantly different from the results in this report. Thus, the use of this report for purposes other than those expressed here may not be appropriate.

This valuation has been conducted in accordance with generally accepted actuarial principles and practices, including the applicable Actuarial Standards of Practice as issued by the Actuarial Standards Board. In addition, the valuation results are based on our understanding of the financial accounting and reporting requirements under U.S. Generally Accepted Accounting Principles as set forth in Governmental Accounting Standards Board Statement No. 75 (GASB 75) including any guidance or interpretations provided by the Commonwealth and/or its audit partners prior to the issuance of this report. The information in this report is not intended to supersede or supplant the advice and interpretations of the Commonwealth of Massachusetts's auditors. Additional disclosures may be required under GASB 74.

Future actuarial measurements may differ significantly from the current measurements presented in this report due (but not limited to) to such factors as the following:

- Plan experience differing from that anticipated by the economic or demographic assumptions;
- Changes in actuarial methods or in economic or demographic assumptions;
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and
- Changes in plan provisions or applicable law.

Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

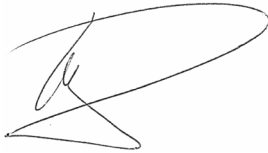
Funded status measurements shown in this report are determined based on various measures of plan assets and liabilities. For entity and plan disclosure and reporting purposes, funded status is determined using plan assets measured at market value. Plan liabilities are measured based on the interest rates and other assumptions summarized in the Actuarial Assumptions and Methods section of this report.

These funded status measurements may not be appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, and funded status measurements for plan sponsor and plan disclosure and reporting purposes may not be appropriate for assessing the need for or the amount of future contributions. In conducting the valuation, we have relied on personnel, plan design, health care claim cost, and asset information supplied by the Commonwealth of Massachusetts as of the measurement and valuation dates. While we cannot verify the accuracy of all the information, the supplied information was reviewed for consistency and reasonableness. As a result of this review, we have no reason to doubt the substantial accuracy or completeness of the information and believe that it has produced appropriate results.

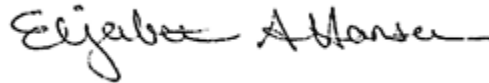
The actuarial assumptions and methods used in this valuation are described in the Actuarial Assumptions and Methods section of this report. The Commonwealth of Massachusetts selected the economic and demographic assumptions and prescribed them for use for purposes of compliance with GASB 75. Aon provided guidance with respect to these assumptions, and it is our belief that the assumptions represent reasonable expectations of anticipated plan experience.

The undersigned are familiar with the near-term and long-term aspects of OPEB valuations and collectively meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. The information provided in this report is dependent upon various factors as documented throughout this report, which may be subject to change. Each section of this report is considered to be an integral part of the actuarial opinions.

To our knowledge, no colleague of Aon providing services to the Commonwealth of Massachusetts has any material direct or indirect financial interest in the Commonwealth of Massachusetts. Thus, we believe there is no relationship existing that might affect our capacity to prepare and certify this actuarial report for the Commonwealth of Massachusetts.



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Accounting Requirements

Development of GASB 75 Net OPEB Expense

Calculation Details

The following table illustrates the Net OPEB Liability under GASB 75. The calculations are labeled for the measurement date of the calculation. The applicable fiscal year is one year after the measurement date.

(\$ in thousands)	Measurement Date 6/30/2017	Measurement Date 6/30/2018
(1) OPEB Liability		
(a) Retired Participants and Beneficiaries Receiving Payment	\$ 9,530,704.3	\$ 10,182,274.3
(b) Active Participants	<u>\$ 8,950,231.7</u>	<u>\$ 9,579,058.2</u>
(c) Total	\$ 18,480,936.0	\$ 19,761,332.5
(2) Plan Fiduciary Net Position	<u>\$ 996,407.0</u>	<u>\$ 1,187,569.0</u>
(3) Net OPEB Liability	\$ 17,484,529.0	\$ 18,573,763.5
(4) Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	5.39%	6.01%

Expense

The following table illustrates the OPEB expense under GASB 75.

(\$ in thousands)	Measurement Date 6/30/2017	Measurement Date 6/30/2018
(1) Service Cost	\$ 950,817.8	\$ 792,134.8
(2) Interest Cost	591,939.5	691,630.0
(3) Expected Investment Return	(65,870.3)	(76,768.3)
(4) Employee Contributions	0.0	0.0
(5) Administrative Expense	627.0	150.0
(6) Other Changes	0.0	1,262.0
(7) Other Additions	0.0	(133.0)
(8) Plan Changes	0.0	0.0
(9) Amortization of Unrecognized		
(a) Liability (Gain)/Loss	(8,396.5)	29,408.4
(b) Asset (Gain)/Loss	(7,998.9)	(11,306.9)
(c) Assumption Change (Gain)/Loss	<u>(413,427.5)</u>	<u>(409,713.4)</u>
(10) Total Expense	\$ 1,047,691.1	\$ 1,016,663.6

Shown below are details regarding the calculation of Service Cost, Interest Cost and Expected Investment Return components of the Expense.

(\$ in thousands)	Measurement Date 6/30/2017	Measurement Date 6/30/2018
(1) Development of Service Cost:		
(a) Normal Cost at Beginning of Measurement Period	\$ 950,817.8	\$ 792,134.8
(2) Development of Interest Cost:		
(a) Total OPEB Liability at Beginning of Measurement Period	\$ 19,821,603.4	\$ 18,480,936.0
(b) Normal Cost at Beginning of Measurement Period	950,817.8	792,134.8
(c) Actual Benefit Payments	441,064.0	(443,763.0)
(d) Discount Rate	<u>2.88%</u>	<u>3.63%</u>
(e) Interest Cost	\$ 591,939.5	\$ 691,630.0
(3) Development of Expected Investment Return:		
(a) Plan Fiduciary Net Position at Beginning of Measurement Period	\$ 866,043.0	\$ 996,407.0
(b) Actual Contributions—Employer	466,233.0	542,896.0
(c) Actual Contributions—Employee	0.0	0.0
(d) Actual Benefit Payments	(441,064.0)	(443,763.0)
(e) Administrative Expenses	(627.0)	(150.0)
(f) Other Changes	0.0	(1,262.0)
(g) Other Additions	0.0	133.0
(h) Expected Return on Assets	<u>7.50%</u>	<u>7.35%</u>
(i) Expected Return	\$ 65,870.3	\$ 76,768.3

Reconciliation of Net OPEB Liability

Shown below are details regarding the Total OPEB Liability, Plan Fiduciary Net Position, and Net OPEB Liability for the Measurement Period from June 30, 2017 to June 30, 2018:

(\$ in thousands)	Increase (Decrease)		
	Total OPEB Liability (a)	Plan Fiduciary Net Position (b)	Net OPEB Liability (c) = (a) – (b)
Balance Recognized at 6/30/2017 Measurement Date	\$ 18,480,936.0	\$ 996,407.0	\$ 17,484,529.0
Changes Recognized for the Fiscal Year:			
Service Cost	792,134.8	N/A	792,134.8
Interest on the Total OPEB Liability	691,630.0	N/A	691,630.0
Changes of Benefit Terms	0.0	N/A	0.0
Differences Between Expected and Actual Experience	218,890.6	N/A	218,890.6
Changes of Assumptions	21,504.1	N/A	21,504.1
Benefit Payments	(443,763.0)	(443,763.0)	0.0
Contributions From the Employer	N/A	542,896.0	(542,896.0)
Contributions From the Employee	N/A	0.0	0.0
Net Investment Income	N/A	93,308.0	(93,308.0)
Other Additions	N/A	(1,262.0)	1,262.0
Other Changes	N/A	133.0	(133.0)
Administrative Expense	N/A	(150.0)	150.0
Net Changes	<u>1,280,396.5</u>	<u>191,162.0</u>	<u>(1,089,243.5)</u>
Balance Recognized at 6/30/2018 Measurement Date	\$ 19,761,332.5	\$ 1,187,569.0	\$ 18,573,763.5

Breakdown of Assumption Changes

Source	Change in Liability (\$ in thousands)
Per Capita Claims Assumption	936,690.4
Trend and Excise Tax Assumption	88,261.6
Mortality Assumption	(2,066.9)
Discount Rate Assumption	<u>(1,001,381.0)</u>
Total	\$ 21,504.1

Liability (Gain)/Loss

The following table illustrates the liability gain/loss under GASB 75.

(\$ in thousands)	Measurement Date 6/30/2017	Measurement Date 6/30/2018
(1) OPEB Liability at Beginning of Measurement Period	\$ 19,821,603.4	\$ 18,480,936.0
(2) Service Cost	950,817.8	792,134.8
(3) Interest on the Total OPEB Liability	591,939.5	691,630.0
(4) Changes of Benefit Terms	0.0	0.0
(5) Changes of Assumptions	(2,393,745.0)	21,504.1
(6) Benefit Payments	<u>(441,064.0)</u>	<u>(443,763.0)</u>
(7) Expected OPEB Liability at End of Measurement Period	\$ 18,529,551.7	\$ 19,542,441.9
(8) Actual OPEB Liability at End of Measurement Period	<u>18,480,936.0</u>	<u>19,761,332.5</u>
(9) OPEB Liability (Gain)/Loss	\$ (48,615.7)	\$ 218,890.6
(10) Average Future Working Life Expectancy	<u>5.79</u>	<u>5.79</u>
(11) OPEB Liability (Gain)/Loss Amortization	\$ (8,396.5)	\$ 37,804.9

Asset (Gain)/Loss

The following table illustrates the asset gain/loss under GASB 75.

(\$ in thousands)	Measurement Date 6/30/2017	Measurement Date 6/30/2018
(1) OPEB Asset at Beginning of Measurement Period	\$ 866,000.0	\$ 996,407.0
(2) Contributions—Employer	466,233.0	542,896.0
(3) Contributions—Employee	0.0	0.0
(4) Expected Investment Income	65,870.3	76,768.3
(5) Benefit Payments	(441,064.0)	(443,763.0)
(6) Administrative Expense	(627.0)	(150.0)
(7) Other Changes	0.0	(1,262.0)
(8) Other Additions	<u>0.0</u>	<u>133.0</u>
(8) Expected OPEB Asset at End of Measurement Period	\$ 956,412.3	\$ 1,171,029.3
(9) Actual OPEB Asset at End of Measurement Period	<u>996,407.0</u>	<u>1,187,569.0</u>
(10) OPEB Asset (Gain)/Loss	\$ (39,994.7)	\$ (16,539.7)
(11) Amortization Factor	<u>5.00</u>	<u>5.00</u>
(12) OPEB Asset (Gain)/Loss Amortization	\$ (7,998.9)	\$ (3,307.9)

Deferred Outflows/Inflows

The following table illustrates the Deferred Inflows and Outflows as of the measurement period ending June 30, 2018 under GASB 75.

(\$ in thousands)	Deferred Outflows	Deferred Inflows
(1) Difference Between Actual and Expected Experience	\$ 181,085.6	\$ (31,822.7)
(2) Net Difference Between Expected and Actual Earnings on OPEB Plan Investments	\$ 0.0	\$ (37,228.6)
(3) Assumption Changes	<u>\$ 17,790.1</u>	<u>\$ (1,566,890.0)</u>
(4) Total	\$ 198,875.7	\$ (1,635,941.3)

Amortization of Deferred Inflows/Outflows

The table below lists the amortization bases included in the deferred inflows/outflows as of the Measurement Period Ending June 30, 2018.

(\$ in thousands)

Date Established	Type of Base	Period		Balance		Annual Payment
		Original	Remaining	Original	Remaining	
6/30/2018	Liability (Gain)/Loss	5.79	4.79	\$ 218,890.6	\$ 181,085.6	\$ 37,804.9
6/30/2018	Asset (Gain)/Loss	5.00	4.00	\$ (16,539.7)	\$ (13,231.8)	\$ (3,307.9)
6/30/2018	Assumptions	5.79	4.79	\$ 21,504.1	\$ 17,790.1	\$ 3,714.0
6/30/2017	Liability (Gain)/Loss	5.79	3.79	\$ (48,615.7)	\$ (31,822.7)	\$ (8,396.5)
6/30/2017	Asset (Gain)/Loss	5.00	3.00	\$ (39,994.7)	\$ (23,996.8)	\$ (7,998.9)
6/30/2017	Assumptions	5.79	3.79	\$ (2,393,745.0)	\$ <u>(1,566,890.0)</u>	\$ <u>(413,427.5)</u>
	Total Charges				\$ (1,437,065.6)	\$ (391,611.9)

Amounts Recognized in the deferred outflows of resources and deferred inflows of resources related to OPEB will be recognized in the OPEB expense as follows:

Measurement Period End June 30:

2019	\$ (391,611.9)
2020	\$ (391,611.9)
2021	\$ (391,611.9)
2022	\$ (295,029.9)
2023	\$ 32,800.0
Total Thereafter	<u>\$ 0.0</u>
Total	\$ (1,437,065.6)

Plan Fiduciary Net Position Projection

The following table illustrates the projection of the fiduciary net position for use in the calculation of the discount rate as of June 30, 2018.

(\$ in thousands)

Year Ending June 30 ²	Beginning Fiduciary Net Position (a)	Total Contributions (b)	Benefit Payments (c)	Administrative Expenses (d)	Investment Earnings (e)	Ending Fiduciary Net Position ¹ (f)
2018	996,407.0	543,029.0	443,763.0	150.0	92,046.0	1,187,569.0
2019	1,187,569.0	535,817.6	610,435.9	154.5	65,245.0	1,178,041.1
2020	1,178,041.1	499,196.3	661,126.4	159.1	62,714.6	1,078,666.6
2021	1,078,666.6	469,323.3	712,710.4	163.9	53,548.3	888,663.8
2022	888,663.8	431,270.8	760,826.6	168.8	37,846.0	596,785.2
2023	596,785.2	396,936.7	809,887.0	173.9	14,621.8	198,282.8
2024	198,282.8	352,533.4	857,515.5	179.1	0.0	0.0
2025	0.0	310,737.3	904,540.5	184.5	0.0	0.0
2026	0.0	255,790.8	949,886.3	190.0	0.0	0.0
2027	0.0	206,265.4	996,208.0	195.7	0.0	0.0
2028	0.0	141,477.0	1,043,314.9	201.6	0.0	0.0
2029	0.0	81,118.7	1,087,424.0	207.6	0.0	0.0
2030	0.0	4,931.6	1,130,985.7	213.9	0.0	0.0
2031	0.0	0.0	1,174,607.9	220.3	0.0	0.0
2032	0.0	0.0	1,216,570.8	226.9	0.0	0.0
2033	0.0	0.0	1,256,463.8	233.7	0.0	0.0
2034	0.0	0.0	1,295,161.4	240.7	0.0	0.0
2035	0.0	0.0	1,334,252.1	247.9	0.0	0.0
2036	0.0	0.0	1,371,337.6	255.4	0.0	0.0
2037	0.0	0.0	1,409,969.0	263.0	0.0	0.0
2038	0.0	0.0	1,448,711.0	270.9	0.0	0.0
2039	0.0	0.0	1,488,929.0	279.0	0.0	0.0
2040	0.0	0.0	1,528,480.9	287.4	0.0	0.0
2041	0.0	0.0	1,567,788.8	296.0	0.0	0.0
2042	0.0	0.0	1,603,078.1	304.9	0.0	0.0
2043	0.0	0.0	1,636,754.2	314.1	0.0	0.0
2044	0.0	0.0	1,668,793.3	323.5	0.0	0.0
2045	0.0	0.0	1,693,962.3	333.2	0.0	0.0
2046	0.0	0.0	1,715,093.0	343.2	0.0	0.0
2047	0.0	0.0	1,726,709.6	353.5	0.0	0.0

¹ (f)=(a) + (b) – (c) – (d) + (e)

² Years later than 2047 were omitted from this table.

Plan Fiduciary Net Position

The last year in which projected benefit payments are due from the Plan is 2110.

The Plan's projected fiduciary net position at the end of the fiscal year ending June 30, 2024 is \$0, based on the valuation completed for the June 30, 2018 measurement date.

As such, the Plan's fiduciary net position was not projected to be available to make all projected future benefit payments for current Plan members. The projected "depletion date" when projected benefits are not covered by projected assets is 2025. Therefore, the long-term expected rate of return on Plan investments of 7.35% per annum was not applied to all periods of projected benefit payments to determine the total OPEB liability as of the June 30, 2018 measurement date shown earlier in this report, pursuant to paragraph 48 of GASB Statement No. 75. The aggregate discount rate is 3.92%.

In projecting the Plan's fiduciary net position the following assumptions were made:

1. Interest rate for discounting was 3.87% per annum.
2. Projected total contributions are employer contributions to the unfunded actuarial accrued liability and normal cost (including administrative expenses). Based on the closed amortization period in place, the unfunded liability is not projected to be paid off. Contributions are assumed to be paid at year end.
3. Assumed contributions are based on the contribution policy of the Commonwealth of Massachusetts. The Commonwealth of Massachusetts will contribute \$25 million annually in addition to the pay-go benefit payments.
4. Projected benefit payments have been determined in accordance with Paragraphs 30-35 of GASB Statement No. 75, and are based on the closed group of active, retired members and beneficiaries as of January 1, 2018. Benefit payments are assumed to be paid beginning of year.
5. Projected investment earnings are based on the assumed investment rate of return of 7.35% per annum. The first year's earnings have been adjusted to account for the actual return through June 30, 2018.

Interest Rate Sensitivity

The following table illustrates the impact of interest rate sensitivity on the Net OPEB Liability for the June 30, 2017 measurement date:

(\$ in thousands)	1% Decrease (2.63%)	Current Rate (3.63%)	1% Increase (4.63%)
(1) Total OPEB Liability	\$21,751,868.9	\$18,480,936.0	\$ 15,880,155.6
(2) Plan Fiduciary Net Position	<u>\$ 996,407.0</u>	<u>\$ 996,407.0</u>	<u>\$ 996,407.0</u>
(3) Net OPEB Liability	\$20,755,468.9	\$17,484,529.0	\$ 14,883,755.6

The following table illustrates the impact of interest rate sensitivity on the Net OPEB Liability for the June 30, 2018 measurement date:

(\$ in thousands)	1% Decrease (2.92%)	Current Rate (3.92%)	1% Increase (4.92%)
(1) Total OPEB Liability	\$23,265,869.9	\$19,761,332.5	\$ 16,981,178.1
(2) Plan Fiduciary Net Position	<u>\$ 1,187,569.0</u>	<u>\$ 1,187,569.0</u>	<u>\$ 1,187,569.0</u>
(3) Net OPEB Liability	\$22,078,300.9	\$18,573,763.5	\$ 15,793,609.1

Healthcare Cost Trend Sensitivity

The following table illustrates the impact of healthcare cost trend sensitivity on the Net OPEB Liability for the June 30, 2017 measurement date:

(\$ in thousands)	1% Decrease	Trend Rate	1% Increase
(1) Total OPEB Liability	\$15,462,590.2	\$18,480,936.0	\$ 22,452,838.6
(2) Plan Fiduciary Net Position	<u>\$ 996,407.0</u>	<u>\$ 996,407.0</u>	<u>\$ 996,407.0</u>
(3) Net OPEB Liability	\$14,466,190.2	\$17,484,529.0	\$ 21,456,438.6

The following table illustrates the impact of healthcare cost trend sensitivity on the Net OPEB Liability for the June 30, 2018 measurement date:

(\$ in thousands)	1% Decrease	Trend Rate	1% Increase
(1) Total OPEB Liability	\$16,899,383.0	\$19,761,332.5	\$ 23,379,210.8
(2) Plan Fiduciary Net Position	<u>\$ 1,187,569.0</u>	<u>\$ 1,187,569.0</u>	<u>\$ 1,187,569.0</u>
(3) Net OPEB Liability	\$15,711,814.0	\$18,573,763.5	\$ 22,191,741.8

See Methods and Assumptions section for current trend rates. For 2018, the healthcare cost trend rate is assumed to be 8.0%. Administrative and EGWP expenses are assumed to increase by 5.0% annually.

Disclosure—Changes in the Net OPEB Liability and Related Ratios

Changes in the Net OPEB Liability and Related Ratios¹

(\$ in thousands)	Measurement Period Ending		
	2016	2017	2018
Total OPEB Liability			
Service Cost	N/A	\$950,817.8	\$792,134.8
Interest Cost	N/A	591,939.5	\$691,630.0
Changes of Benefit Terms	N/A	0.0	\$0.0
Differences Between Expected and Actual Experiences	N/A	(48,615.7)	\$218,890.6
Changes of Assumptions	N/A	(2,393,745.0)	\$21,504.1
Benefit Payments	N/A	(441,064.0)	\$(443,763.0)
Net Change in Total OPEB Liability	N/A	\$(1,340,667.4)	\$1,280,396.5
Total OPEB Liability (Beginning)	N/A	\$19,821,603.4	\$18,480,936.0
Total OPEB Liability (Ending)	\$19,821,603.4	\$18,480,936.0	\$19,761,332.5
Plan Fiduciary Net Position			
Contributions—Employer	N/A	465,449.0	\$542,896.0
Contributions—Member	N/A	0.0	0.0
Other Additions	N/A	784.0	133.0
Net Investment Income	N/A	105,822.0	93,308.0
Benefit Payments	N/A	(441,064.0)	(443,763.0)
Administrative Expense	N/A	(127.0)	(150.0)
Other	N/A	(500.0)	(1,262.0)
Net Change in Plan Fiduciary Net Position	N/A	130,364.0	191,162.0
Plan Fiduciary Net Position (Beginning)	N/A	866,043.0	\$996,407.0
Plan Fiduciary Net Position (Ending)	\$866,043.0	\$996,407.0	\$1,187,596.0
Net OPEB Liability (Ending)	\$18,955,603.4	\$17,484,529.0	\$18,573,763.5
Net Position as a Percentage of OPEB Liability	4.37%	5.39%	6.01%
Covered-Employee Payroll	\$5,792,300.0	\$5,927,012.0	\$6,155,194.0
Net OPEB Liability as a Percentage of Payroll	319.82%	295.00%	301.76%

¹ GASB 75 was effective first for employer fiscal years beginning after June 15, 2017.

Disclosure—Contribution Schedule

Contributions

	Fiscal Year Ending		
	2017	2018	2019
Actuarially Determined Contribution	\$1,623,200.0	\$1,913,700.0	\$1,394,170.1
Contributions Made in Relation to the Actuarially Determined Contribution	\$465,449.0	\$542,896.0	\$594,916.0
Contribution Deficiency (Excess)	\$1,157,751.0	\$1,370,804.0	\$799,254.1
Covered-Employee Payroll	\$5,927,000.0	\$6,155,200.0	\$6,354,473.0
Contributions as a Percentage of Payroll	7.85%	8.82%	9.36%

Notes to Schedule:

Valuation Date: Actuarially determined contribution rates are calculated as of January 1, 6 months prior to the end of the fiscal year in which contributions are reported.

Methods and assumptions used to determine contribution rates:

Actuarial Cost Method	Entry Age Normal, level percent of payroll with 30-year open period amortization of Net OPEB liability
Asset Valuation Method	Market Value.
Investment Rate of Return	7.35%, net of OPEB plan investment expense, including inflation.
Retirement Age	Varies by age.
Mortality	RP 2014 Blue Collar Mortality Table projected with scale MP-2016 from the central year, with females set forward one year.

See additional information regarding assumptions in the “Methods and Assumption” section

Appendix

Demographic Information

The following tables summarize active, inactive participant, and retiree demographic information as of January 1, 2018.

	Participants	Spouses	1/1/2018 Total	1/1/2017 Total
Actives	70,711	N/A	70,711	71,465
Inactive participants¹	3,142	N/A	3,142	2,671
Retirees	50,680	25,071	75,751	73,692
Survivors	N/A	7,231	7,231	7,419
	124,533	32,302	156,835	155,247

¹ Inactives are certain former employees with a minimum amount of years of creditable service who have left contributions in the State Retirement System.

Actives: Counts by Job Group					
Sex	1	2	3	4	Total
Female	34,008	1,391	71	1,056	36,526
Male	24,933	1,988	1,304	5,960	34,185
Total	58,941	3,379	1,375	7,016	70,711

Actives: Average Age by Job Group					
Sex	1	2	3	4	Total
Female	48.20	48.06	48.48	40.11	47.96
Male	48.51	47.42	47.43	42.15	47.30
Total	48.33	47.68	47.48	41.85	47.64

Actives: Average Service by Job Group					
Sex	1	2	3	4	Total
Female	13.12	15.82	22.25	10.76	13.17
Male	13.15	15.56	20.19	13.61	13.64
Total	13.13	15.67	20.30	13.18	13.39

Demographic Information (continued)

Active: Age-Service Scatter

Age	Service						Total
	0: 4	5: 9	10:14	15:19	20:24	25+	
15:19	2	0	0	0	0	0	2
20:24	521	5	0	0	0	0	526
25:29	4,745	725	13	0	0	0	5,483
30:34	4,454	2,382	777	10	0	1	7,624
35:39	2,971	1,944	2,075	495	9	0	7,494
40:44	1,952	1,510	1,738	1,747	413	21	7,381
45:49	1,793	1,395	1,805	2,141	1,614	792	9,540
50:54	1,582	1,306	1,598	1,825	1,482	2,806	10,599
55:59	1,322	1,183	1,434	1,559	1,208	3,800	10,506
60:64	832	878	1,103	1,273	929	2,540	7,555
65:69	212	392	463	503	408	915	2,893
70+	26	80	141	191	126	544	1,108
Total	20,412	11,800	11,147	9,744	6,189	11,419	70,711

Demographic Information (continued)

Inactives and Retirees: Participant Counts			
Sex	Inactives	Retirees	Total
Female	1,826	24,861	26,687
Male	1,316	25,819	27,135
Total	3,142	50,680	53,822

Inactives and Retirees: Participant Average Age			
Sex	Inactives	Retirees	Total
Female	52.29	72.57	71.18
Male	52.20	70.62	69.73
Total	52.25	71.58	70.45

Spouses: Participant Counts			
Sex	Spouses of Retirees	Survivors	Total
Female	8,232	6,355	14,587
Male	16,839	876	17,715
Total	25,071	7,231	32,302

Spouses: Participant Average Age			
Sex	Spouses of Retirees	Survivors	Total
Female	70.76	79.22	74.45
Male	66.53	77.29	67.06
Total	67.92	78.99	70.40

Methods and Assumptions

Actuarial Method	Entry Age Normal Level Percent of Pay Method
Normal Cost	Determined for each active employee as the Actuarial Present Value of benefits allocated to the valuation year. The benefit attributed to the valuation year is that incremental portion of the total projected benefit earned during the year in accordance with the plan provisions. This allocation is based on each individual's service between date of hire and assumed retirement age.
Accumulated Postretirement Benefit Obligation	The Actuarial Present Value of Benefits allocated to all periods prior to the valuation year.
Discount Rate	3.92%
20 Year Municipal Bond Rate	3.87%
Municipal Bond Rate Basis	Bond Buyer General Obligation 20 year Municipal Bond Index
Expected Return on Assets	7.35%
Inflation Assumption	3.00%

Medical Trend

Calendar Year	Annual Rate of Increase		
	Medical/Rx	EGWP	Admin
2018	8.00%	5%	5%
2019	7.50%	5%	5%
2020	7.00%	5%	5%
2021	6.50%	5%	5%
2022	6.00%	5%	5%
2023	5.50%	5%	5%
2024	5.25%	5%	5%
2025+	5.00%	5%	5%

Methods and Assumptions (continued)

Morbidity/Aging

Medical and Prescription Drug

GASB requires that the costs for retiree benefits be separately identified. Currently, the Commonwealth provides benefits for actives and retirees not eligible for Medicare under one rating structure. However, retirees utilize benefits at a greater rate than the active population, due in part to their age. When using a one rate structure basis, the active employees are "implicitly" subsidizing the retiree cost of the plan of benefits in the GIC rate basis. GASB requires that the Commonwealth utilize actual experience or actuarial adjustments in order to calculate the true cost of retiree benefits in order to calculate the present value of the retiree benefits. The actuarial assessment of the best estimate of retiree cost of benefits is premised on utilizing the morbidity/aging table above and the claims costs by age shown in the tables below.

The following assumptions are assumed to follow the annual increase due to aging:

- Medical and prescription drug claims costs
- Medical and prescription drug Medicare offsets
- Retiree contributions

Age	Annual Increase
20 - 44	3.3%
45 - 49	3.8%
50 - 54	4.3%
55 - 59	4.4%
60 - 64	3.8%
65 - 69	3.1%
70 - 74	2.1%
75 - 79	1.4%
80 - 84	1.3%
85 - 89	0.6%
90 or Older	0.0%

Methods and Assumptions (continued)

Excise Tax (“Cadillac Tax”) on High Cost Plans For the excise tax, the overall value of the benefit was compared to the excise tax threshold. The values of the benefits were assumed to increase with the valuation trend and the excise tax thresholds were assumed to increase by 3.0% per year.

On a blended basis, the excise tax reaches the threshold in 2056. The effect of the excise tax is estimated to result in **1.79%** and **4.72%** increases in the actuarial accrued liability and normal cost respectively.

Other Requirements of the Patient Protection and Affordable Care Act For purposes of this valuation, the following aspects of Health Reform have been incorporated in our development of the underlying claim costs:

- Extended coverage for children
- 100% coverage of preventive care

Other aspects of Health Reform, noted below, result in no additional employer liability:

- Elimination of lifetime maximum benefits
- Removal of the limits on essential health care

Methods and Assumptions (continued)

The medical and prescription drugs per capita costs were based on the claims and enrollment for the time period July 1, 2016 through June 30, 2017, separately for pre-65 vs. post-65 and separately for the different plans. The experience was converted to incurred basis, adjusted for demographics and plan changes and trended to the valuation period.

The EGWP per capita reimbursements were based on the claims and enrollment for the time period January 1, 2016 – December 31, 2016, adjusted for demographics and trended to the valuation period.

Administrative costs were assumed to be 5% of the pre-65 costs and 10% of the post-65 costs.

Per Member Claim Costs for Calendar Year 2018

Age	Indemnity / Blend 1									
	Total Cost of Health Care Before Subsidies and Retiree Cost Sharing	Medicare Adjustment	Total Cost of Health Care Before Retiree Cost Sharing	EGWP Revenue	Contributions for Retirees who Retired Prior to 7/1/94	Contributions for Spouses of Retirees who Retired Prior to 7/1/94	Contributions for Retirees who Retired Between 7/1/94 and 10/1/09	Contributions for Spouses of Retirees who Retired Between 7/1/94 and 10/1/09	Contributions for Retirees who Retired After 10/1/09	Contributions for Spouses of Retirees who Retired After 10/1/09
25	\$4,562	\$0	\$4,562	\$0	(\$518)	(\$638)	(\$692)	(\$850)	(\$867)	(\$1,061)
30	\$5,240	\$0	\$5,240	\$0	(\$609)	(\$750)	(\$814)	(\$999)	(\$1,020)	(\$1,248)
35	\$6,036	\$0	\$6,036	\$0	(\$716)	(\$883)	(\$958)	(\$1,175)	(\$1,199)	(\$1,468)
40	\$6,974	\$0	\$6,974	\$0	(\$843)	(\$1,038)	(\$1,127)	(\$1,383)	(\$1,411)	(\$1,727)
45	\$8,075	\$0	\$8,075	\$0	(\$991)	(\$1,221)	(\$1,325)	(\$1,626)	(\$1,659)	(\$2,031)
50	\$9,584	\$0	\$9,584	\$0	(\$1,194)	(\$1,472)	(\$1,597)	(\$1,960)	(\$2,000)	(\$2,447)
55	\$11,660	\$0	\$11,660	\$0	(\$1,474)	(\$1,817)	(\$1,971)	(\$2,419)	(\$2,468)	(\$3,021)
60	\$14,290	\$0	\$14,290	\$0	(\$1,828)	(\$2,253)	(\$2,445)	(\$3,000)	(\$3,061)	(\$3,746)
65	\$16,899	(\$12,439)	\$4,460	(\$862)	(\$440)	(\$440)	(\$610)	(\$610)	(\$780)	(\$780)
70	\$19,594	(\$14,491)	\$5,103	(\$1,005)	(\$513)	(\$513)	(\$711)	(\$711)	(\$908)	(\$908)
75	\$21,681	(\$16,078)	\$5,603	(\$1,115)	(\$569)	(\$569)	(\$788)	(\$788)	(\$1,007)	(\$1,007)
80	\$23,202	(\$17,235)	\$5,967	(\$1,195)	(\$610)	(\$610)	(\$845)	(\$845)	(\$1,080)	(\$1,080)
85	\$24,713	(\$18,385)	\$6,328	(\$1,275)	(\$651)	(\$651)	(\$901)	(\$901)	(\$1,152)	(\$1,152)
90	\$25,448	(\$18,943)	\$6,505	(\$1,313)	(\$670)	(\$670)	(\$929)	(\$929)	(\$1,187)	(\$1,187)

Methods and Assumptions (continued)

Per Member Claim Costs for Calendar Year 2018

POS / PPO / Blend 2										
Age	Total Cost of Health Care Before Subsidies and Retiree Cost Sharing	Medicare Adjustment	Total Cost of Health Care Before Retiree Cost Sharing	EGWP Revenue	Contributions for Retirees who Retired Prior to 7/1/94	Contributions for Spouses of Retirees who Retired Prior to 7/1/94	Contributions for Retirees who Retired Between 7/1/94 and 10/1/09	Contributions for Spouses of Retirees who Retired Between 7/1/94 and 10/1/09	Contributions for Retirees who Retired After 10/1/09	Contributions for Spouses of Retirees who Retired After 10/1/09
25	\$3,622	\$0	\$3,622	\$0	(\$252)	(\$359)	(\$378)	(\$539)	(\$504)	(\$719)
30	\$4,169	\$0	\$4,169	\$0	(\$296)	(\$423)	(\$445)	(\$634)	(\$593)	(\$846)
35	\$4,812	\$0	\$4,812	\$0	(\$349)	(\$497)	(\$523)	(\$746)	(\$697)	(\$995)
40	\$5,568	\$0	\$5,568	\$0	(\$410)	(\$585)	(\$615)	(\$878)	(\$820)	(\$1,170)
45	\$6,458	\$0	\$6,458	\$0	(\$482)	(\$688)	(\$724)	(\$1,032)	(\$965)	(\$1,376)
50	\$7,675	\$0	\$7,675	\$0	(\$581)	(\$829)	(\$872)	(\$1,244)	(\$1,162)	(\$1,658)
55	\$9,352	\$0	\$9,352	\$0	(\$717)	(\$1,024)	(\$1,076)	(\$1,535)	(\$1,435)	(\$2,047)
60	\$11,473	\$0	\$11,473	\$0	(\$890)	(\$1,269)	(\$1,335)	(\$1,904)	(\$1,779)	(\$2,539)
65	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
70	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
75	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
80	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
85	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
90	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Methods and Assumptions (continued)

Per Member Claim Costs for Calendar Year 2018

HMO / Blend 3										
Age	Total Cost of Health Care Before Subsidies and Retiree Cost Sharing	Medicare Adjustment	Total Cost of Health Care Before Retiree Cost Sharing	EGWP Revenue	Contributions for Retirees who Retired Prior to 7/1/94	Contributions for Spouses of Retirees who Retired Prior to 7/1/94	Contributions for Retirees who Retired Between 7/1/94 and 10/1/09	Contributions for Spouses of Retirees who Retired Between 7/1/94 and 10/1/09	Contributions for Retirees who Retired After 10/1/09	Contributions for Spouses of Retirees who Retired After 10/1/09
25	\$3,751	\$0	\$3,751	\$0	(\$213)	(\$313)	(\$319)	(\$469)	(\$426)	(\$626)
30	\$4,324	\$0	\$4,324	\$0	(\$251)	(\$368)	(\$376)	(\$552)	(\$501)	(\$736)
35	\$5,000	\$0	\$5,000	\$0	(\$295)	(\$433)	(\$442)	(\$649)	(\$589)	(\$866)
40	\$5,796	\$0	\$5,796	\$0	(\$347)	(\$509)	(\$520)	(\$764)	(\$693)	(\$1,018)
45	\$6,730	\$0	\$6,730	\$0	(\$408)	(\$599)	(\$612)	(\$898)	(\$815)	(\$1,198)
50	\$8,009	\$0	\$8,009	\$0	(\$491)	(\$722)	(\$737)	(\$1,082)	(\$983)	(\$1,443)
55	\$9,770	\$0	\$9,770	\$0	(\$606)	(\$891)	(\$910)	(\$1,336)	(\$1,213)	(\$1,781)
60	\$12,000	\$0	\$12,000	\$0	(\$752)	(\$1,105)	(\$1,128)	(\$1,657)	(\$1,504)	(\$2,209)
65	\$14,359	(\$9,929)	\$4,430	(\$862)	(\$268)	(\$268)	(\$402)	(\$402)	(\$536)	(\$536)
70	\$16,646	(\$11,567)	\$5,079	(\$1,005)	(\$312)	(\$312)	(\$469)	(\$469)	(\$625)	(\$625)
75	\$18,415	(\$12,833)	\$5,582	(\$1,115)	(\$347)	(\$347)	(\$520)	(\$520)	(\$693)	(\$693)
80	\$19,706	(\$13,757)	\$5,949	(\$1,195)	(\$372)	(\$372)	(\$557)	(\$557)	(\$743)	(\$743)
85	\$20,988	(\$14,675)	\$6,313	(\$1,275)	(\$396)	(\$396)	(\$594)	(\$594)	(\$793)	(\$793)
90	\$21,610	(\$15,120)	\$6,490	(\$1,313)	(\$408)	(\$408)	(\$612)	(\$612)	(\$817)	(\$817)

Methods and Assumptions (continued)

Data Assumptions

Age Difference/
% Married

Males are assumed to be 3 years older than females. Active employees are assumed to be 80% married and choose family coverage at retirement.

Coverage

We have assumed that:

- 100% of all retirees who currently have health care coverage will continue with the same coverage, except that retirees under age 65 with POS/PPO coverage switch to Indemnity at age 65 and those over age 65 with POS/PPO coverage switch to HMO.
- All current retirees, other than those indicated on the census data as not being eligible by Medicare, have Medicare coverage upon attainment of age 65, as do their spouses. All future retirees are assumed to have Medicare coverage upon attainment of age 65.
- 80% of current and future contingent eligible participants will elect health care benefits at age 55, or current age if later.
- Actives, upon retirement, take coverage, and will be assumed to have the following coverage:

Retirement Age:	<u>Under 65</u>	<u>Age 65 +</u>
Indemnity	40%	85%
POS/PPO	50%	0%
HMO	10%	15%

Methods and Assumptions (continued)

Mortality	<p>Pre-retirement mortality reflects RP-2014 Blue Collar Employees table projected generationally with Scale MP-2016 set forward 1 year for females.</p> <p>Post-retirement mortality reflects RP-2014 Blue Collar Healthy Annuitant table projected generationally with Scale MP-2016 set forward 1 year for females</p> <p>For disabled retirees, the mortality rate reflects the post-retirement mortality described above, set forward 1 year.</p>
Retirement Age	<p>Retirement rates are shown on the following pages. These rates are consistent with the rates used by PERAC for GASB 68.</p>
Turnover	<p>Turnover rates are shown on the following pages. These rates are consistent with the rates used by PERAC for GASB 68.</p>
Disability	<p>Disability rates are shown on the following pages. These rates are consistent with the rates used by PERAC for GASB 68.</p>
Valuation Methodology and Terminology	<p>We have used GASB accounting methodology to determine the postretirement medical benefit obligations.</p>
Life Insurance	<p>A 10% retention load has been added to life insurance benefits to cover administrative costs, risk charges, premium taxes, and the carrier's profit.</p>
Salary Scale	<p>Assumed at a rate of 4.0% per year.</p>
Changes Since Prior Valuation	<ul style="list-style-type: none"> ▪ Excise tax impact was updated ▪ Trend tables were updated ▪ Disabled mortality was updated

Methods and Assumptions (continued)

The following table shows annual rates of retirement at selected ages:

	RATES OF RETIREMENT				
	(Number Retiring per 1,000 Members)				
	AGE				
	50	55	60	65	70
<i>Job Group 1</i>					
Male	30	35	90	200	1,000
Female	30	50	75	200	1,000
<i>Job Group 2</i>					
Male	20	75	150	200	1,000
Female	20	75	150	200	1,000
<i>Job Group 3</i>					
Male	50	100	140	250	1,000
Female	50	100	140	250	1,000
<i>Job Group 4</i>					
Male	60	250	200	500	1,000
Female	60	250	200	500	1,000

Methods and Assumptions (continued)

The following table shows sample annual rates of withdrawal for Job Groups 1 and 2:

RATES OF WITHDRAWAL (Number of Withdrawals Per 1,000 Members)											
YEARS OF SERVICE											
Age	0	1	2	3	4	5	6	7	8	9	10+
20	270	250	220	150	150	120	90	80	80	60	45
25	250	220	190	140	130	110	90	80	80	60	45
30	230	180	150	130	120	100	90	80	55	55	45
35	180	140	130	120	110	90	80	65	50	50	33
40	160	120	110	95	90	80	70	60	45	35	30
45	150	100	85	80	70	70	55	50	40	35	30
50	180	90	80	70	65	60	50	50	35	30	30
55	180	100	80	60	60	50	40	40	30	25	0
60	180	100	80	75	75	50	50	35	35	35	0
65+	250	150	150	150	150	120	100	100	80	70	0

Methods and Assumptions (continued)

The following table shows sample annual rates of withdrawal for Job Groups 3 and 4:

RATES OF WITHDRAWAL (Number of Withdrawals per 1,000 Members)					
All Ages	YEARS OF SERVICE				
	1	5	10	15	20+
<i>Job Group 3</i>					
Unisex	7	7	5	5	5
<i>Job Group 4</i>					
Unisex	90	60	35	20	15

Methods and Assumptions (continued)

The following table shows sample annual rates of disability at selected ages:

	RATES OF DISABILITY						
	(Number becoming disabled per 10,000 Members)						
	AGE						
	25	30	35	40	45	50	55
<i>Job Group 1</i>							
Unisex	1	1	3.4	6.8	10	13.3	14
<i>Job Group 2</i>							
Unisex	6.2	7.2	10	21	30	42	50
<i>Job Group 3</i>							
Unisex	11	16	23	36	58	94	190
<i>Job Group 4</i>							
Unisex	20	21	40	71	100	110	80

Actuarial Assumptions and Methods (continued)

Discussion of Actuarial Assumptions and Methods

Commonwealth of Massachusetts selected the economic, demographic and health care claim cost assumptions and prescribed them for use for purposes of compliance with GASB 75. Aon provided guidance with respect to these assumptions, and it is our belief that the assumptions represent reasonable expectations of anticipated plan experience.

Calculation of Liabilities

The method used to calculate the service cost and accumulated postretirement benefit obligation for determining OPEB expense is the entry age normal cost method. Under this cost method, the actuarial accrued liability is based on a prorated portion of the present value of all benefits earned to date over expected future working life time as defined by GASB. The proration is determined so that the cost with respect to service accrued from date of hire is recognized as a level percentage of pay each year.

Accounting Information Under GASB 75

Benefit obligations and expense/(income) are calculated under U.S. Generally Accepted Accounting Principles as set forth in Government Accounting Standards Board Statement 75.

1. The total OPEB liability represents the actuarial present value of benefits based on the entry age normal cost method as of the measurement date.

Summary of Principal Plan Provisions

Participation

Participation in the health and life insurance programs administered by the GIC is voluntary, but requires membership in the State Retirement System. Participation in the State Retirement System is mandatory for all full-time employees. Eligibility with respect to part-time, provisional, temporary, seasonal or intermittent employment is governed by regulations promulgated by the retirement board, and approved by PERAC. Membership is optional for certain elected officials.

Differences in participation between the State Retirement System and the GIC are:

- Certain employees and retirees, who are eligible for GIC benefits, are covered by separate retirement boards and thus do not participate in the State Retirement System.
- Certain authorities, and other entities, participate in the State Retirement System, but are billed in full for their GIC benefits.

There are 4 classes of membership in the State Retirement System:

Group 1:

General employees, including clerical, administrative, technical and all other employees not otherwise classified.

Group 2:

Certain specified hazardous duty positions.

Group 3:

State police officers and inspectors.

Group 4:

Corrections officers, and other specified hazardous positions.

Summary of Principal Plan Provisions (continued)

Retirement Age Constraints

In 2 of the 4 groups (Groups 2 and 4) there is a small subset of positions that have a mandatory retirement age of age 65. There is no subset with a mandatory retirement age for employees in Groups 1 and 3. The actuarial assumptions used for this valuation were developed taking into account the small portion of the population subject to mandatory retirement provisions.

Superannuation Retirement

Eligibility

A member is eligible for superannuation retirement (service retirement) upon meeting the following conditions:

- Completion of 20 years of service, or
- Attainment of age 55 if hired prior to 1978, or if classified in Group 3 or Group 4, or
- Attainment of age 55 with 10 years of service, if hired after 1978, and if classified in Group 1 or 2

Health and Basic Life Insurance Benefits

Retirees can achieve Medicare status by virtue of achieving age 65 with 40 quarters of Social Security service, by being approved for a disability, or being in a disease state that qualifies one for Medicare. The GIC provides health coverage to a small subset of retired employees who are age 65 or older who are not Medicare eligible because the Commonwealth's retirement pension system does not participate in the Social Security Administration's pension system. The retired employees are enrolled in the same health plans available to active employees under age 65. However, these employees may be covered by Medicare through a spouse's eligibility.

Both Medicare and Non-Medicare retirees, who retired on or before July 1, 1994, contribute 10% of the cost of the plan, as determined by the GIC. Those who retired after July 1, 1994 but on or before October 1, 2009 contribute 15% of the cost of the plan as determined by the GIC. Those who retired after October 1, 2009 contribute 20% of the cost of the plan as determined by the GIC. Certain supplemental benefits are fully paid for by the participant.

Upon the retirees' death, all survivors, regardless of their deceased spouse's retirement date, contribute 10% of the cost of their health coverage. Survivor health coverage continues until the survivor remarries or dies. Survivors are not eligible for life insurance benefits.

Summary of Principal Plan Provisions (continued)

For Non-Medicare retirees, the total cost of the plan, for each option, is a blend of active and retiree claims and non-claims costs. Retiree contributions to these plans, at 10%, 15% or 20% of plan cost, depending on the date of retirement, are favorably influenced by this blending. The blending of active and retired experience results in an implicit rate subsidy, and results in these retirees paying less than 10%, 15% or 20% of their cohort's expected cost. As shown below, Aon has valued the age appropriate claims costs, and the dollar amount of retiree contributions, to effectively capture the resulting costs and liabilities to the Commonwealth.

Termination With 10 or More Years of Service (Contingent Status)

Eligibility

A participant who has completed 10 or more years of creditable service may be eligible for benefits on a contingent basis. Elected officials and others who were hired prior to 1978 may be eligible after 6 years in accordance with G.L. c. 32, s. 10.

If a participant does not withdraw his or her member pension contributions for retirement benefits upon termination of employment, the participant continues with their ability to receive retirement coverage through the GIC. If the participant withdraws his or her retirement contributions, the subsidized benefit eligibility ends.

Health and Basic Life Insurance Benefits

During the time period between termination of employment and retirement, the participant may continue coverage by paying 100% of the cost of coverage. Upon retirement, the participant may elect coverage. The participant contributes 10%, 15% or 20% of the cost of coverage, depending on the date of retirement.

If the participant has not yet retired, and dies, the survivor may apply for health coverage (if the participant had health and life coverage or life only coverage through the GIC, i.e. was paying 100% of the cost). The survivor would contribute at the 10% rate. If the participant has retired, and then dies, the survivor may elect to continue health coverage, and contribute at the 10% rate. Survivor health coverage continues until the survivor remarries or dies.

Summary of Principal Plan Provisions (continued)

Termination of Employment With Less Than Ten Years of Service

No subsidized GIC health or life benefits available. Therefore, no liability will be valued upon this event.

Disability Retirement

Eligibility

- Ordinary Disability: Non–veterans who become totally and permanently disabled by reason of a non-job related condition with at least 10 years of creditable service (or 15 years creditable service in systems in which the local option contained in G.L. c. 32, s.6(l) has not been adopted).

Veterans with ten years of creditable service who become totally and permanently disabled by reason of a non-job related condition prior to reaching “maximum age.”

- Accidental Disability: Applies to members who become permanently and totally unable to perform the essential duties of the position as a result of a personal injury sustained or hazard undergone while in the performance of duties. There are no minimum age or service requirements.

Health and Basic Life Insurance Benefits

If the retiree receives an ordinary or accidental disability pension, health and basic life insurance coverage will continue, and participants will contribute either 10%, 15% or 20% of the cost of coverage (subject to the statement below regarding life insurance coverage), depending on when the disability occurred.

If under age 60 at disability, basic life insurance coverage will continue, and the participant can apply for a waiver of premium within 24 months of the disability.

Summary of Principal Plan Provisions (continued)

Death in Active Service

Eligibility

Survivors of active employees who had GIC health coverage are eligible to continue health coverage.

Health and Basic Life Insurance Benefits

Health coverage is provided, and survivors contribute at the 10% rate. Survivor health coverage continues until the survivor remarries or dies. Survivors are not eligible for Basic Life Insurance.

Sick Leave Benefits

Sick leave is earned at the rate of 1.25 days per full payroll month.

Employees can accumulate sick leave hours and convert to a cash payout and/or retiree medical "bank" to use for retiree premium contributions, according to the following provisions. The retiree medical "bank" is used to pay the retiree's share of the medical premium until it runs out.

IBEW Local 103, Teamsters Local 127, CASE Local 127, USW Local 5696-00

- Employees who had 100 Sick Days as of November 1, 2009, are eligible for 50% Cash and 35% Sick Leave Bank of the value of their Sick Leave Balance as of November 1, 2009, paid at the employee's hourly rate at the time of retirement. If balance falls below 100 sick days, payment and sick leave bank are based upon the sick leave balance at the time of retirement.
- Employees who did not have 100 Sick Days as of November 1, 2009 are eligible for 50% Cash payment only of the value of their Sick Leave Balance as of November 1, 2009.
- Sick Leave earned after November 1, 2009, will be paid 20% with no Sick Leave Bank.

Classified, Executive, and USW Local 5696-01:

- Employees are eligible for 50% Cash and 50% Sick Leave Bank of the value of their Sick Leave Balance as of September 30, 1996, paid at the employee's hourly rate at the time of retirement if they have 100 sick days when they retire.
- Sick Leave earned after September 30, 1996 will be paid at 20% with no Sick Leave Bank

Dependent Benefits

Retiree medical bank is available to surviving spouses. If both retiree and spouse die, there is no additional payout or benefit.

Sick leave benefits are not included in this valuation as the provision is not considered material and the data is not easily available.

Summary of Principal Plan Provisions (continued)

	UniCare State Indemnity Plan Medicare Extension	Harvard Pilgrim Medicare Enhance	Health New England MedPlus	Tufts Health Plan Medicare Complement	Tufts Health Plan Medicare Preferred
Deductible	none	none	none	none	none
Out-Of-Pocket Max	none	none	none	none	none
Physicians					
Office Visit	\$10 copay	\$15 copay	\$15 copay	\$15 copay	\$15 copay
Preventive Care	100%	100%	100%	100%	100%
Hospitalization	100%	100%	100%	100%	100%
Surgery	100%	100%	100%	100%	100%
Diagnostic / X-Ray	100%	100%	100%	100%	100%
ER	\$50 copay	\$50 copay	\$50 copay	\$50 copay	\$50 copay
Outpatient Mental Health	Visit 1-4:\$0; Visit 5+:\$10	\$15 copay	\$15 copay	\$15 copay	\$15 copay
Outpatient Substance Abuse	Visit 1-4:\$0; Visit 5+:\$10	\$15 copay	\$15 copay	\$15 copay	\$15 copay

Summary of Principal Plan Provisions (continued)

Summary of Plan Designs – Medical (Non-Medicare)

	UniCare State Indemnity Plan / Basic with CIC	UniCare State Indemnity Plan / Community Choice	UniCare State Indemnity Plan / Plus	Harvard Pilgrim Independence Plan
		In-Network Benefits Shown	In-Network Benefits Shown	In-Network Benefits Shown
Deductible (single/family)	\$500/\$1,000	\$400/\$800	\$500/\$1,000	\$500/\$1,000
Out-Of-Pocket Max	\$5,000/\$10,000	\$5,000/\$10,000	\$5,000/\$10,000	\$5,000/\$10,000
Physicians				
Primary Care Office Visit (Tier 1/2/3)	\$20 copay	\$15 copay	\$20 copay	\$20 copay
Specialist Office Visit (Tier 1/2/3)	\$20/\$30/\$40 copay	\$25/\$30/\$45 copay	\$25/\$30/\$45 copay	\$20/\$35/\$45 copay
Inpatient Care (Tier 1/2/3)*	\$275	\$275	\$275/\$500/\$1,500	\$275/\$500/\$1,500
Outpatient Surgery (Tier 1/2/3)*	\$110 copay	\$110 copay	\$110/\$110/\$250 copay	\$150 copay
ER	\$100 copay	\$100 copay	\$100 copay	\$100 copay
Outpatient Mental Health	\$20 copay	\$15 copay	\$20 copay	\$20 copay

*Copay per admission; max one copay / quarter or four copays per year, depending on plan

Summary of Principal Plan Provisions (continued)

Summary of Plan Designs – Medical (Non-Medicare)

	Navigator by Tufts Health Plan	Harvard Pilgrim Primary Choice Plan	Spirit by Tufts Health Plan	Fallon Community Health Plan Direct Care
In-Network Benefits Shown				
Deductible (single/family)	\$500/\$1,000	\$400/\$800	\$400/\$800	\$400/\$800
Out-Of-Pocket Max	\$5,000/\$10,000	\$5,000/\$10,000	\$5,000/\$10,000	\$5,000/\$10,000
Physicians				
Primary Care Office Visit (Tier 1/2/3)	\$20 copay	\$20 copay	\$20 copay	\$15 copay
Specialist Office Visit (Tier 1/2/3)	\$25/\$35/\$45 copay	\$20/\$35/\$45 copay	\$25/\$35/\$45 copay	\$25 copay
Inpatient Care (Tier 1/2/3)*	\$275/\$1,000	\$275/\$1,000	\$275/\$500	\$275
Outpatient Surgery (Tier 1/2/3)*	\$150 copay	\$150 copay	\$150 copay	\$110 copay
ER	\$100 copay	\$100 copay	\$100 copay	\$100 copay
Outpatient Mental Health	\$20 copay	\$20 copay	\$20 copay	\$15 copay

*Copay per admission; max one copay / quarter or four copays per year, depending on plan

Summary of Principal Plan Provisions (continued)

Summary of Plan Designs – Medical (Non-Medicare)

	Fallon Community Health Plan Select Care	Health New England	NHP Care (Neighborhood Health Plan)
Deductible (single/family)	\$500/\$1,000	\$400/\$800	\$500/\$1,000
Out-Of-Pocket Max	\$5,000/\$10,000	\$5,000/\$10,000	\$5,000/\$10,000
Physicians			
Primary Care Office Visit (Tier 1/2/3)	\$20 copay	\$20 copay	\$20 copay
Specialist Office Visit (Tier 1/2/3)	\$25/\$35/\$45 copay	\$25/\$35/\$45 copay	\$25/\$35/\$45 copay
Inpatient Care (Tier 1/2/3)*	\$275	\$275	\$275
Outpatient Surgery (Tier 1/2/3)*	\$125 copay	\$110 copay	\$110 copay
ER	\$100 copay	\$100 copay	\$100 copay
Outpatient Mental Health	\$20 copay	\$20 copay	\$25 copay

*Copay per admission; max one copay / quarter or four copays per year, depending on plan

Summary of Principal Plan Provisions (continued)

Summary of Plan Designs – Prescription Drug (Medicare and Non-Medicare)

All Plans	
Deductible (single/family)	\$100/300*
Generic	
Retail	\$ 10
Mail	\$ 25
Formulary	
Retail	\$ 30
Mail	\$ 70
Non-Formulary	
Retail	\$65
Mail	\$165

*The two Fallon plans have a family Rx deductible of \$200

Dental/Vision Care

Upon retirement these benefits are available to participants, but the cost of these benefits are paid in full by the participants. These benefits are not included in the valuation results presented herein.

Basic Life Insurance

Retirees are eligible for \$5,000 Basic Life Insurance. The plan provides for a \$5,000 payment upon the death of the participant. Surviving spouses are not eligible for Basic Life Insurance

Appendix A

Commonwealth of Massachusetts Health Plan Providers

The following chart summarizes the various health plan providers (by type, i.e., Indemnity, POS/PPO, and HMO) utilized by the participants included in this valuation.

Indemnity (Blend 1)

Commonwealth Indemnity Plan

POS/PPO (Blend 2)

Commonwealth Indemnity Plan PLUS
Commonwealth Indemnity Plan Community CHOICE
Commonwealth PPO – Tufts Health Plan Navigator
Harvard Pilgrim POS

HMO (Blend 3)

Fallon Senior Plan
Harvard Pilgrim Medicare Enhance
Health New England MedPlus
Tufts Health Plan Medicare Complement
Tufts Health Plan Medicare Preferred
Harvard Pilgrim Primary Choice Plan
Spirit by Tufts Health Plan
Fallon Community Health Plan Direct Care
Fallon Community Health Plan Select Care
Health New England
NHP Care (Neighborhood Health Plan)

Appendix B

Detailed Breakdown of Per Member Claim Costs for Calendar Year 2018

Indemnity / Blend 1												
Age	(1) Medical Cost	(2) Medicare Adjustment	(3) Prescription Cost	(4) Administrative Cost	(5) = (1) + (2) + (3) + (4) Total Cost of Health Care Before Retiree Cost Sharing	EGWP Revenue	Contributions for Retirees who Retired Prior to 7/1/94	Contributions for Spouses of Retirees who Retired Prior to 7/1/94	Contributions for Retirees who Retired Between 7/1/94 and 10/1/09	Contributions for Spouses of Retirees who Retired Between 7/1/94 and 10/1/09	Contributions for Retirees who Retired After to 10/1/09	Contributions for Spouses of Retirees who Retired After to 10/1/09
25	\$3,245	\$0	\$598	\$719	\$4,562	\$0	(\$518)	(\$638)	(\$692)	(\$850)	(\$867)	(\$1,061)
30	\$3,817	\$0	\$704	\$719	\$5,240	\$0	(\$609)	(\$750)	(\$814)	(\$999)	(\$1,020)	(\$1,248)
35	\$4,489	\$0	\$828	\$719	\$6,036	\$0	(\$716)	(\$883)	(\$958)	(\$1,175)	(\$1,199)	(\$1,468)
40	\$5,281	\$0	\$974	\$719	\$6,974	\$0	(\$843)	(\$1,038)	(\$1,127)	(\$1,383)	(\$1,411)	(\$1,727)
45	\$6,211	\$0	\$1,145	\$719	\$8,075	\$0	(\$991)	(\$1,221)	(\$1,325)	(\$1,626)	(\$1,659)	(\$2,031)
50	\$7,485	\$0	\$1,380	\$719	\$9,584	\$0	(\$1,194)	(\$1,472)	(\$1,597)	(\$1,960)	(\$2,000)	(\$2,447)
55	\$9,238	\$0	\$1,703	\$719	\$11,660	\$0	(\$1,474)	(\$1,817)	(\$1,971)	(\$2,419)	(\$2,468)	(\$3,021)
60	\$11,458	\$0	\$2,113	\$719	\$14,290	\$0	(\$1,828)	(\$2,253)	(\$2,445)	(\$3,000)	(\$3,061)	(\$3,746)
65	\$13,807	(\$12,439)	\$2,546	\$546	\$4,460	(\$862)	(\$440)	(\$440)	(\$610)	(\$610)	(\$780)	(\$780)
70	\$16,083	(\$14,491)	\$2,965	\$546	\$5,103	(\$1,005)	(\$513)	(\$513)	(\$711)	(\$711)	(\$908)	(\$908)
75	\$17,845	(\$16,078)	\$3,290	\$546	\$5,603	(\$1,115)	(\$569)	(\$569)	(\$788)	(\$788)	(\$1,007)	(\$1,007)
80	\$19,129	(\$17,235)	\$3,527	\$546	\$5,967	(\$1,195)	(\$610)	(\$610)	(\$845)	(\$845)	(\$1,080)	(\$1,080)
85	\$20,405	(\$18,385)	\$3,762	\$546	\$6,328	(\$1,275)	(\$651)	(\$651)	(\$901)	(\$901)	(\$1,152)	(\$1,152)
90	\$21,025	(\$18,943)	\$3,877	\$546	\$6,505	(\$1,313)	(\$670)	(\$670)	(\$929)	(\$929)	(\$1,187)	(\$1,187)

Appendix B (continued)

Detailed Breakdown of Per Member Claim Costs for Calendar Year 2018

POS / PPO / Blend 2												
Age	(1) Medical Cost	(2) Medicare Adjustment	(3) Prescription Cost	(4) Administrative Cost	(5) = (1) + (2) + (3) + (4) Total Cost of Health Care Before Retiree Cost Sharing	EGWP Revenue	Contributions for Retirees who Retired Prior to 7/1/94	Contributions for Spouses of Retirees who Retired Prior to 7/1/94	Contributions for Retirees who Retired Between 7/1/94 and 10/1/09	Contributions for Spouses of Retirees who Retired Between 7/1/94 and 10/1/09	Contributions for Retirees who Retired After to 10/1/09	Contributions for Spouses of Retirees who Retired After to 10/1/09
25	\$2,460	\$0	\$642	\$520	\$3,622	\$0	(\$252)	(\$359)	(\$378)	(\$539)	(\$504)	(\$719)
30	\$2,894	\$0	\$755	\$520	\$4,169	\$0	(\$296)	(\$423)	(\$445)	(\$634)	(\$593)	(\$846)
35	\$3,404	\$0	\$888	\$520	\$4,812	\$0	(\$349)	(\$497)	(\$523)	(\$746)	(\$697)	(\$995)
40	\$4,003	\$0	\$1,045	\$520	\$5,568	\$0	(\$410)	(\$585)	(\$615)	(\$878)	(\$820)	(\$1,170)
45	\$4,709	\$0	\$1,229	\$520	\$6,458	\$0	(\$482)	(\$688)	(\$724)	(\$1,032)	(\$965)	(\$1,376)
50	\$5,674	\$0	\$1,481	\$520	\$7,675	\$0	(\$581)	(\$829)	(\$872)	(\$1,244)	(\$1,162)	(\$1,658)
55	\$7,004	\$0	\$1,828	\$520	\$9,352	\$0	(\$717)	(\$1,024)	(\$1,076)	(\$1,535)	(\$1,435)	(\$2,047)
60	\$8,686	\$0	\$2,267	\$520	\$11,473	\$0	(\$890)	(\$1,269)	(\$1,335)	(\$1,904)	(\$1,779)	(\$2,539)
65	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
70	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
75	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
80	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
85	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
90	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Appendix B (continued)

Detailed Breakdown of Per Member Claim Costs for Calendar Year 2018

HMO / Blend 3												
Age	(1) Medical Cost	(2) Medicare Adjustment	(3) Prescription Cost	(4) Administrative Cost	(5) = (1) + (2) + (3) + (4) Total Cost of Health Care Before Retiree Cost Sharing	EGWP Revenue	Contributions for Retirees who Retired Prior to 7/1/94	Contributions for Spouses of Retirees who Retired Prior to 7/1/94	Contributions for Retirees who Retired Between 7/1/94 and 10/1/09	Contributions for Spouses of Retirees who Retired Between 7/1/94 and 10/1/09	Contributions for Retirees who Retired After to 10/1/09	Contributions for Spouses of Retirees who Retired After to 10/1/09
25	\$2,585	\$0	\$675	\$491	\$3,751	\$0	(\$213)	(\$313)	(\$319)	(\$469)	(\$426)	(\$626)
30	\$3,040	\$0	\$793	\$491	\$4,324	\$0	(\$251)	(\$368)	(\$376)	(\$552)	(\$501)	(\$736)
35	\$3,576	\$0	\$933	\$491	\$5,000	\$0	(\$295)	(\$433)	(\$442)	(\$649)	(\$589)	(\$866)
40	\$4,207	\$0	\$1,098	\$491	\$5,796	\$0	(\$347)	(\$509)	(\$520)	(\$764)	(\$693)	(\$1,018)
45	\$4,948	\$0	\$1,291	\$491	\$6,730	\$0	(\$408)	(\$599)	(\$612)	(\$898)	(\$815)	(\$1,198)
50	\$5,962	\$0	\$1,556	\$491	\$8,009	\$0	(\$491)	(\$722)	(\$737)	(\$1,082)	(\$983)	(\$1,443)
55	\$7,359	\$0	\$1,920	\$491	\$9,770	\$0	(\$606)	(\$891)	(\$910)	(\$1,336)	(\$1,213)	(\$1,781)
60	\$9,127	\$0	\$2,382	\$491	\$12,000	\$0	(\$752)	(\$1,105)	(\$1,128)	(\$1,657)	(\$1,504)	(\$2,209)
65	\$10,998	(\$9,929)	\$2,870	\$491	\$4,430	(\$862)	(\$268)	(\$268)	(\$402)	(\$402)	(\$536)	(\$536)
70	\$12,812	(\$11,567)	\$3,343	\$491	\$5,079	(\$1,005)	(\$312)	(\$312)	(\$469)	(\$469)	(\$625)	(\$625)
75	\$14,215	(\$12,833)	\$3,709	\$491	\$5,582	(\$1,115)	(\$347)	(\$347)	(\$520)	(\$520)	(\$693)	(\$693)
80	\$15,238	(\$13,757)	\$3,977	\$491	\$5,949	(\$1,195)	(\$372)	(\$372)	(\$557)	(\$557)	(\$743)	(\$743)
85	\$16,255	(\$14,675)	\$4,242	\$491	\$6,313	(\$1,275)	(\$396)	(\$396)	(\$594)	(\$594)	(\$793)	(\$793)
90	\$16,748	(\$15,120)	\$4,371	\$491	\$6,490	(\$1,313)	(\$408)	(\$408)	(\$612)	(\$612)	(\$817)	(\$817)