



# Commonwealth of Massachusetts

Postemployment Benefit Other Than Pensions  
Actuarial Valuation

Fiscal Year Ending June 30, 2016

January 1, 2016 Valuation Date



October 24, 2016

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This report presents the January 1, 2016 Actuarial Valuation results for the **Commonwealth of Massachusetts (“the Commonwealth”)** for the retiree benefits (health and life insurance) that are provided through the Group Insurance Commission (“the GIC”). The purposes of this report are to:

- (1) Determine the Commonwealth’s January 1, 2016 obligations;
- (2) Determine the Commonwealth’s Fiscal Year End June 30, 2016 accrual under the *Governmental Accounting Standards Board (GASB)* standard based on GASB Statement 45;
- (3) Provide disclosure information for the Fiscal Year End June 30, 2016; and
- (4) Provide information that may be helpful in future planning for the Commonwealth.

A summary of the major results is shown in the Executive Summary, while the Principal Valuation Results Section provides more detail.

The Accounting Information Section summarizes GASB Other Postemployment Benefit (OPEB) accounting treatment including the Fiscal Year End June 30, 2016 Annual Required Contribution (ARC), Annual OPEB Cost (AOC), and Net OPEB Obligation (NOO).

This report’s costs and liabilities are based upon the data and plan provisions provided by the Commonwealth, as summarized in the Demographic Information and Summary of Principal Plan Provisions Sections, respectively, and the funding method and actuarial assumptions outlined in the Methods and Assumptions Section of this report. This report presents our best estimate of the costs of the Plan in accordance with accepted actuarial principles and our understanding of GASB Statement 45.

Respectfully,

**Aon Hewitt**

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## Executive Summary

The Commonwealth provides medical, prescription drug, mental health/substance abuse, and life insurance to retirees and their covered dependents. The Commonwealth pays a portion of the cost for retirees, spouses, and dependents. All active employees who retire from the Commonwealth and meet the eligibility criteria have the option to receive these benefits.

The Commonwealth also offers dental and vision care to retirees. Since these benefits are completely paid by the retirees, there is no GASB 45 liability for the Commonwealth.

This summary identifies the value of benefits as of January 1, 2016 and costs for the Fiscal Year End June 30, 2016. GASB requires that the most recent actuarial valuation be used in the determination of costs and liabilities. Therefore, this report provides Fiscal Year End June 30, 2016 costs and liabilities.

In 2006, the Office of the State Comptroller contracted with Aon Hewitt to produce an actuarial valuation which calculated the liability of the present value of benefits if the Commonwealth chose to continue to fund that liability on a pay-as-you-go basis (using a discount rate of 4.50%) and what the liability would be should the Commonwealth choose to fully fund the liability over the next 30 years (using a discount rate of 7.50%).

With this information, the Commonwealth formed a Commission to study the issue. The Commission issued its report in July 2008 with a number of recommendations including a recommendation to dedicate a revenue stream toward partially funding the liability until the pension system is fully funded. While legislation was enacted by the Commonwealth to prefund this liability using an increasing share of tobacco master settlement revenues starting in FY 2013, this funding plan is still in its infancy and therefore the January 1, 2016 valuation has been run at the unfunded discount rate of 4.50%, the estimate of the Commonwealth's long-term yield on uninvested or "free" cash. This rate is only a benchmark and should be adjusted as trends warrant.

## Executive Summary (continued)

The Commonwealth requested that Aon Hewitt produce an updated liability with January 1, 2016 data for the Fiscal Year Ending June 30, 2016 at discount rates of 4.50% and 7.50% (7.75% for 2015), consistent with the discount rate assumed by the Public Employee Retirement Administration Commission (PERAC) in its actuarial valuation of the Commonwealth's state and teachers' pension plans. The tables that follow show the results of these valuations:

2016			2015		
Results in millions	4.50% Discount rate	7.50% Discount rate	Results in millions	4.50% Discount rate	7.75% Discount rate
Liability	\$17,082.9	\$10,915.3	Liability	\$16,502.8	\$10,068.2
Assets	\$760.4	\$760.4	Assets	\$610.0	\$610.0
Unfunded Liability	\$16,322.5	\$10,154.9	Unfunded Liability	\$15,892.8	\$9,458.2

The Accumulated Postretirement Benefit Obligation (APBO) increased from \$16,502.8 million as of January 1, 2015 to \$17,082.9 million as of January 1, 2016. The main reason for this increase was partially due to the revised trend and excise tax assumptions and partially due to the benefits earned over time. This increase was partially offset by favorable claims experience.

The liability was developed as follows:

	Liability
<b>2015 Valuation (in millions)</b>	\$16,502.8
Expected Increase	\$864.6
Demographic Changes	\$138.8
Per Capita Adjustments	(\$2,713.2)
Trend & Excise Assumption	\$2,288.5
MTA Sick Leave	\$1.4
<b>2016 Valuation (in millions)</b>	\$17,082.9

The following table shows the impact of various discount rates on the Annual Required Contribution (ARC) & Annual OPEB Cost (AOC) calculations as of January 1, 2016:

Discount Rate	4.50%	7.50%
ARC (in millions)	\$1,417.8	\$863.9
Adjustment (in millions)	\$57.0	\$57.0
AOC (in millions)	\$1,474.8	\$920.9

The liability for the Massachusetts Department of Transportation (MassDOT), which includes former Massachusetts Turnpike Authority (MTA) employees is included in the Commonwealth's liability. The former MTA had established an irrevocable trust to fund OPEB liabilities. The trust had a balance of \$77 million as of June 30, 2014. During FY2015, the trustees approved the transfer of those assets to the State Retirement Benefits Trust Fund (SRBTF), as did the SRBTF board. As a result, the assets were merged with all other SRBTF assets in February 2015 (and not segregated). The value of the addition is included as a contribution in the asset reconciliation.

## Executive Summary (continued)

### Summary of Benefit Obligations

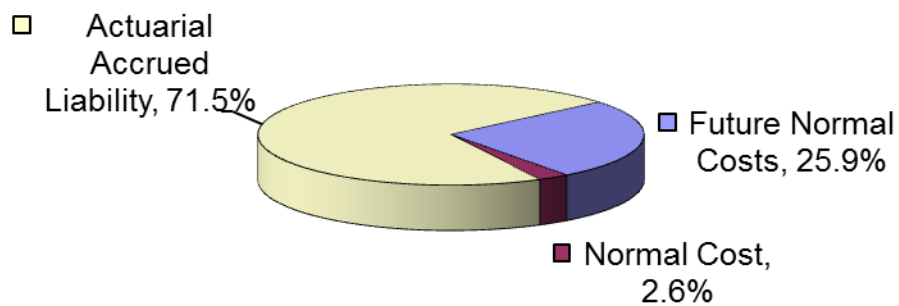
GASB 45 Results for Fiscal Year End June 30,	2016 *	2015 **
	(\$ millions)	(\$ millions)
Present Value of all Projected Benefits	\$23,888.7	\$23,164.1
Present Value of Benefits		
Earned to Date (Actuarial Accrued Liability)	\$17,082.9	\$16,502.8
FY Annual Required Contribution (ARC)***	\$1,417.8	\$1,360.9
FY Annual OPEB Cost	\$1,474.8	\$1,410.1
Expected Benefit Payments	\$536.6	\$528.6
* The Fiscal Year End June 30, 2016 Present Value of Benefits was calculated on January 1, 2016 using a 4.50% discount rate.		
** The Fiscal Year End June 30, 2015 Present Value of Benefits was calculated on January 1, 2015 using a 4.50% discount rate.		
*** The Annual Required Contribution reflects a closed 30-year, 4.5% annual increasing amortization of the Unfunded Actuarial Accrued Liability.		

- The **Present Value of all Projected Benefits** is the total present value of all expected future benefits, based on certain actuarial assumptions. The Present Value of all projected benefits is a measure of total liability or obligation. Essentially, the Present Value of all projected benefits is the value (on the valuation date) of the benefits promised to current and future retirees. The Plan's present value of all projected benefits (at January 1, 2016) is \$23,888.7 million. The majority of this liability is for current active employees (future retirees).
- The **Actuarial Accrued Liability** is the liability or obligation for benefits earned through the valuation date, based on certain actuarial methods and assumptions. The Plan's Actuarial Accrued Liability (at January 1, 2016) is \$17,082.9 million assuming no prefunding of obligations. Approximately 48.1% of this obligation is for active employees. The Actuarial Accrued Liability represents approximately 71.5% of the present value of all projected benefits.
- The **Expected Benefit Payments** are calculated as of a fixed point in time, based on the actuarial method and assumptions used in this report and are not intended to match actual benefits paid by the Commonwealth. The actual amount paid by the Commonwealth during the 2016 Fiscal Year was \$459.6 million. Differences between the Expected Benefit Payments and the amount the Commonwealth actually paid during the fiscal year are summarized below:
  - Historical claims used in the medical underwriting are trended forward to match the valuation date in question;
  - The valuation assumes new retirees based on the retirement timing assumptions set forth by the Massachusetts State Board of Retirement, and may not match actual experience for that period;
  - Underwriting adjustments are made to fully-insured plans' premiums to create estimated retiree-specific costs as well as to the cost for over-65 retirees who are not eligible for Medicare benefits and for the aging of the retiree population; and
  - Actuarial benefit payments are calculated as of the beginning of the year and trended forward (normalized) to the end of the valuation year with interest.

## Executive Summary (continued)

- **Normal Cost** is the value of benefits expected to be earned during the current year, again based on certain actuarial methods and assumptions. The Fiscal Year End June 30, 2016 Normal Cost is \$632.3 million as of the beginning of the plan year. In pension accounting, this is also known as “**service cost.**”
- **Future Normal Costs** represent the present value of the remaining balance of all projected benefits to be earned in future years.

The following chart illustrates (for the scenario assuming no prefunding) the Present Value of all Projected Benefits, the yellow area representing the Actuarial Accrued Liability in total:



## Executive Summary (continued)

The results were calculated based upon plan provisions, as provided by the Commonwealth, along with certain demographic and economic assumptions as recommended by Aon Hewitt, in conjunction with the Commonwealth with guidance from the GASB statement.

### Demographic Assumptions

Data was provided by the Commonwealth as of January 1, 2016. Demographic assumptions used to project the data are the same as those used to value the Commonwealth's pension liabilities under GASB 68. There is no assumption for future new hires.

### Economic Assumptions

The GASB statement requires that the discount rate used to determine the retiree health care liabilities should be the estimated long-term yield on investments that are expected to be used to finance the payment of benefits. If the Commonwealth decided not to prefund the retiree health care and life insurance liabilities, the discount rate would be based on the portfolio of the Commonwealth's "general assets" used to pay these benefits. Historical monthly yields for this portion of the portfolio are derived from the rate of return of the Massachusetts Municipal Depository Trust (MMDT) which is an investment pool managed by the Treasurer and Receiver - General not only on behalf of the Commonwealth, but various other governments. The rate of return calculated on a monthly basis from the inception of MMDT in September of 1978 to the present suggests a 4.0% to 5.0% discount rate. Conversely, if the Commonwealth prefunded the full obligation, we recommended using the same rate as used for valuing the Commonwealth's pension liabilities, which is 7.50%.

The Commonwealth has established a retiree benefits trust fund. In developing the 2009 budget, the Commonwealth funded OPEB initially with a transfer from the General Fund of \$372 million, which was subsequently reduced to \$352 million by legislative action reflecting actual cost of benefits for 2009. In fiscal 2008, the Commonwealth funded transfers from the General Fund including federally approved cost recovery on fringe benefits and a supplemental budget totaling approximately \$355 million. Furthermore, the corpus of unspent master settlement agreement proceeds were also transferred amounting to approximately \$329 million. The current asset value as of January 1, 2016, after adjusting for payments and investment return, is \$760.4 million.

Based on its initial expected funding policy over a nine (9) year span, the Commonwealth originally assumed to fund approximately 80% of the ARC. Therefore, it was the Commonwealth's view that a percentage of ARC approach be used to determine the discount rate assumption. While legislation was recently enacted by the Commonwealth to prefund this liability using an increasing share of tobacco master settlement revenues starting in FY 2013 (approximately \$25 million contributed to funding OPEB, projected to increase to approximately \$250 million by FY 2022), this funding plan is still in its infancy and the Commonwealth has decided on a 4.50% discount rate for Fiscal Year Ending June 30, 2016 representing the unfunded discount rate assumption.



## Executive Summary (continued)

The trend assumption is used to project the growth of the expected claims over the lifetime of the health care recipients. The GASB statement does not require a particular source for information to determine health care trends, but it does recommend selecting a source that is “publicly available, objective and unbiased.”

Aon Hewitt developed the trend assumption utilizing the short-term rates expected on the Commonwealth plan along with information in published papers from other industry experts (actuaries, health economists, etc.). This amount initially is at 9.0% and decreases to a 5.0% long-term trend rate for all health care benefits after eight years. The health care cost trend assumption was revised for purposes of the January 1, 2016 valuation to be more representative of Aon Hewitt’s long-term expectations for the increases in health benefits.

The GIC began offering an Employee Group Waiver Plan (or EGWP, Medicare prescription drug coverage for OPEB plan participants) for most of their members effective January 1, 2016. The use of the EGWP approach lowered the actuarial present value of future plan benefits.

### Health Care Reform

Certain provisions of health care legislation that are effective in future years have the potential to impact the GASB 45 liabilities. As a result of the Affordable Care Act legislation, beginning in 2020 there will be a 40% excise tax on per capita medical benefit costs that exceed certain thresholds. We estimate that the excise tax results in a 1.24% and 3.46% increase to the Commonwealth of Massachusetts’s Actuarial Accrued Liability and Normal Cost, respectively, associated with medical and prescription drug coverage as of January 1, 2016. This assumption has been revised based on recent claims experience and results in an actuarial gain when compared to the prior valuation report. Further detail of the excise tax calculation is included in the Methods and Assumptions section of this report.

The balance of this report provides greater detail for the above results.

## Actuarial Certification

This report presents the results of the Actuarial Valuation for the Commonwealth of Massachusetts' Postemployment Benefits Other Than Pensions (the Plan) as of January 1, 2016 for development of accounting and financial reporting information under Statement No. 45 of the Governmental Accounting Standards Board.

This report has been prepared using generally accepted actuarial practices and methods. The actuarial assumptions (other than those strictly applicable to valuing the Plan, or as otherwise explicitly specified) used in the calculations are consistent with those used by the Commonwealth's Actuary for the pension valuation for the State Retirement System. We have discussed Plan-specific assumptions with the Commonwealth and believe them to be reasonable.

Aon Hewitt did not audit the employee data and financial information used in this valuation. On the basis of our review of this data, we believe that the information is sufficiently complete and reliable, and that it is appropriate for the purposes intended.

Actuarial computations under GASB 45 are for purposes of fulfilling governmental accounting requirements. The calculations reported herein have been made on a basis consistent with our understanding of the accounting standard. Determinations for purposes other than meeting governmental financial accounting requirements may be different from these results. Accordingly, additional determinations may be needed for other purposes, such as judging benefit security at termination.

This report is intended for the sole use of the Commonwealth. It is intended only to supply information for the Commonwealth to comply with the stated purposes of the report and may not be appropriate for other purposes. Reliance on information contained in this report by anyone for other than the intended purposes, puts the relying entity at risk of being misled because of confusion or failure to understand applicable assumptions, methodologies, or limitations of the report's conclusions. Accordingly, no person or entity, including the Commonwealth should base any representations or warranties in any business agreement on any statements or conclusions contained in this report without the written consent of Aon Hewitt.

The actuaries whose signatures appear below are Members of the American Academy of Actuaries and together meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. They are available to answer any questions with regard to the matters enumerated in this report.

We further certify that this report is in compliance with Actuarial Standard of Practice No. 41, "Actuarial Communications."

Aon Hewitt's relationship with the Plan and the Commonwealth is strictly professional. There are no aspects of the relationship that may impair or appear to impair the objectivity of our work.



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Thomas G. Vicente, FSA, MAAA



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Elizabeth A. Hanson, FSA, MAAA

## Principal Valuation Results

The following highlights the Commonwealth's recognition of its GASB 45 obligations:

- The January 1, 2016 assets are \$760.4 million.
- The FYE June 30, 2016 Annual Required Contribution (ARC) is \$1,417.8 million.
- The FYE June 30, 2016 Annual OPEB Cost (AOC) is \$1,474.8 million.
- Expected Fiscal Year Ending June 30, 2016 benefit payments are \$536.6 million.

The following table shows results by active, inactive and retired employee groups as compared to what was reported as of January 1, 2015:

GASB Results (\$ millions)	January 1, 2016			January 1, 2015
	(1) Health	(2) Life Insurance	Total = (1) + (2)	Total
<b>Present Value of Projected Benefits</b>				
Active	\$14,956.5	\$68.8	\$15,025.3	\$15,075.1
Inactive <sup>1</sup>	\$660.7	\$2.7	\$663.4	\$584.7
Retirees	\$8,060.6	\$139.4	\$8,200.0	\$7,504.3
<b>Total</b>	<b>\$23,677.8</b>	<b>\$210.9</b>	<b>\$23,888.7</b>	<b>\$23,164.1</b>
<b>Actuarial Accrued Liability</b>				
Active	\$8,171.4	\$48.1	\$8,219.5	\$8,413.8
Inactive <sup>1</sup>	\$660.7	\$2.7	\$663.4	\$584.7
Retirees	\$8,060.6	\$139.4	\$8,200.0	\$7,504.3
<b>Total</b>	<b>\$16,892.7</b>	<b>\$190.2</b>	<b>\$17,082.9</b>	<b>\$16,502.8</b>
<b>Assets</b>	\$751.9	\$8.5	\$760.4	\$610.0
<b>Unfunded Actuarial Accrued Liability</b>	\$16,140.8	\$181.7	\$16,322.5	\$15,892.8
<b>Normal Cost at beginning of year</b>	\$629.7	\$2.6	\$632.3	\$622.6

<sup>1</sup> Inactives are certain former employees with at least the minimum required years of creditable service who have left contributions in the state retirement system.

2015 and 2016 Figures are based on a 4.50% discount rate.

## Trust Information

An OPEB Trust was established effective June 30, 2008 by an Appropriations bill. Trust assets for former MTA employees were merged with all the other SRBTF assets in February 2015. The transfer is included as a contribution below. The activity of this trust from January 1, 2015 through January 1, 2016 is as follows:

<b>Market Value of Assets</b>	
<b>January 1, 2015 (\$ millions)</b>	<b>\$610.0</b>
(1) Contributions	\$148.8
(2) Investment Change	
(a) Gross Investment Income	\$18.4
(b) Less Management Fees	<u>(\$3.9)</u>
(c) Net Investment Income = (2a) + (2b)	\$14.5
(d) Net Unrealized Gains / Losses	(\$37.2)
(e) Net Realized Gains / Losses	<u>\$25.3</u>
(f) Total = (2c) + (2d) + (2e)	\$2.6
(3) Disbursements	
(a) Benefit Payments	(\$1.0)
(4) Net Change = (1) + (2f) + (3a)	\$150.4
<b>January 1, 2016 (\$ millions)</b>	<b>\$760.4</b>

## Accounting Information

The following shows the Annual Required Contribution (ARC), Annual OPEB Cost (AOC), and projected June 30, 2016 Net OPEB Obligation (NOO).

### Annual Required Contribution (ARC)

The Standard sets the method for determining the Commonwealth's postemployment benefits accrual, the Annual Required Contribution (ARC), to include both the value of benefits earned during the year (Normal Cost) and an amortization of the Unfunded Actuarial Accrued Liability. Accordingly, the following table shows the Commonwealth's Fiscal Year End June 30, 2016 Annual Required Contribution (ARC) based on a closed 30-year amortization of the Unfunded Actuarial Accrued Liability as an increasing 4.5% annual amortization compared to what was reported for Fiscal Year End June 30, 2015.

<b>Fiscal Year Ending June 30,</b>	<b>2016 (\$ millions)</b>	<b>2015 (\$ millions)</b>
Normal Cost at End of Year	\$660.7	\$650.6
Unfunded Actuarial Accrued Liability Amortization	<u>\$757.1</u>	<u>\$710.3</u>
Annual Required Contribution (ARC)	\$1,417.8	\$1,360.9

## Accounting Information (continued)

### Schedule of Amortization Bases

For each year the Annual Required Contribution (ARC) is calculated, a new amortization base is established. The sum of all amortization bases is shown on the prior page as the Unfunded Actuarial Accrued Liability Amortization. The chart below illustrates the development of the total amortization calculation, when each base was established, the original amount of the base, and the payment associated with each for the current fiscal year.

Original Amount (\$ millions)	Year Established (\$ millions)	Years Left	Unamortized Amount (\$ millions)	BOY Annual Payment (\$ millions)
\$9,812.2	1/1/2008	22	\$10,317.3	\$469.0
\$5,037.9	1/1/2009	23	\$5,256.1	\$228.5
(\$315.9)	1/1/2010	24	(\$329.1)	(\$13.7)
\$1,241.7	1/1/2011	25	\$1,289.5	\$51.6
(\$32.3)	1/1/2012	26	(\$33.4)	(\$1.3)
(\$1,011.7)	1/1/2013	27	(\$1,039.0)	(\$38.5)
(\$273.5)	1/1/2014	28	(\$278.7)	(\$10.0)
\$707.8	1/1/2015	29	\$715.0	\$24.7
\$424.8	1/1/2016	30	\$424.8	\$14.2
<b>Total</b>			<b>\$16,322.5</b>	<b>\$724.5</b>

Calculation of 2016 Amortization Base	
Prior Contribution Deficiency	\$773.2
Prior AOC Adjustment	(\$49.1)
Asset (Gain) / Loss	(\$16.3)
Demographic (Gain) / Loss	\$138.8
Per Capita (Gain) / Loss	(\$2,713.2)
Trend & Excise (Gain) / Loss	\$2,288.5
MTA Sick Leave (Gain) / Loss	\$1.4
Expected vs. Actual Experience	
- Benefit Payments & Contributions	\$1.5
<b>Total</b>	<b>\$424.8</b>

## Accounting Information (continued)

### Determination of Actuarial (Gain) / Loss

The following chart illustrates the development of the Actuarial Liability from January 1, 2015 through January 1, 2016.

		<b>Total (\$Millions)</b>
(1)	Liability at 1/1/2015	\$16,502.8
(2a)	Service Cost	\$650.6
(2b)	Interest Cost	\$742.6
(2c)	Expected Benefit Payments	<u>(\$528.6)</u>
(2d)	Total Increase	\$864.6
(3)	Expected Liability at 12/31/2015: (1) + (2d)	\$17,367.4
(4a)	Demographic (Gain) / Loss	\$138.8
(4b)	Per Capita (Gain) / Loss	(\$2,713.2)
(4c)	Trend & Excise (Gain) / Loss	\$2,288.5
(4d)	MTA Sick Leave (Gain) / Loss	<u>\$1.4</u>
(4e)	Total (Gain) / Loss	(\$284.5)
(5)	Actual Liability at 1/1/2016: (3) + (4e)	<b>\$17,082.9</b>

## Accounting Information (continued)

### Summary of Total Annual OPEB Cost (AOC)

The initial Net OPEB Obligation at July 1, 2007 was \$0. Therefore, in Fiscal Year Ending June 30, 2008, or the first year of implementation of GASB 45, there is no adjustment to the Annual Required Contribution (ARC). As the years go forth, any cumulative unpaid ARC will result in an adjustment to the ARC.

Fiscal Year Ending June 30,	2016 (\$ millions)	2015 (\$ millions)
Annual Required Contribution (ARC)	\$1,417.8	\$1,360.9
Adjustment to Annual Required Contribution		
- Interest on Net OPEB Obligation (NOO)	\$252.3	\$217.4
- Amortization of Net OPEB Obligation (NOO)	(\$195.3)	(\$168.3)
<b>Total Annual OPEB Cost (AOC)</b>	<b>\$1,474.8</b>	<b>\$1,410.0</b>

Annual OPEB Cost Summary (After adoption, a 3-year display will be shown):

Fiscal Year Ending	Annual OPEB Cost (\$ millions)	Percentage of Annual OPEB Cost Contributed *	Net OPEB Obligation (\$ millions)
6/30/2014	\$1,292.7	45.5%	\$4,832.4
6/30/2015	\$1,410.0	47.0%	\$5,605.6
6/30/2016	\$1,474.8	45.2%	\$6,466.5

\* Based on expected benefit payments & contributions for the applicable fiscal year end. Contributions include both tobacco settlement revenues and capital gains tax revenues.



## Accounting Information (continued)

### Projected June 30, 2016 Net OPEB Obligation (NOO)

Based on the Annual OPEB Cost developed above, the following is the projected June 30, 2016 Net OPEB Obligation (NOO):

	Total (\$ millions)
June 30, 2014 Net OPEB Obligation (NOO)	\$4,832.4
<i>Plus: FYE 2015 Annual OPEB Cost (AOC)</i>	\$1,410.0
<i>Less: FYE 2015 Contributions *</i>	\$636.8
<b>Equals: Actual June 30, 2015 Net OPEB Obligation (NOO)</b>	<b>\$5,605.6</b>
<i>Plus: FYE 2016 Annual OPEB Cost (AOC)</i>	\$1,474.8
<i>Less: Schedule of contributions from the employer and other contributing entities *</i>	\$613.9
<b>Equals: Expected June 30, 2016 Net OPEB Obligation (NOO)</b>	<b>\$6,466.5</b>

\* Contributions include tobacco settlement revenues, and capital gain tax revenues.

### Required Supplementary Information

Below is the projected schedule of funding progress:

Valuation Date	Actuarial Value of Assets at Valuation Date (\$ millions) (a)	Actuarial Accrued Liability - Projected Unit Credit (\$ millions) (b)	Unfunded Actuarial Accrued Liability (\$ millions) (b) - (a)	Funded Ratio (a) / (b)	Covered Payroll (\$ millions) (c)	Unfunded Actuarial Accrued Liability as a Percentage of Covered Payroll [(b) - (a)] / (c)
1/1/2014	\$511.2	\$15,670.2	\$15,159.0	3%	\$5,344.5	283.6%
1/1/2015	\$610.0	\$16,502.8	\$15,892.8	4%	\$5,591.9	284.2%
1/1/2016	\$760.4	\$17,082.9	\$16,322.5	4%	\$5,792.3	281.8%

## 10-Year Payout Projection

Annual payments expected based on assumptions and contributions detailed in the Methods and Assumptions Section.

### Total Benefit Payments

<b>Fiscal Year Ending</b>	<b>Health (\$ millions)</b>	<b>Life Insurance (\$ millions)</b>	<b>Total (\$ millions)</b>
6/30/2016	\$526.8	\$9.8	\$536.6
6/30/2017	\$577.1	\$9.8	\$586.9
6/30/2018	\$630.5	\$9.8	\$640.3
6/30/2019	\$685.3	\$9.9	\$695.2
6/30/2020	\$740.9	\$10.0	\$750.9
6/30/2021	\$796.7	\$10.0	\$806.7
6/30/2022	\$848.9	\$10.1	\$859.0
6/30/2023	\$900.9	\$10.2	\$911.1
6/30/2024	\$950.8	\$10.3	\$961.1
6/30/2025	\$997.3	\$10.5	\$1,007.8

### Estimated Tobacco Settlement Contributions

<b>Fiscal Year Ending</b>	<b>Tobacco Settlement (\$ millions)</b>
6/30/2016*	\$77.3
6/30/2017	\$76.0
6/30/2018	\$100.0
6/30/2019	\$125.0
6/30/2020	\$150.0
6/30/2021	\$175.0
6/30/2022	\$200.0
6/30/2023	\$225.0
6/30/2024	\$250.0
6/30/2025	\$250.0

\* Includes \$0 in capital gains tax revenues for FYE 2016.

## 10-Year Projection of Annual OPEB Cost (AOC)

Projections assume a closed group population (i.e., no new hires). We also assume that assets grow at a 4.50% annual rate of investment return.

Fiscal Year Ending	ARC (\$ millions)	Adjustment to ARC* (\$ millions)	Total AOC (\$ millions)	Expected Contributions** (\$ millions)	Net OPEB Obligation at FYE (\$ millions)
6/30/2016	\$1,417.8	\$57.0	\$1,474.8	\$613.9	\$6,466.5
6/30/2017	\$1,512.8	\$65.7	\$1,578.5	\$662.9	\$7,382.1
6/30/2018	\$1,613.9	\$75.1	\$1,689.0	\$740.3	\$8,330.8
6/30/2019	\$1,723.2	\$84.7	\$1,807.9	\$820.2	\$9,318.5
6/30/2020	\$1,839.0	\$94.7	\$1,933.7	\$900.9	\$10,351.3
6/30/2021	\$1,961.7	\$105.2	\$2,066.9	\$981.7	\$11,436.5
6/30/2022	\$2,092.0	\$116.3	\$2,208.3	\$1,059.0	\$12,585.8
6/30/2023	\$2,230.6	\$128.0	\$2,358.6	\$1,136.1	\$13,808.3
6/30/2024	\$2,378.3	\$140.4	\$2,518.7	\$1,211.1	\$15,115.9
6/30/2025	\$2,535.7	\$153.7	\$2,689.4	\$1,257.8	\$16,547.5

\* Including interest on Net OPEB Obligation.

\*\* Based on expected benefit payments & contributions for the applicable fiscal year end. Contributions include both tobacco settlement revenue and capital gains tax revenue. Under current law, 30% of tobacco settlement revenue in fiscal year 2016 was dedicated to the State Retiree Benefits Trust Fund (SRBTF), the trust established to fund post-employment benefits. This allocation is scheduled to increase in 10% annual increments until in fiscal year 2022 and thereafter all tobacco settlement revenue will be deposited in the SRBTF. However, this requirement was suspended for fiscal year 2017 in that year's enacted budget which froze the required contribution at 30% or approximately \$76 million. In accordance with this law \$77.3 million was deposited in the SRBTF in fiscal year 2016 and the expected contributions reflect increases each year until the contribution reaches \$250 million in fiscal year 2024. In addition, 5% of fiscal year capital gains tax revenue in excess of \$1 billion (adjusted annually for economic growth) is required by statute to be deposited in the SRBTF. This requirement was suspended by the legislature for fiscal years 2015 and 2016. Due to the volatility of capital gains tax revenue, additional contributions from this source are not assumed in fiscal years after 2016.

## Sensitivity Analysis

### Impact of 1% Change in Health Trend Rates

	4.50% Discount Rate (\$ millions)	Impact of 1% Health Trend Rate	
		Plus 1% trend (\$ millions)	Minus 1% trend (\$ millions)
<b>Funded Status:</b>			
Actuarial Accrued Liability	\$17,082.9	\$20,265.4	\$14,605.9
Assets	<u>\$760.4</u>	<u>\$760.4</u>	<u>\$760.4</u>
Unfunded Actuarial Accrued Liability	\$16,322.5	\$19,505.0	\$13,845.5
<b>Annual Required Contribution (ARC):</b>			
Normal Cost at End of Year	\$660.7	\$865.3	\$513.2
Unfunded Accrued Liability Amortization	<u>\$757.1</u>	<u>\$868.4</u>	<u>\$671.3</u>
Annual Required Contribution (ARC)	\$1,417.8	\$1,733.7	\$1,184.5

## Demographic Information

The following tables summarize active, inactive participant, and retiree demographic information as of January 1, 2016.

	Participants	Spouses	Total	1/1/2015 Total
<b>Actives</b>	71,623	N/A	71,623	73,988
<b>Inactive participants<sup>1</sup></b>	2,664	N/A	2,664	2,479
<b>Retirees</b>	48,978	23,640	72,618	68,149
<b>Survivors</b>	N/A	7,779	7,779	7,571
	<b>123,265</b>	<b>31,419</b>	<b>154,684</b>	<b>152,187</b>

<sup>1</sup> 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	31,963	3,417	79	1,130	36,589
Male	24,451	2,668	1,445	6,470	35,034
<b>Total</b>	<b>56,414</b>	<b>6,085</b>	<b>1,524</b>	<b>7,600</b>	<b>71,623</b>

Actives: Average Age by Job Group					
Sex	1	2	3	4	Total
Female	48.81	43.92	47.54	39.67	48.07
Male	48.86	46.13	47.33	41.68	47.26
<b>Total</b>	<b>48.83</b>	<b>44.89</b>	<b>47.34</b>	<b>41.38</b>	<b>47.67</b>

Actives: Average Service by Job Group					
Sex	1	2	3	4	Total
Female	13.35	13.28	21.28	10.20	13.26
Male	13.38	14.56	20.17	12.84	13.65
<b>Total</b>	<b>13.36</b>	<b>13.84</b>	<b>20.23</b>	<b>12.45</b>	<b>13.45</b>

## Demographic Information (continued)

### Active: Age-Service Scatter

Age	Service							Total
	0: 4	5: 9	10:14	15:19	20:24	25:29	30+	
< 25	604	5	0	0	0	0	0	609
25:29	4,880	684	12	0	0	0	0	5,576
30:34	4,311	2,401	690	8	1	0	0	7,411
35:39	2,712	1,974	1,752	615	10	0	0	7,063
40:44	1,879	1,736	1,650	1,955	475	41	0	7,736
45:49	1,827	1,646	1,787	2,166	1,500	1,002	121	10,049
50:54	1,635	1,524	1,559	1,818	1,302	1,886	1,341	11,065
55:59	1,312	1,294	1,485	1,597	1,074	1,568	2,340	10,670
60:64	768	973	1,072	1,223	799	1,001	1,628	7,464
65:69	201	414	496	486	325	344	679	2,945
70+	19	79	137	169	103	123	405	1,035
<b>Total</b>	<b>20,148</b>	<b>12,730</b>	<b>10,640</b>	<b>10,037</b>	<b>5,589</b>	<b>5,965</b>	<b>6,514</b>	<b>71,623</b>

## Demographic Information (continued)

<b>Inactives and Retirees: Participant Counts</b>			
<b>Sex</b>	<b>Inactives</b>	<b>Retirees</b>	<b>Total</b>
Female	1,531	23,841	25,372
Male	1,133	25,137	26,270
<b>Total</b>	<b>2,664</b>	<b>48,978</b>	<b>51,642</b>

<b>Inactives and Retirees: Participant Average Age</b>			
<b>Sex</b>	<b>Inactives</b>	<b>Retirees</b>	<b>Total</b>
Female	51.79	72.36	71.12
Male	52.04	70.43	69.63
<b>Total</b>	<b>51.90</b>	<b>71.37</b>	<b>70.36</b>

<b>Spouses: Participant Counts</b>			
<b>Sex</b>	<b>Spouses of Retirees</b>	<b>Survivors</b>	<b>Total</b>
Female	8,001	6,917	14,918
Male	15,639	862	16,501
<b>Total</b>	<b>23,640</b>	<b>7,779</b>	<b>31,419</b>

<b>Spouses: Participant Average Age</b>			
<b>Sex</b>	<b>Spouses of Retirees</b>	<b>Survivors</b>	<b>Total</b>
Female	73.78	79.75	76.55
Male	68.13	77.48	68.62
<b>Total</b>	<b>70.04</b>	<b>79.50</b>	<b>72.38</b>

## MTA Information

### Summary of Benefit Obligations

GASB 45 Results for Fiscal Year End June 30,	2016 * (\$ millions)
Present Value of Projected Benefits Earned to Date (Actuarial Accrued Liability) For Former MTA Employees	
Active Liability	\$94.7
Inactive Liability	<u>\$42.8</u>
Total Liability	\$137.5
Present Value of Projected Benefits Earned to Date (Actuarial Accrued Liability) Attributed to Sick Leave	
Active Liability	\$8.6
Inactive Liability	<u>\$3.7</u>
Total Liability	\$12.3
Aggregate Retiree Balance in MTA Sick Leave Bank	\$12.3
* The Fiscal Year End June 30, 2016 Present Value of Benefits was calculated on January 1, 2016 using a 4.50% discount rate.	

## Demographic Information: MTA Participants

The following tables summarize active and retiree demographic information as of January 1, 2016 for former MTA participants with a sick leave balance.

MTA: Participant Count	
Status	Participants
Actives	1,124
Retirees	228
<b>Total</b>	<b>1352</b>

MTA: Average Age	
Status	Age
Actives	55.54
Retirees	71.42
<b>Total</b>	<b>58.22</b>



## 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 Hewitt 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.

## Summary of Principal Plan Provisions (continued)

### Summary of Plan Designs – Medical (Medicare)

	UniCare State Indemnity Plan Medicare Extension	Fallon Senior Plan	Harvard Pilgrim Medicare Enhance	Health New England MedPlus	Tufts Health Plan Medicare Complement	Tufts Health Plan Medicare Preferred
Deductible	none	none	none	none	none	none
Out-Of-Pocket Max	none	none	none	none	none	none
<b>Physicians</b>						
Office Visit	\$35 ded/yr	\$10 copay	\$10 copay	\$10 copay	\$10 copay	\$10 copay
Preventive Care	100%	100%	100%	100%	100%	100%
Hospitalization	\$50 ded/qtr	100%	100%	100%	100%	100%
Surgery	100%	100%	100%	100%	100%	100%
Diagnostic / X-Ray	100%	100%	100%	100%	100%	100%
ER	\$25 copay	\$50 copay	\$50 copay	\$50 copay	\$50 copay	\$50 copay
Outpatient Mental Health	Visit 1-4:\$0; Visit 5+:\$10	\$10 copay	\$10 copay	\$10 copay	\$10 copay	\$10 copay
Outpatient Substance Abuse	Visit 1-4:\$0; Visit 5+:\$10	\$10 copay	\$10 copay	\$10 copay	\$10 copay	\$10 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)	\$300/\$900	\$300/\$900	\$300/\$900	\$300/\$900
Out-Of-Pocket Max	\$5,000/\$10,000	\$5,000/\$10,000	\$5,000/\$10,000	\$5,000/\$10,000
<b>Physicians</b>				
Primary Care Office Visit (Tier 1/2/3)	\$20 copay	\$20 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	\$20 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)	\$300/\$900	\$300/\$900	\$300/\$900	\$300/\$900
Out-Of-Pocket Max	\$5,000/\$10,000	\$5,000/\$10,000	\$5,000/\$10,000	\$5,000/\$10,000
<b>Physicians</b>				
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/\$1,500	\$275/\$1,500	\$275/\$1,500	\$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)	\$300/\$900	\$300/\$900	\$300/\$900
Out-Of-Pocket Max	\$5,000/\$10,000	\$5,000/\$10,000	\$5,000/\$10,000
<b>Physicians</b>			
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	
<b>Generic</b>	
Retail	\$ 10
Mail	\$ 25
<b>Formulary</b>	
Retail	\$ 30
Mail	\$ 70
<b>Non-Formulary</b>	
Retail	\$65
Mail	\$165

#### 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

## Methods and Assumptions

<b>Actuarial Method</b>	Projected Unit Credit Cost Method	
<b>Normal Cost</b>	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.	
<b>Accumulated Postretirement Benefit Obligation</b>	The Actuarial Present Value of Benefits allocated to all periods prior to the valuation year.	
<b>Discount Rate</b>	As of January 1, 2016	4.50%
	As of January 1, 2015	4.50%

### Medical Trend

Calendar Year	Annual Rate of Increase		
	Medical/Rx	EGWP	Admin
2016	9.0%	5%	5%
2017	8.5%	5%	5%
2018	8.0%	5%	5%
2019	7.5%	5%	5%
2020	7.0%	5%	5%
2021	6.5%	5%	5%
2022	6.0%	5%	5%
2023	5.5%	5%	5%
2024+	5.0%	5%	5%

## Methods and Assumptions (continued)

### Morbidity/Aging

#### Medical and Prescription Drug

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 - 59	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%

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.

## Methods and Assumptions (continued)

### **Excise Tax (“Cadillac Tax”) on High Cost Plans**

For purposes of estimating the excise tax, per capita plan costs are developed on a two-tier basis (employee only and employee plus family) and compared to the thresholds stipulated in the Patient Protection and Affordable Care Act (PPACA).

The 2018 cost thresholds are assumed to be \$10,200 for individual and \$27,500 for family coverage.

After 2018, the cost thresholds are indexed by CPI (CPI +1% in 2019 only). CPI is assumed to be 3% in all future years.

On December 18, 2015 the President signed the Consolidated Appropriations Act, 2016 into law. The new law delays the implementation of the excise tax for two years (i.e., from 2018 to 2020) and allows the excise tax to be deductible to the taxpayer.

### **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)

Cost assumptions were developed from actual GIC data for retirees. Data for the entirety of the GIC retired population was utilized, analyzed, and projected forward to Calendar Year 2016. As detailed in Appendix B, the data was aggregated into three categories of like plans (called blends): The Indemnity Plans (including the GIC rider), POS and PPO plans (for non-Medicare retirees), and HMOs. Since the EGWP plan was put into place effective 1/1/2016 and no actual data were available, the per capita reimbursements were estimated based on the claims and enrollment for the period January 1, 2014 – December 31, 2015 from another group adjusted for Commonwealth of Massachusetts' demographics and trended to the valuation period.

### Per Member Claim Costs for Calendar Year 2016

Indemnity / Blend 1									
Age	Total Cost of Health Care Before Subsidies and Retiree Cost Sharing	Medicare Adjustment	Total Cost of Health Care Before Retiree Cost Sharing	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	\$4,331	\$0	\$4,331	(\$479)	(\$640)	(\$644)	(\$861)	(\$810)	(\$1,083)
30	\$4,976	\$0	\$4,976	(\$564)	(\$753)	(\$758)	(\$1,013)	(\$952)	(\$1,274)
35	\$5,735	\$0	\$5,735	(\$663)	(\$885)	(\$892)	(\$1,192)	(\$1,120)	(\$1,498)
40	\$6,628	\$0	\$6,628	(\$780)	(\$1,041)	(\$1,049)	(\$1,402)	(\$1,318)	(\$1,762)
45	\$7,679	\$0	\$7,679	(\$918)	(\$1,225)	(\$1,234)	(\$1,649)	(\$1,550)	(\$2,073)
50	\$9,116	\$0	\$9,116	(\$1,106)	(\$1,476)	(\$1,487)	(\$1,987)	(\$1,868)	(\$2,498)
55	\$11,095	\$0	\$11,095	(\$1,365)	(\$1,822)	(\$1,835)	(\$2,453)	(\$2,305)	(\$3,083)
60	\$13,600	\$0	\$13,600	(\$1,693)	(\$2,260)	(\$2,276)	(\$3,042)	(\$2,859)	(\$3,824)
65	\$16,069	(\$12,023)	\$4,046	(\$427)	(\$427)	(\$593)	(\$593)	(\$758)	(\$758)
70	\$18,638	(\$14,005)	\$4,633	(\$498)	(\$498)	(\$691)	(\$691)	(\$884)	(\$884)
75	\$20,626	(\$15,539)	\$5,087	(\$552)	(\$552)	(\$766)	(\$766)	(\$980)	(\$980)
80	\$22,076	(\$16,658)	\$5,418	(\$592)	(\$592)	(\$822)	(\$822)	(\$1,051)	(\$1,051)
85	\$23,517	(\$17,769)	\$5,748	(\$632)	(\$632)	(\$876)	(\$876)	(\$1,121)	(\$1,121)
90	\$24,215	(\$18,309)	\$5,906	(\$651)	(\$651)	(\$903)	(\$903)	(\$1,155)	(\$1,155)

## Methods and Assumptions (continued)

### Per Member Claim Costs for Calendar Year 2016

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	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	\$3,280	\$0	\$3,280	(\$243)	(\$348)	(\$365)	(\$522)	(\$487)	(\$696)
30	\$3,774	\$0	\$3,774	(\$286)	(\$409)	(\$429)	(\$614)	(\$573)	(\$819)
35	\$4,355	\$0	\$4,355	(\$337)	(\$482)	(\$505)	(\$722)	(\$674)	(\$963)
40	\$5,039	\$0	\$5,039	(\$396)	(\$566)	(\$594)	(\$850)	(\$792)	(\$1,133)
45	\$5,843	\$0	\$5,843	(\$466)	(\$666)	(\$699)	(\$999)	(\$932)	(\$1,332)
50	\$6,942	\$0	\$6,942	(\$561)	(\$803)	(\$842)	(\$1,204)	(\$1,123)	(\$1,606)
55	\$8,457	\$0	\$8,457	(\$693)	(\$991)	(\$1,040)	(\$1,486)	(\$1,386)	(\$1,982)
60	\$10,373	\$0	\$10,373	(\$860)	(\$1,229)	(\$1,289)	(\$1,843)	(\$1,719)	(\$2,458)
65	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
70	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
75	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
80	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
85	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
90	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

## Methods and Assumptions (continued)

### Per Member Claim Costs for Calendar Year 2016

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	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	\$3,325	\$0	\$3,325	(\$194)	(\$287)	(\$291)	(\$430)	(\$389)	(\$573)
30	\$3,832	\$0	\$3,832	(\$229)	(\$337)	(\$343)	(\$506)	(\$457)	(\$674)
35	\$4,430	\$0	\$4,430	(\$269)	(\$397)	(\$403)	(\$595)	(\$538)	(\$793)
40	\$5,132	\$0	\$5,132	(\$316)	(\$467)	(\$474)	(\$700)	(\$632)	(\$933)
45	\$5,959	\$0	\$5,959	(\$372)	(\$549)	(\$558)	(\$823)	(\$744)	(\$1,098)
50	\$7,090	\$0	\$7,090	(\$448)	(\$661)	(\$672)	(\$992)	(\$896)	(\$1,323)
55	\$8,647	\$0	\$8,647	(\$553)	(\$816)	(\$830)	(\$1,224)	(\$1,106)	(\$1,633)
60	\$10,618	\$0	\$10,618	(\$686)	(\$1,012)	(\$1,029)	(\$1,519)	(\$1,372)	(\$2,025)
65	\$12,703	(\$9,175)	\$3,528	(\$334)	(\$334)	(\$501)	(\$501)	(\$668)	(\$668)
70	\$14,725	(\$10,688)	\$4,037	(\$389)	(\$389)	(\$584)	(\$584)	(\$779)	(\$779)
75	\$16,289	(\$11,859)	\$4,430	(\$432)	(\$432)	(\$648)	(\$648)	(\$864)	(\$864)
80	\$17,431	(\$12,712)	\$4,719	(\$463)	(\$463)	(\$695)	(\$695)	(\$926)	(\$926)
85	\$18,564	(\$13,560)	\$5,004	(\$494)	(\$494)	(\$741)	(\$741)	(\$988)	(\$988)
90	\$19,113	(\$13,972)	\$5,141	(\$509)	(\$509)	(\$763)	(\$763)	(\$1,018)	(\$1,018)



## 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)

<b>Mortality</b>	<p>Pre-retirement mortality reflects RP-2000 Employees table projected generationally with Scale BB and a base year of 2009 (gender distinct).</p> <p>Post-retirement mortality reflects RP-2000 Healthy Annuitant table projected generationally with Scale BB and a base year of 2009 (gender distinct).</p> <p>For disabled members, the mortality rate is assumed to be in accordance with the RP-2000 Healthy Annuitant table projected generationally with Scale BB and a base year of 2015 (gender distinct).</p>
<b>Retirement Age</b>	Retirement rates are shown on the following pages.
<b>Turnover</b>	Turnover rates are shown on the following pages.
<b>Disability</b>	Disability rates are shown on the following pages.
<b>Valuation Methodology and Terminology</b>	We have used GASB accounting methodology to determine the postretirement medical benefit obligations.
<b>Amortization Period</b>	The amortization cost for the initial Unfunded Actuarial Accrued Liability is a level percentage of payroll for a closed period of 30 years. This has been calculated assuming the amortization payment increases at a rate of 4.5% per year.
<b>Salary Scale</b>	Assumed at a rate of 4.5% per year.
<b>Changes Since Prior Valuation</b>	<ul style="list-style-type: none"><li>▪ Excise tax impact was updated</li><li>▪ Trend tables were updated</li></ul>

## Methods and Assumptions (continued)

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

	<b>RATES OF RETIREMENT</b>				
	<b>(Number Retiring per 1,000 Members)</b>				
	<b>AGE</b>				
	<b>50</b>	<b>55</b>	<b>60</b>	<b>65</b>	<b>70</b>
<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:

<b>RATES OF WITHDRAWAL</b> <b>(Number of Withdrawals Per 1,000 Members)</b>											
<b>YEARS OF SERVICE</b>											
<b>Age</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10+</b>
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:

<b>RATES OF WITHDRAWAL</b> (Number of Withdrawals per 1,000 Members)					
<b>All Ages</b>	<b>YEARS OF SERVICE</b>				
	<b>1</b>	<b>5</b>	<b>10</b>	<b>15</b>	<b>20+</b>
<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:

<b>RATES OF DISABILITY</b> <b>(Number becoming disabled per 10,000 Members)</b>							
	<b>AGE</b>						
	<b>25</b>	<b>30</b>	<b>35</b>	<b>40</b>	<b>45</b>	<b>50</b>	<b>55</b>
<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

## Glossary

### Actuarial accrued liability

That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of OPEB plan benefits and expenses which is not provided for by future Normal Costs.

### Actuarial assumptions

Assumptions as to the occurrence of future events affecting costs, such as: mortality, withdrawal, disablement and retirement; changes in compensation and Government provided benefits; rates of investment earnings and asset appreciation or depreciation; procedures used to determine the Actuarial Value of Assets; and other relevant items.

### Actuarial cost method

A procedure for determining the Actuarial Present Value of OPEB plan benefits and expenses and for developing an actuarially equivalent allocation of such value to time periods, usually in the form of a Normal Cost and an Actuarial Accrued Liability.

### Actuarial experience gain or loss

A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates, as determined in accordance with a particular Actuarial Cost Method.

### Actuarial present value of total projected benefits

Total projected benefits include all benefits estimated to be payable to plan members (retirees and beneficiaries, terminated employees entitled to benefits but not yet receiving them, and current active members) as a result of their service through the valuation date and their expected future service. The actuarial present value of total projected benefits as of the valuation date is the present value of the cost to finance benefits payable in the future, discounted to reflect the expected effects of the time value (present value) of money and the probabilities of payment. Expressed another way, it is the amount that would have to be invested on the valuation date so that the amount invested plus investment earnings will provide sufficient assets to pay total projected benefits when due.

### Actuarial valuation

The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for an OPEB plan.

### Actuarial valuation date

The date as of which an actuarial valuation is performed.

### Actuarial value of assets

The value of cash, investments and other property belonging to a plan, as used by the actuary for the purpose of an Actuarial Valuation.

## Glossary (continued)

### Amortization (of unfunded actuarial accrued liability)

The portion of the OPEB plan contribution which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability or the Unfunded Frozen Actuarial Accrued Liability.

### Annual OPEB cost

An accrual-basis measure of the periodic cost of an employer's participation in a defined benefit OPEB plan.

### Annual required contributions of the employer (ARC)

The employer's periodic required contributions to a defined benefit OPEB plan.

### Covered Group

Plan members included in an actuarial valuation.

### Defined benefit OPEB plan

An OPEB plan having terms that specify the benefits to be provided at or after separation from employment. The benefits may be specified in dollars (for example, a flat dollar payment or an amount based on one or more factors such as age, years of service, and compensation), or as a type or level of coverage (for example, prescription drugs or a percentage of health care insurance premiums).

### Employer's contributions

Contributions made in relation to the annual required contributions of the employer (ARC). An employer has made a contribution in relation to the ARC if the employer has (a) made payments of benefits directly to or on behalf of a retiree or beneficiary, (b) made premium payments to an insurer, or (c) irrevocably transferred assets to a trust, or equivalent arrangement, in which plan assets are dedicated to providing benefits to retirees and their beneficiaries in accordance with the terms of the plan and are legally protected from creditors of the employer(s) of plan administrator. Employer's contributions generally *do not equate* to benefits paid.

### Funded ratio

The actuarial value of assets expressed as a percentage of the actuarial accrued liability.

### Funding excess

The excess of the actuarial value of assets over the actuarial accrued liability.

### Funding policy

The program for the amounts and timing of contributions to be made by plan members, employer(s), and other contributing entities (for example, state government contributions to a local government plan) to provide the benefits specified by an OPEB plan.



## Glossary (continued)

### Health care cost trend rate

The rate of change in per capita health claims costs over time as a result of factors such as medical inflation, utilization of health care services, plan design, and technological developments.

### Implicit Rate Subsidy

The differential between utilizing a blend of active and non-Medicare retiree experience for cost of benefits, and utilizing solely the expected retiree experience. Blending a lower cost active cohort with retirees' results in an implicit rate subsidy for the retirees of the entire group

### Inactives

Certain former employees with a minimum amount of years of creditable service who have left contributions in the state retirement system.

### Investment return assumption (discount rate)

The rate used to adjust a series of future payments to reflect the time value of money.

### Level percentage of projected payroll amortization method

Amortization payments are calculated so that they are a constant percentage of the projected payroll of active plan members over a given number of years. The dollar amount of the payments generally will increase over time as payroll increases due to inflation; in dollars adjusted for inflation, the payments can be expected to remain level.

### Market-related value of plan assets

A term used with reference to the actuarial value of assets. A market related value may be fair value, market value (or estimated market value), or a calculated value that recognizes changes in fair or market value over a period of, for example, three to five years.

### Net OPEB obligation

The cumulative difference since the effective date of this Statement between annual OPEB cost and the employer's contributions to the plan, including the OPEB liability (asset) at transition, if any, and excluding (a) short-term differences and (b) unpaid contributions that have been converted to OPEB-related debt.

### Normal cost

That portion of the Actuarial Present Value of OPEB plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method. In GASB 45, the term refers to employer normal cost.

### OPEB assets

The amount recognized by an employer for contributions to an OPEB plan greater than OPEB expense.

### OPEB expenditures

The amount recognized by an employer in each accounting period for contributions to an OPEB plan on the modified accrual basis of accounting.

## Glossary (continued)

### OPEB expense

The amount recognized by an employer in each accounting period for contributions to an OPEB plan on the accrual basis of accounting.

### OPEB liabilities

The amount recognized by an employer for contributions to an OPEB plan less than OPEB expense/expenditures.

### Other postemployment benefits

Postemployment benefits other than pension benefits. Other postemployment benefits (OPEB) include postemployment health care benefits, regardless of the type of plan that provides them, and all postemployment benefits provided separately from a pension plan, excluding benefits defined as termination offers and benefits.

### Pay-as-you-go

A method of financing an OPEB plan under which the contributions to the plan are generally made at about the same time and in about the same amount as benefit payments and expenses becoming due.

### Plan assets

Resources, usually in the form of stocks, bonds, and other classes of investments, that have been segregated and restricted in a trust, or equivalent arrangement, in which (a) employer contributions to the plan are irrevocable, (b) assets are dedicated to providing benefits to retirees and their beneficiaries, (c) assets are legally protected from creditors of the employers or plan administrator, for the payment of benefits in accordance with the terms of the plan.

### Plan members

The individuals covered by the terms of an OPEB plan. The plan membership generally includes employees in active service, terminated employees who have accumulated benefits but are not yet receiving them, and retired employees and beneficiaries currently receiving benefits.

### Postemployment

The period between termination of employment and retirement as well as the period after retirement.

### Postemployment health care benefits

Medical, dental, vision, and other health-related benefits provided to terminated or retired employees and their dependents and beneficiaries.

## Glossary (continued)

### Postretirement benefit increase

An increase in the benefits of retirees or beneficiaries granted to compensate for the effects of inflation (cost-of-living adjustment) or for other reasons. Ad hoc increases may be granted periodically by a decision of the board of trustees, legislature, or other authoritative body; both the decision to grant an increase and the amount of the increase are discretionary. Automatic increases are periodic increases specified in the terms of the plan; they are nondiscretionary except to the extent that the plan terms can be changed.

### Projected unit credit actuarial cost method

A method under which the benefits (projected or unprojected) of each individual included in an Actuarial Valuation are allocated by a consistent formula to valuation years. The Actuarial Present Value of benefits allocated to a valuation year is called the Normal Cost. The Actuarial Present Value of benefits allocated to all periods prior to a valuation year is called the Actuarial Accrued Liability.

Under this method, the Actuarial Gains (losses), as they occur, generally reduce (increase) the Unfunded Actuarial Accrued Liability.

Under this method, benefits are projected to all future points in time under the terms of the Plan and actuarial assumptions (for example, health trends). Retirees are considered to be fully attributed in their benefits. For actives, attribution is to expected retirement age; thus, benefits at each future point in time are allocated to past service based on a prorate of service-to-date over projected service.

### Required supplementary information (RSI)

Schedules, statistical data, and other information that are an essential part of financial reporting and should be presented with, but are not part of, the basic financial statements of a governmental entity.

### Single-employer plan

A plan that covers the current and former employees, including beneficiaries, of only one employer.

### Sponsor

The entity that established the plan. The sponsor generally is the employer or one of the employers that participate in the plan to provide benefits for their employees. Sometimes, however, the sponsor establishes the plan for the employees of other entities but does not include its own employees and, therefore, is not a participating employer of that plan. An example is a state government that establishes a plan for the employees of local governments within the state, but the employees of the state government are covered by a different plan.

### Substantive plan

The terms of an OPEB plan as understood by the employer(s) and plan members.

### Transition year

The fiscal year in which this Statement is first implemented.

## Glossary (continued)

### Unfunded actuarial accrued liability (unfunded actuarial liability)

The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets.

## 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 2016

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	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	\$3,104	\$0	\$558	\$669	\$4,331	(\$479)	(\$640)	(\$644)	(\$861)	(\$810)	(\$1,083)
30	\$3,651	\$0	\$656	\$669	\$4,976	(\$564)	(\$753)	(\$758)	(\$1,013)	(\$952)	(\$1,274)
35	\$4,294	\$0	\$772	\$669	\$5,735	(\$663)	(\$885)	(\$892)	(\$1,192)	(\$1,120)	(\$1,498)
40	\$5,051	\$0	\$908	\$669	\$6,628	(\$780)	(\$1,041)	(\$1,049)	(\$1,402)	(\$1,318)	(\$1,762)
45	\$5,942	\$0	\$1,068	\$669	\$7,679	(\$918)	(\$1,225)	(\$1,234)	(\$1,649)	(\$1,550)	(\$2,073)
50	\$7,160	\$0	\$1,287	\$669	\$9,116	(\$1,106)	(\$1,476)	(\$1,487)	(\$1,987)	(\$1,868)	(\$2,498)
55	\$8,837	\$0	\$1,589	\$669	\$11,095	(\$1,365)	(\$1,822)	(\$1,835)	(\$2,453)	(\$2,305)	(\$3,083)
60	\$10,960	\$0	\$1,971	\$669	\$13,600	(\$1,693)	(\$2,260)	(\$2,276)	(\$3,042)	(\$2,859)	(\$3,824)
65	\$13,207	(\$12,023)	\$2,375	\$487	\$4,046	(\$427)	(\$427)	(\$593)	(\$593)	(\$758)	(\$758)
70	\$15,385	(\$14,005)	\$2,766	\$487	\$4,633	(\$498)	(\$498)	(\$691)	(\$691)	(\$884)	(\$884)
75	\$17,070	(\$15,539)	\$3,069	\$487	\$5,087	(\$552)	(\$552)	(\$766)	(\$766)	(\$980)	(\$980)
80	\$18,299	(\$16,658)	\$3,290	\$487	\$5,418	(\$592)	(\$592)	(\$822)	(\$822)	(\$1,051)	(\$1,051)
85	\$19,520	(\$17,769)	\$3,510	\$487	\$5,748	(\$632)	(\$632)	(\$876)	(\$876)	(\$1,121)	(\$1,121)
90	\$20,112	(\$18,309)	\$3,616	\$487	\$5,906	(\$651)	(\$651)	(\$903)	(\$903)	(\$1,155)	(\$1,155)

## Appendix B (continued)

### Detailed Breakdown of Per Member Claim Costs for Calendar Year 2016

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	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	\$2,216	\$0	\$586	\$478	\$3,280	(\$243)	(\$348)	(\$365)	(\$522)	(\$487)	(\$696)
30	\$2,607	\$0	\$689	\$478	\$3,774	(\$286)	(\$409)	(\$429)	(\$614)	(\$573)	(\$819)
35	\$3,066	\$0	\$811	\$478	\$4,355	(\$337)	(\$482)	(\$505)	(\$722)	(\$674)	(\$963)
40	\$3,607	\$0	\$954	\$478	\$5,039	(\$396)	(\$566)	(\$594)	(\$850)	(\$792)	(\$1,133)
45	\$4,243	\$0	\$1,122	\$478	\$5,843	(\$466)	(\$666)	(\$699)	(\$999)	(\$932)	(\$1,332)
50	\$5,112	\$0	\$1,352	\$478	\$6,942	(\$561)	(\$803)	(\$842)	(\$1,204)	(\$1,123)	(\$1,606)
55	\$6,310	\$0	\$1,669	\$478	\$8,457	(\$693)	(\$991)	(\$1,040)	(\$1,486)	(\$1,386)	(\$1,982)
60	\$7,826	\$0	\$2,069	\$478	\$10,373	(\$860)	(\$1,229)	(\$1,289)	(\$1,843)	(\$1,719)	(\$2,458)
65	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
70	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
75	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
80	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
85	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
90	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

## Appendix B (continued)

### Detailed Breakdown of Per Member Claim Costs for Calendar Year 2016

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	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	\$2,312	\$0	\$570	\$443	\$3,325	(\$194)	(\$287)	(\$291)	(\$430)	(\$389)	(\$573)
30	\$2,719	\$0	\$670	\$443	\$3,832	(\$229)	(\$337)	(\$343)	(\$506)	(\$457)	(\$674)
35	\$3,199	\$0	\$788	\$443	\$4,430	(\$269)	(\$397)	(\$403)	(\$595)	(\$538)	(\$793)
40	\$3,762	\$0	\$927	\$443	\$5,132	(\$316)	(\$467)	(\$474)	(\$700)	(\$632)	(\$933)
45	\$4,426	\$0	\$1,090	\$443	\$5,959	(\$372)	(\$549)	(\$558)	(\$823)	(\$744)	(\$1,098)
50	\$5,333	\$0	\$1,314	\$443	\$7,090	(\$448)	(\$661)	(\$672)	(\$992)	(\$896)	(\$1,323)
55	\$6,582	\$0	\$1,622	\$443	\$8,647	(\$553)	(\$816)	(\$830)	(\$1,224)	(\$1,106)	(\$1,633)
60	\$8,164	\$0	\$2,011	\$443	\$10,618	(\$686)	(\$1,012)	(\$1,029)	(\$1,519)	(\$1,372)	(\$2,025)
65	\$9,837	(\$9,175)	\$2,423	\$443	\$3,528	(\$334)	(\$334)	(\$501)	(\$501)	(\$668)	(\$668)
70	\$11,459	(\$10,688)	\$2,823	\$443	\$4,037	(\$389)	(\$389)	(\$584)	(\$584)	(\$779)	(\$779)
75	\$12,714	(\$11,859)	\$3,132	\$443	\$4,430	(\$432)	(\$432)	(\$648)	(\$648)	(\$864)	(\$864)
80	\$13,630	(\$12,712)	\$3,358	\$443	\$4,719	(\$463)	(\$463)	(\$695)	(\$695)	(\$926)	(\$926)
85	\$14,539	(\$13,560)	\$3,582	\$443	\$5,004	(\$494)	(\$494)	(\$741)	(\$741)	(\$988)	(\$988)
90	\$14,980	(\$13,972)	\$3,690	\$443	\$5,141	(\$509)	(\$509)	(\$763)	(\$763)	(\$1,018)	(\$1,018)



## About Aon

Aon plc (NYSE:AON) is the leading global provider of risk management, insurance and reinsurance brokerage, and human resources solutions and outsourcing services. Through its more than 66,000 colleagues worldwide, Aon unites to empower results for clients in over 120 countries via innovative and effective risk and people solutions and through industry-leading global resources and technical expertise. Aon has been named repeatedly as the world's best broker, best insurance intermediary, best reinsurance intermediary, best captives manager, and best employee benefits consulting firm by multiple industry sources. Visit [aon.com](http://aon.com) for more information on Aon and [aon.com/manchesterunited](http://aon.com/manchesterunited) to learn about Aon's global partnership with Manchester United.